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DESIGN AND DEVELOPMENT OF SOCIAL NETWORK AGGREGATOR

DIPLOMA THESIS OF

HÉCTOR FADRIQUE DEL CAMPO

STUDENT OF THE UNIVERSITY OF VALLADOLID

SUPERVISOR: PROF. N. AVOURIS

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CERTIFICATION

It is certified that Diploma Thesis with the title:

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Of the student of the University of Valladolid

Name: Héctor

Surname: Fadrique del Campo

Was presented in public at the Department of Electrical and Computer Engineering of the University of Patras, Greece on ……..

The supervisor

N. Avouris

The head of the Electronics and Computers division

E. Housos

ABSTRACT

This thesis presents the development of a Social Network Aggregator, which makes the experience of the users who manage several social nets easier.

The goal of this application is to link in the same environment different social networks such as Facebook, Twitter or LinkedIn. Hence, the user is able to use several services from the same platform, fast and simple.

With the aim of making easier the user´s experience, the aggregator has been divided in 3 main parts: *Easy Social Networks*, which is a simple sample of each social net with the basic functionalities; *Fast Post* that allows the user to post easily in each social network or in all networks at the same time and *Normal Social Networks*, that open the real social nets.

Finally, this thesis present some possible extensions of the implementations as future work. Since this is the "first step" for a social network aggregator, this future works is about add new functionalities that interacts with the APIs so that the user has not need of going to the real social networks anymore to update, chat, watch the last news and so on.

Key Words: Social Network, API, PHP, HTML, aggregator, Facebook, Twitter, LinkedIn, Easy Social Networks, Fast Post.

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Chapter 1

INTRODUCTION

1.1 Aim of the Thesis

The main goal of this project is to develop a social network aggregator, which means that the user is able to use one or more social networks in which is registered from the same site. The application must offer the basic functionalities such as check the updates (from user and connections), news feed, post, search and so on, since the aim is not to replace the real social nets, but make easier the process of checking and updating several social nets.

One of the important things of this project is the *Fast Post* that offers the possibility of posting something in all the nets the user is registered in once or only select the social net in which the user wants to post.

As with this application the user can post everywhere at the same time, another goal is to be able to check all updates at the same time, this means in the same page. Hence the user can know all the updates from the same Web page, all together.

Abstract of Goals:

- Link all the social networks (Facebook, Twitter, LinkedIn) in the same Web Site
- Easy Facebook
- Easy Twitter
- Easy LinkedIn
- Fast Post
- Fast Updates
- Normal Social Networks

1.2 Motivation

The Internet has a deep impact on work, leisure and knowledge worldwide. Thanks to the Web, millions of people have easy and immediate access to a vast and diverse amount of information online.

In recent years, there has been a boom in the way of sharing information, because of social networks, blogs, e-learning platforms and so on, where the aim is for users to collaborate and

promote the smooth exchange of information. This is what is known as the second generation of the Web, *Web 2.0*.

In this environment in which each user has several profiles in different social networks, it is clear the amount of time they spend for managing it. Therefore, sometimes check all the profiles in the Internet becomes a problem, due to the user has to open the browser, sign in, check the updates and so on, and this action for each social network in which he is registered. Hence, the need to make it simple is clear.

To solve this problem, we developed F.A.D project application *(First Aggregator Developed)*, which allows to link all the social networks in the same Web Site so that the user could use them from the same place, fast and simple.

Many users have accounts on several different social networking sites. In November 2007, Alex Patriquin of Compete.com reported on the member overlap between various online social network services:

Site	**Bebo**	**Facebook**	**Friendster**	**Hi5**	**LinkedIn**	**MySpace**	**Ning**	**Orkut**	**Plaxo**
Bebo	100	25	2	3	1	65	1	0	0
Facebook	4	100	2	2	2	64	1	1	9
Friendster	5	23	100	4	6	49	2	1	0
Hi5	7	24	4	100	1	69	0	2	0
LinkedIn	4	42	8	2	100	32	8	3	3
MySpace	3	20	1	1	0	100	0	0	0
Ning	6	35	6	1	19	44	100	2	2
Orkut	3	26	4	7	8	29	2	100	1
Plaxo	5	48	8	2	54	34	14	4	100

A 2009 study of 11,000 users reported that the majority of MySpace, LinkedIn, and Twitter users also have Facebook accounts [1].

1.3 Related Work

Nowadays there are some other Social network aggregator, each one with its capabilities and features. Various aggregation services provide tools or widgets to allow users to consolidate messages, track friends, combine bookmarks, search across multiple social networking sites, read RSS feeds for multiple social networks, see when their name is mentioned on various sites, access their profiles from a single interface, provide "lifestreams", etc.[1]

1.3.1 Some Examples

- **Flock**

Flock is a web browser specialized in providing management tools for social networking and other Web 2.0 services through its user interface.

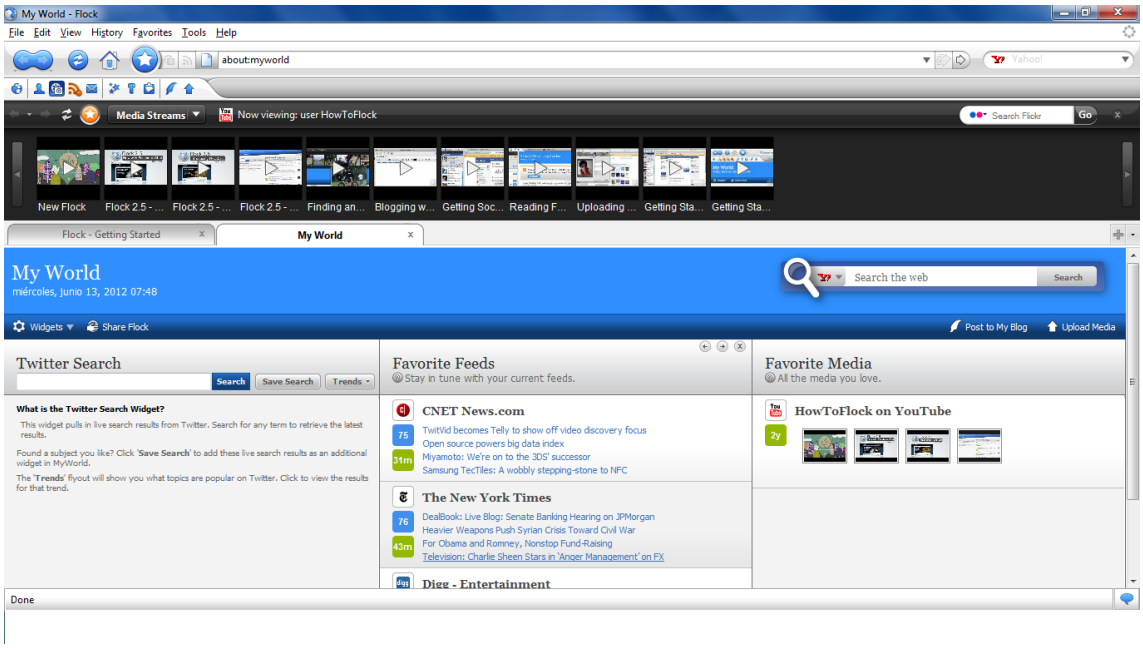

Figure 1. Flock Menu

Flock integrates multimedia services, including Myspace, Facebook, YouTube, Twitter, Flickr, Blogger, Gmail, Yahoo! Mail, etc. When logging into any of the supported services, Flock can get updates from friends, status updates and photos submitted. In addition, Flock can search in Twitter to update multiple services at once, and use Facebook chat from the browser.
Other features are:

- Native sharing of text, links, photos and videos.
- A media bar showing previews of videos and pictures.
- News reader with RSS feeds
- An editor and reader of blogs
- An email client.

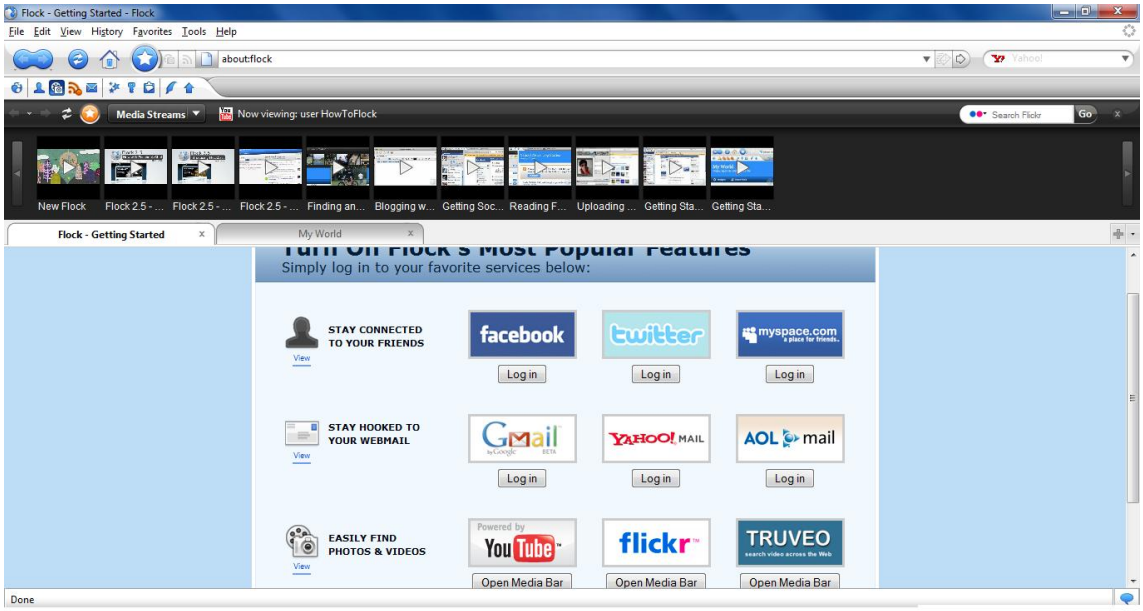

Figure 2. Flock features

- **XeeMe**

This aggregator lets users or brands organize their entire social presence, discover new networks and people and grow their presence and influence. It has a long number of supported networks and it offers useful analytics and with XeeGraph the user has a point of reference about his presence value and network relevance. The founders of XeeMe sais that is free and will remain to be free, but additional business features or applications are provided as subscription service.

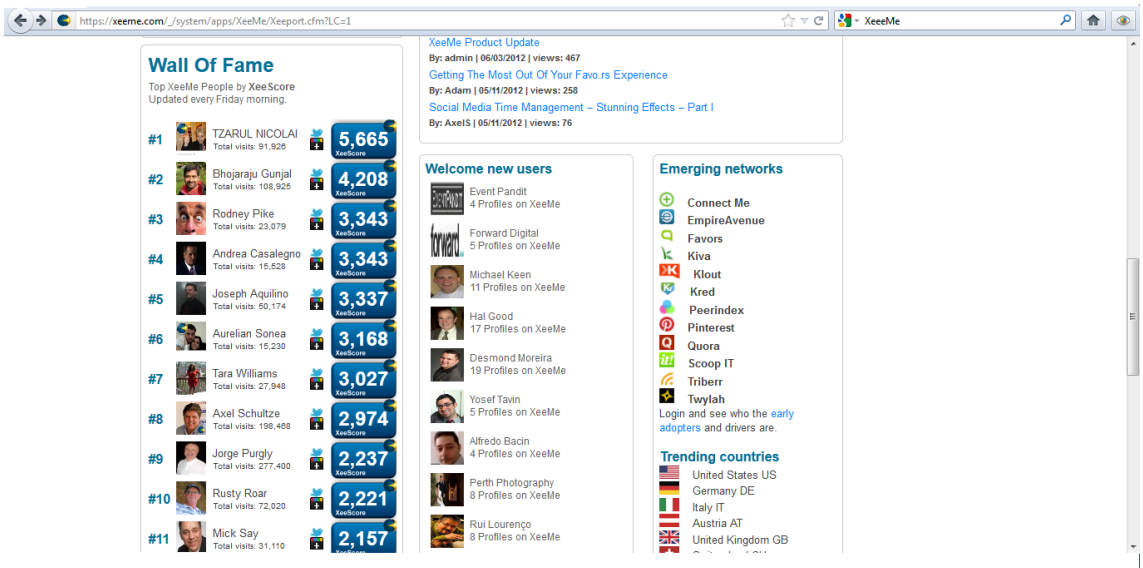

Figure 3. XeeMe Wall of Fame

XeeMe has 3 important points:

- *Organize Social Presence*: Xeeme offers the user the possibility of organize all social networks in one place and share all the social presence with one URL with existing friends, customers, partners and people the user don´t know yet.
- *Discover new networks and people*: Trough this application the user can discover new networks or people who is in other networks and offer the possibility of connecting with them.
- *Expand the presence and influence*: By sharing the URL on each post, the number of visits to the social site of the user will increase. The connections of the user will connect also on platforms they did not even know the user are on.

Maybe one of the most important tools of XeeMe is the report about "social traffic" and network relevance, so the user can focus in the nets that are interesting to his contacts. To do this XeeMe use a sophisticated algorithm and technique to measure social presence value and network relevance.

Figure 4. XeeMe main page

- **Hootsuite**

Hootsuite is an aggregator for businesses and organizations to collaboratively execute campaigns across multiple social networks from one secure, web-based dashboard. The user must sign in the social networks he wants to use and give some permission. After that the user can see the updates in his nets, publish in one or more nets at the same time, launch marketing campaigns, identify and grow audiences, and distribute targeted messages.

It is also possible to invite multiple collaborators to manage social profiles securely, plus provide custom reports using the comprehensive social analytics tools for measurement.

Figure 5. Hootsuite connection with social network

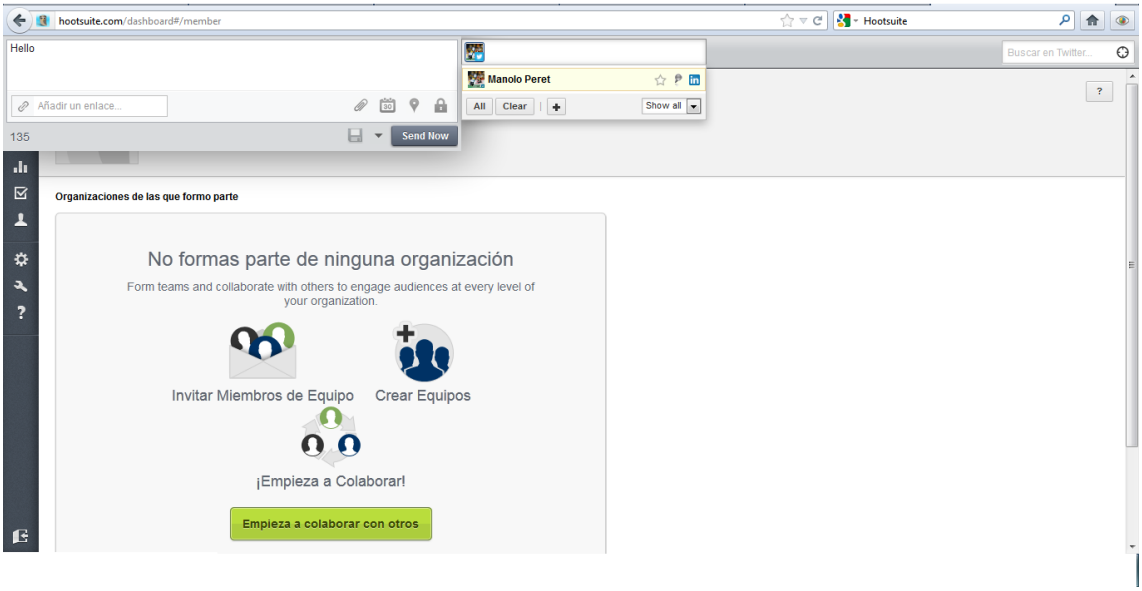

Figure 6. Hootsuite updating status

This application works with: Facebook, Twitter, LinkedIn, and new Google+ Pages, plus a suite of social content apps for YouTube, Flickr, Tumblr and more.

1.4 Overview

This thesis is divided in 8 chapters. The first chapters introduce the reader to the topic of the thesis. Then it shows the developing process of the application with all the required steps. It is also presented a user guide with some indications about how to use the application. Finally it shows the conclusions and future lines. At the end of the thesis it is the test results of the application. The thesis presents the following structure:

Chapter 2 makes a briefly introduction to the social networking services. Then it talks about the three social media that the application supports, their history and basic features and functionalities.

Chapter 3 shows the protocols and APIs used in the application. It starts with the introduction to the APIs and then it explains the libraries and APIs for each social media, the functions and methods offered and how to interact with them.

Chapter 4 talks about the authentication and authorization process with the social networking services. It starts with the OAuth protocol, the protocol used to authenticate user in the social networking services and then it will explain the flow of information and all the special characteristics for all the social networks.

Chapter 5 shows the design process. It has four different parts. First we design the main structure of the social network aggregator. After this, it shows some diagrams so that the reader could understand better the flow of information among all the actors involved in the process. The next part is the abstract design of the interface, how it will be and some characteristics. Finally it presents the technologies and software selected for the development of the aggregator.

Chapter 6 shows all the steps of the development of the application. All the features, supported nets and characteristic are explained here in detail.

Chapter 7 shows the conclusions and future lines. At the end of the document is time to value whether the application has achieved all the goals that were proposed at the beginning. It is important to point some future lines for the next developers so that the application could be improved easily. In the end of this chapter it talks about the software used to develop the application, such as database, or programming interfaces used in the process.

Chapter 8 is about testing the application. With the aim of be sure that the application has achieved its goals, some users must test the application and reflect their experiences so that the application could be evaluated.

Chapter 2

INTRODUCTION TO SOCIAL MEDIA

The following parts of this chapter describe the concepts, tools and technologies used in the development of this application.

2.1 Social Network

A social networking service is an online service that offers the possibility of build social relations between people, who has the same interests, share the same activities, or has real connections in their life.

To be part of a social network service is necessary to have a profile, what is a representation of the user in this social net, the user social links and some additional services. The normal services that are offered are instant messaging or mailing. The most important skill of the social sites is that they allow users to share ideas, activities, new events and all their interests within their individual networks.

We can divide this kind of services in 2 categories: ISN (Internal Social Networks) and ESN (External social networks). The ISN is a private community that consists of a group of people within a company, partnership, society, education provider and organization or even an "invitation", created by a group of users in the ESN. On the other hand, the ESN is an open community for all Web users and is designed to attract the advertisers. Users can add an image and can often be "friends" with other users. In most social network services, users must confirm that you are friends before they are able to link one to each other. This means that the social networks have some kind of privacy. In fact, usually they have privacy controls that allow users to choose who can view their profile or contact them.

Some social networks have additional features like the possibility of creating groups that share common interests or affiliations, upload videos, and discussions in the forums. Geosocial networking given the option of mapping Internet services to organize user participation around geographic features and attributes.

There are different researches within the social networks services:

- Identity
- Privacy
- Learning
- Company relation/links
- Teenagers

Social networks have one important skill, it is able to connect people easily, simple and with a low cost, which it is so important for entrepreneurs and small businesses that want to make new contacts. These kinds of networks often act as a tool for managing customer relationships for companies, selling products and services. Companies can also use social networks as advertising and text advertising. It seems that social networks can make connections easier, what is very useful for companies which cannot afford expensive marketing.

However, it is important to keep in mind the social origin of these networks. Because of that, try to make sales through the social networks could make the users will delete the link with the company.

2.2 Twitter

Twitter is social network service based on real-time information that connects users with the latest stories, ideas, opinions and news. This kind of services are called *microblogging services,* since differs from a traditional blog in that its content is typically smaller in both actual and aggregate file size. Twitter allows users to exchange small elements of content such as short sentences, individual images or video links. It was created by Jack Dorsey and launched in July 2006. The service rapidly gained worldwide popularity with over 14o million active users.

The use of this social network service is so simple. The user must create a profile, find the accounts that are interesting and follow the conversations. The user can also post something to the net or update. These pieces of information are called “Tweets”. Tweets has a longitude of 140 characters

Figure 7. Twitter

Twitter is a very useful tool for business. The most important skill that Twitter can offer is the capacity of connecting companies with customers in real time. Companies use Twitter to share information quickly with people interested in their products, build relationships with customers, partners and influencers.

Figure 8. Tweets

Talking about propagation, twitter is one of the most powerful tools. Therefore, create a new corporate Twitter account as part of the marketing strategy is essential when the company wants to present a new project to the rest of the world. Twitter it is also adapted to mobile environment what make it a very powerful tool with instant spreading.

One important issue in Twitter is contacts. The spreading in real time not only focuses on what the user do or what the others do, but the speed with which the people make contact, among the followers of the user and the people that the user follows.

Twitter has one powerful tool, the search engine. The Twitter search is powerful, segmented and specific. This tool is needed to reach one group with the same way of thinking or one group in which the user is interested in.

Nowadays, we can realize about the power of this kind of services with the recent demonstrations in different countries. In that moment Twitter appear as the ideal tool to exchange information and ideas, just like to organize all the stages of the demonstrations and report the latest news in those places.

With a single tweet, millions of people know or show the last update or piece of news from a user, positive initiatives that without Twitter it would be unknown.

2.3 Facebook

Facebook is a social networking service for exchanging messages, share photos and with automatic notifications when one connection updates his profile. It was launched in February

2004 and on May 2012 it has over 900 million active users among web clients and mobile devices.

Users must create a profile, add other users as friends and then they are able to use all the capabilities of the application. The users may join common interest, make private or public groups, chat and organize all the connections by school or college, family or other characteristics.

Facebook was founded by Mark Zuckerberg with his college friends Eduardo Saverin, Dustin Moskovitz and Chris Hughes. In the beginning was limited to Harvard students, but was expanded to other colleges nearby. On October 2007 Microsoft had purchased a 1.6% share of Facebook for 240 million dollars, what meant an implied valor to Facebook about $15 billion. In 2010 it became the third largest U.S. Web company after Google and Amazon.

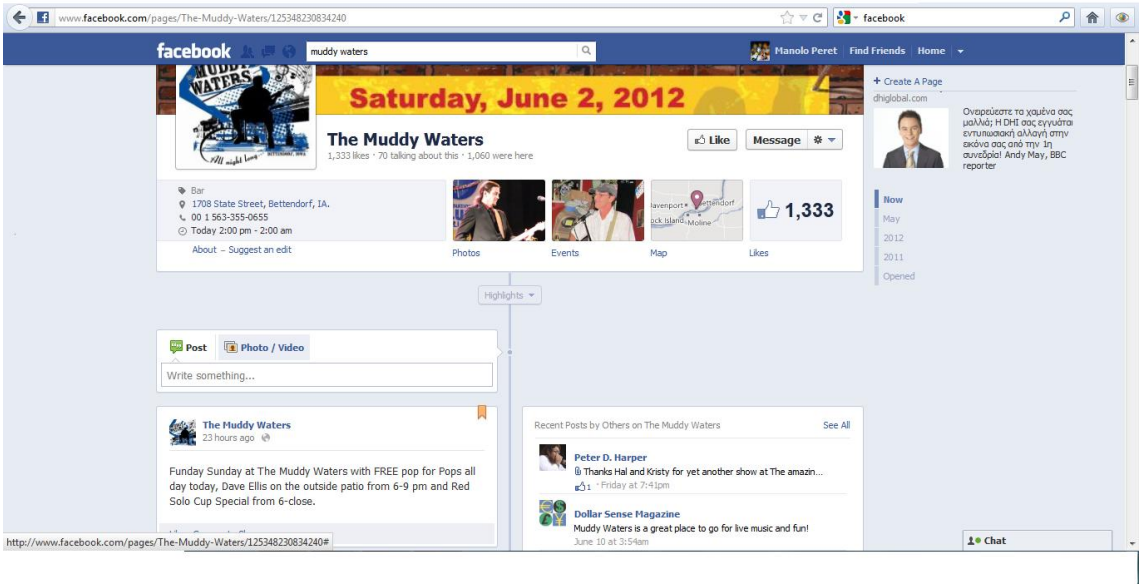

Figure 9. Facebook page

Users can communicate with friends and other users through private or public messages or even using chat feature. They can create and join interest groups and “like pages” as well.

Facebook launched on September 2006 the *News Feed*. It shows the new information or changes, upcoming events or birthdays of the user friends. Users are able to prevent what kind of updates it will show in the *News Feed*, Wall post, profile changes and newly added friends. One of the most used applications of Facebook is the Photos application. With this application users can upload photos in different albums.

For sure, one of the most famous applications of Facebook is the Wall. This is the original profile where was the user´s content, a space on every user´s profile that allows friends to post messages for the user. The Wall is visible for everyone who can see the user´s full profile. From 2007 on, the company allowed users to post attachments to the Wall, since before the Wall was limited to text only. But as it was said before, the Wall also displays events that happened

to the user (events, new friends added, change profile picture and so on). Finally the Wall have been replaced by the Timeline, what starts at the end of 2011.

The impact of Facebook in the society is pretty big. Facebook has affected the social life of the people in different ways. The main issue is to be continuously in contact with relatives, friends, workmates…It can link people with similar interests or "likes" in common. With its availability on mobile devices, the contact is always present whenever the user has access to the Internet. But there also critics to this ways of communication since they say that that it can cause antisocial tendencies because people are not directly communicating with each other, only through the computer.

It is clear the impact of the social networking service in politics. Over a million people installed the Facebook application "US Politics on Facebook" so that they can take part. It shows to the world one important thing, Facebook has become a powerful and popular new way to interact and voice opinions.

2.4 LinkedIn

LinkedIn is a social networking service oriented for professional networking. It was launched in May 2003. It has more than 161 million subscribers and is the bigger professional networking service with about 2 new members each second.

It is called the "professional Facebook". Having a LinkedIn profile is good professional presentation in the Internet since LinkedIn is a useful tool whether it is used to make business and new contacts. Hence, a user profile in LinkedIn should be an abstract of the professional skill of the user, something like a C.V., recommendations, contacts and experience.

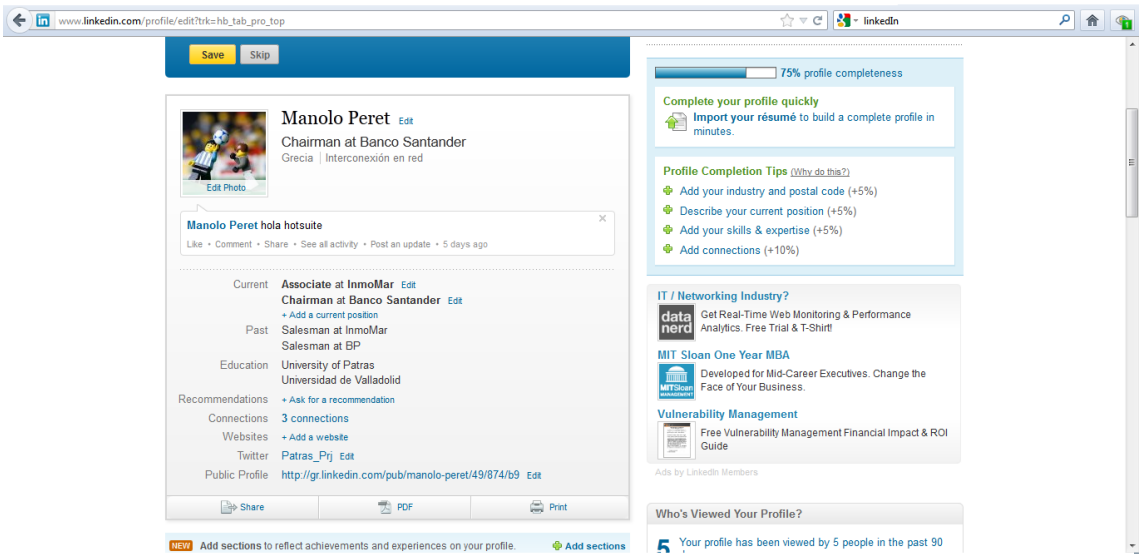

Figure 10. linkedIn profile

The site allows users to maintain a list of contact details of people with whom they have some level of relationship, workmates, friends or relatives. The users can make new connections through invitation, and build a big and useful net of connections. The connections list is used in several ways. For example, there are different levels of connection: second, third… this can be used to gain an introduction to someone a person wishes to know through a mutual contact.

This site was developed as a showcase work for professionals, and it must be used to find jobs, people and business opportunities recommended by some contact. Moreover, employers offer jobs and search for proper candidates for these jobs, so job seekers can review the profile of hiring managers and discover which of their existing contacts can introduce them. One important skill of LinkedIn is to follow companies that are interesting for the user and get a notification when someone uploads new offers. Then the user can bookmark the interesting job to apply.

Therefore LinkedIn seems to be quite powerful site for making new contacts, finding jobs, finding and making business easily and simple. Because of that is so important not to use it like personal networking service, but a professional.

Chapter 3

PROTOCOLS AND APIS IN SOCIAL MEDIA

3.1 APIs

API (Application Programming Interface) is a collection of services and functionalities that one O.S. or application offers to the user. It is something like and interface used by software components to communicate each other. An API should include specifications for data structures, object classes, types, routines and semantic meanings. It can take many forms like International Standard POSIX, private documentation, for example Windows API, or the libraries of programming language such as Java API.

The APIs offer to the programmers or user the way to interact with the OS or the applications that offers open APIs. That means create new applications and new services using the skills offered in the API definitions.

In this section we will review the libraries offered by the social networking services (i.e. Facebook, Twitter and LinkedIn).

3.1.1 Facebook Graph API and Library

The API used by Facebook is the Graph API. It presents a simple view of the Facebook social graph uniformly representing objects in the graph (e.g., people, photos, events and pages) and the connections between them (e.g., friend relationships, shared content, and photo tags). Every object in the social graph has a unique ID. You can access the properties of an object by requesting https://graph.facebook.com/ID.[3]

Facebook offers different kinds of libraries which depend on the programming language the user will use. The library used is SDK library and offers support for:

- *JavaScript* which enables the user to access all of the features of the Graph API and Dialogs via JavaScript. It provides a rich set of client-side functionality for authentication and rendering the XFBML versions of Facebook Social Plugins.
- *PHP SDK* provides Facebook Platform support to PHP-based web apps. This library helps to add Facebook Login and Graph API support to user´s Website.

- *IOS SDK* provides first-class Facebook Platform support for iPhone, iPad and iPod Touch apps written in Objective-C. The user can utilize single-sign-on, call the Graph API and display Platform Dialogs.
- *Android SDK* brings the Facebook Platform to the Android Platform (mobile & devices). The user can use this SDK to add single-sign-on to his Android apps, invoke the Graph API and more.

In the development of this application we have used PHP SDK since the *Fad Project* is and application based on Website.

The PHP SDK is typically used to perform operations as an app administrator, but can also be used to perform operations on behalf of the current session user. By removing the need to manage access tokens manually, the PHP SDK greatly simplifies the process of authentication and authorizing users for your app. [4]

PHP SDK offers several methods to interact with Facebook API (Graph API):

- *getAccessToken*: Get the current access token being used by the SDK.
- *getApiSecret:* Get the App secret that the SDK is currently using.
- *getAppId*: Get the App ID that the SDK is currently using.
- *getLoginStatusUrl*: Returns a URL based on the user's login status on Facebook.
- *getLoginUrl*: Get a URL that the user can click to login, authorize the app, and get redirected back to the app.
- *getLogoutUrl*: This method returns a URL that, when clicked by the user, will log them out of their Facebook session and then redirect them back to your application.
- *getSignedRequest*: Get the current signed request being used by the SDK.
- *getUser*: This method returns the Facebook User ID of the current user, or 0 if there is no logged-in user.
- *setAccessToken*: Set the current access token being used by the SDK.
- *setApiSecret*: Set the App secret that the SDK is currently using.
- *setAppId*: Set the App ID that the SDK is currently using.
- *setFileUploadSupport*: Set file upload support in the SDK.
- *useFileUploadSupport*: Get whether file upload support has been enabled in the SDK.

The use of this library is quite easy. The user just need extract the downloaded files in the directory where is the application located, in the server folder. After this it is required to use to application ID and application secret.

3.1.2 Twitter API and Library

Twitter has three different APIs: Search API, REST API and Streaming API. The Search API allows users to query for Twitter content. This is, look for specific keywords within tweets, finding tweets referencing a specific user, or finding tweets from particular user. With this API the user can have access to data around Trends. But if the user needs to query the Search API at extreme velocities, then it is better to use the Streaming API.

The REST API allows developers to access some of the core primitives of Twitter, like timelines, status updates or user information. If one developer wants to build one application with the profile of one user, name, picture, followers, last tweets and so on this is the proper API. In addition to offering programmatic access to the timeline, status, and user objects, this API also enables developers a multitude of integration opportunities to interact with Twitter. Through this API, users are able to create and post back to Twitter, reply tweets, retweet and the rest of functionalities offered by Twitter.

On the other hand, the Streaming API is for developers who have data intensive needs. If the application to build is something related with analytics research, this API is the correct one. The user can get large quantities of keywords to be specified and tracked, retrieve geo-tagged tweets or get the public status of a user. The first step should be work with the search API first, and if the application is being rate-limited or it is clear that the application has very aggressive querying needs, then it is necessary to move over the Streaming API.

"Fad Project" has not big needs talking about rating limits, since by now it uses only the user profile, tweet, timeline and search. So during the development of the application we have used REST API and Search API. Since we are working with PHP we had to choose the proper library to reach our goal.

Twitter offers different libraries for several languages:

- ActionScript/Flash
- C++
- Clojure
- ColdFusion
- Erlang
- Java
- JavaScript
- .NET
- Objective-C/Cocoa
- Perl
- PHP
- Pyton
- Ruby
- Scala

Inside PHP language we have 5 official libraries:

- *Oauth-php* by Corollarium Technologies. This is an OAuth library for clients and providers.
- *Services_Twitter (PEAR)* by Joe Stump, David Jean Louis and Bill Shupp. This is a library for communicating with Twitter's public API. Send status updates, fetch information, add friends, etc.

- *TmhOAuth* by Matt Harris. This OAuth library supports file uploading.
- *TwitterOAuth* by Abraham Williams.
- *Twitter_async* by Jaisen Mathai. This is a wrapper for Twitter OAuth API that provides asynchronous calls.

In the application we used TwitterOauth by Abraham Williams since we were coding with PHP it seems the best one is this library.

The REST API resources are divided according to the purpose of the query: timelines, tweets, search, streaming, direct messages, friends & followers, users, suggested users, favorites, list, accounts, places and geo or trends among others more. Some examples are shown below:

Timelines

- *GET_statuses/home_timeline*: Returns the most recent statuses, including retweets if they exist, posted by the authenticating user and the users they follow. This is the same timeline seen by a user when they login to twitter.com.
- *GET_statuses/mentions*: Returns the 20 most recent mentions (status containing @username) for the authenticating user. The timeline returned is the equivalent of the one seen when you view your mentions on twitter.com. This method can only return up to 800 statuses.
- *GET_statuses/retweeted_by_me*: Returns the 20 most recent retweets posted by the authenticating user.
- *GET_statuses/retweeted_to_me*: Returns the 20 most recent retweets posted by users the authenticating user follow.
- *GET_statuses/user_timeline:* Returns the 20 most recent statuses posted by the authenticating user. It is also possible to request another user's timeline by using the screen_name or user_id parameter.

Friends & Followers

- *GET followers/ids*: Returns an array of numeric IDs for every user following the specified user. This method is powerful when used in conjunction with users/lookup.
- *GET friendships/exists:* Test for the existence of friendship between two users. Will return true if user_a follows user_b, otherwise will return false. Authentication is required if either user A or user B are protected.
- *GET friendships/show:* Returns detailed information about the relationship between two users.
- *POST friendships/create:* Allows the authenticating users to follow the user specified in the ID parameter. Returns the befriended user in the requested format when successful. Returns a string describing the failure condition when unsuccessful.

Trends

- GET trends/woeid: Returns the top 10 trending topics for a specific WOEID, if trending information is available for it. The response is an array of "trend" objects that encode the name of the trending topic, the query parameter that can be used to search for the topic on Twitter Search.
- *GET trends/available*: Returns the locations that Twitter has trending topic information for. The response is an array of "locations" that encode the location's WOEID and some other human-readable information such as a canonical name and country the location belongs in.
- *GET trends/daily:* Returns the top 20 trending topics for each hour in a given day.
- *GET trends/weekly*: Returns the top 30 trending topics for each day in a given week.[5]

So after use the resource we need Twitter will send us the information in array, the next step is to interpret this information and use it properly.

3.1.3 LinkedIn API and Library

LinkedIn divide the API according to the technology: JavaScript API and REST API. The JavaScript API is a rich client library enabling developers to build dynamic applications in the web browser. It is necessary use OAuth 2 to easily authorize users via the "Sign In with LinkedIn" button, access LinkedIn data with native objects, and interact with Plugins. This API bridges between the user's browser and his REST endpoint. As a developer, you use a simple, consistent JavaScript interface to interact with the fundamental LinkedIn data types (Profiles, Connections, People Search, etc). Under the hood, LinkedIn translate the request into a REST call which they make on user´s behalf via Ajax. All the details of cross domain Ajax and OAuth 2 are abstracted away, the user simply invoke a method and receive JSON in return.

On the other hand, REST API is the API with the proper methods inside. The user must request these methods so that LinkedIn can send him the requested information. Some examples of the resources offered by the REST API are shown below:

Member Profile

The Profile API returns a member's LinkedIn profile. There are two versions available:

- **Standard**: Displays the profile the requestor is allowed to see. The specific content will depend on the privacy settings of the profile owner, the relationship (degree separation or groups in common) between the owner and requestor, and in rare cases, the privacy settings of the requestor

- **Public**: Returns the public profile. The fields returned are only determined by the privacy settings of the profile owner.

In order to get one profile, the user must use GET http://api.linkedin.com/v1/people/”profile fields” with “+++” the id of the user or other value from the profile selector list.

Connections

The Connections API returns a list of connections for a user who has granted access to the account. The user can control the fields returned and the number of connections returned for each call.

So that the user can get the proper connections information, he must use GET http://api.linkedin.com/v1/people/"profile field"/connections

People Search

The people search resource search for people matching according to the criteria used in the request. It returns information about people but there are lots of possibilities talking about the information returned.

The URL used for the search should be something like: http://api.linkedin.com/v1/people-search?wordsearch. "Wordsearch" represent the parameters of the search. It could be a keyword, first name, last name, location, distance… or all together for unique search.

Companies

This resource allows the users to see information about the companies. The company profile retrieves and displays one or more company profiles based on the company ID or universal name. It also returns basic company profile data, such as name, website, industry or Twitter and RSS feed.

The URL needed for this resource should be http://api.linkedin.com/v1/companies/"profile fields"

Jobs

The Jobs API returns detailed information about job postings on LinkedIn. The user is able to see the job summary, description, location, and apply for it. User can use inline filters and LinkedIn's nested domain structure to explore details about the job and the hiring company within a single REST call.

The URL to get access to this information should be: http://api.linkedin.com/v1/jobs/{id}

Messaging

It allows the user to send messages to his connections or invitations to create a new connection. The URL must be use with POST:

http://api.linkedin.com/v1/people/~/mailbox

Network Updates

- Getting Updates

  The user can get his updates or connection´s updates, through the network updates resource. It returns a feed of event items. Each item has some

information such as when it occurred, type of event and comments or likes. To retrieve user updates should be through GET and the next URL http://api.linkedin.com/v1/people/~/network/updates

- Posting Updates

It allows users to send in an activity to be posted to the first degree connections of the users. The post is the news feed and it appears on the center column of the home page. All this kind of updates will be broadcasting to the first degree connections of the users. The proper use of this resource includes POST and http://api.linkedin.com/v1/people/~/person-activities

- Posting Shares

If the user wants to share some content with their network or with all of LinkedIn this is the proper resource. This share could be short text update, URL with a title and photo or both.

Using POST and the next basic URL http://api.linkedin.com/v1/people/~/shares

- Comments and Likes

Some networks updates may have comments or likes attached to them. When users want to add comment or like to one network update, they should do it with POST and http://api.linkedin.com/v1/people/~/network/updates/key={NETWORK UPDATE KEY}/update-comments.

As we said before, the LinkedIn API can be used with several programming languages. In the developers site of LinkedIn they present some tested libraries by LinkedIn and other no-official libraries that can be used by the developers since it is working fine with the API. The tested OAuth libraries are:

Language	Library	Author
Java	Scribe	Pablo Fernandez
JavaScript	LinkedIn JSAPI	LinkedIn
PHP	PECL OAuth	
Python	Fork of python-oauth2	Kristen Jones

Table 1. Tested Libraries LinkedIN [6]

Apart from the tested libraries LinkedIn offers other Oauth libraries for several languages:

- AS3
- C# (.NET)
- C++
- Java (Android)
- Objective C (iPhone)
- Perl
- PHP
- Play Framework
- Python
- Ruby
- Clojure

Since we are programming in PHP the selected library for interact with LinkedIn API was PHP based no-tested version called “simple-linkedinphp”. This is a PHP class designed to be a simple stand-alone wrapper for the most used functionality of the LinkedIn API. It has one pre-requisite, the PHP cURL library and without it and exception will be thrown. This library has been designed to work with PHP5.2+.

Chapter 4

AUTHENTICATION AND AUTHORIZATION

4.1 Introduction

In this chapter is shown the whole process of developing the application. First of all, we introduce to the reader the authentication process based on OAuth protocol. How it works, and in which way the social networking services used (Facebook, Twitter and LinkedIn) have adapted this protocol for their authentication process.

Then in "Design the application" we will see the required steps to be developer in Facebook, Twitter and LinkedIn. Then register one application in those social networking services. After these steps we can start programming the application, showing all the steps to create the social network aggregator, the main pages, log in, the register steps and so on.

The last part of the chapter is for throwing some conclusions, whether we reach our goals or not, some problems found and the proper solutions for these problems.

4.2 Authentication and Authorization

The authentication and authorization process is based on OAuth protocol. This is an open protocol to allow secure API authorization in a simple way from desktop and web applications. It allows users to share their private resources (e.g. photos, videos, contact lists) stored on one site with another site without having to hand out their credentials, typically supplying username and password tokens instead.

Each token gives access to a specific site such as a video editing site, for specific resources (e.g., just videos from a specific album) and for a defined duration (e.g., the next 2 hours). This allows a user to grant a third party site access to their information stored with another service provider, without sharing their access permissions or the full extent of their data.

OAuth began in November 2006 during the development of Twitter OpenID implementation. At the same time, Ma.gnolia needed a solution to allow its members with OpenID to authorize Dashboard Widgets to access their service. The idea was try to use OpendID with the twitter and Ma.gnolia APIs to delegate authentication. The conclusion was that there were no open standards for API access delegation.

It was 3rd October 2007 when the OAuth core 1.0 was released. The OAuth protocol was published as RFC 5849.

OAuth 2.0 is the next step of the OAuth protocol and is not backward compatible with OAuth 1.0. OAuth 2.0 focuses on client developer simplicity while providing specific authorization flows for web applications, desktop applications, mobile phones, and living room devices. [8]

4.2.1 Authentication Facebook

The Facebook platform uses Oauth 2.0 for authentication and authorization. On the Desktop Web, to authenticate a user using a server-side flow we have to follow these steps:

1. Redirect the user to the Oauth dialog
2. The user is prompted to use the application (Fad Project)
3. The user is redirected back to the application (Fad Project)
4. Exchange the code for a user access token
5. User is able to make requests to the Graph API

A successful authentication flow results in the application “Fad Project” obtaining a **user access token** which can be used to make requests to Facebook's APIs. There are several authentication flows and each is applicable to a different platform or context.

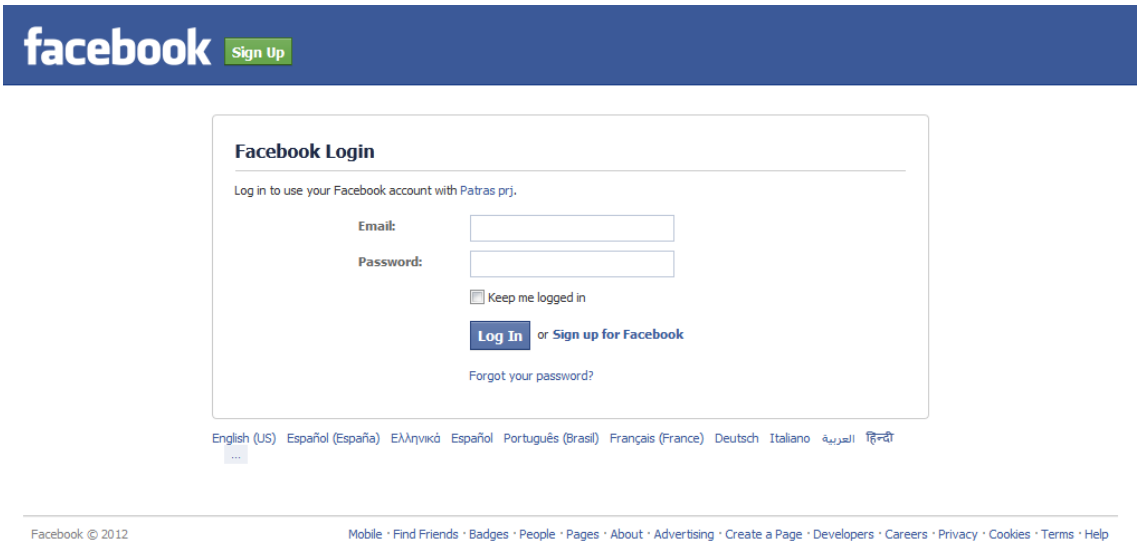

Figure 11. Facebook OAuth dialog

When the application obtains an access token from Facebook, it will be valid immediately and it is usable in requests to the API for some time period defined by Facebook. After that period has elapsed, the access token is considered to have expired and the user will need to be authenticated again in order for your app to obtain a fresh access token. The duration for which a given access token is valid depends on how it was generated.

Here it is shown the authentication process:

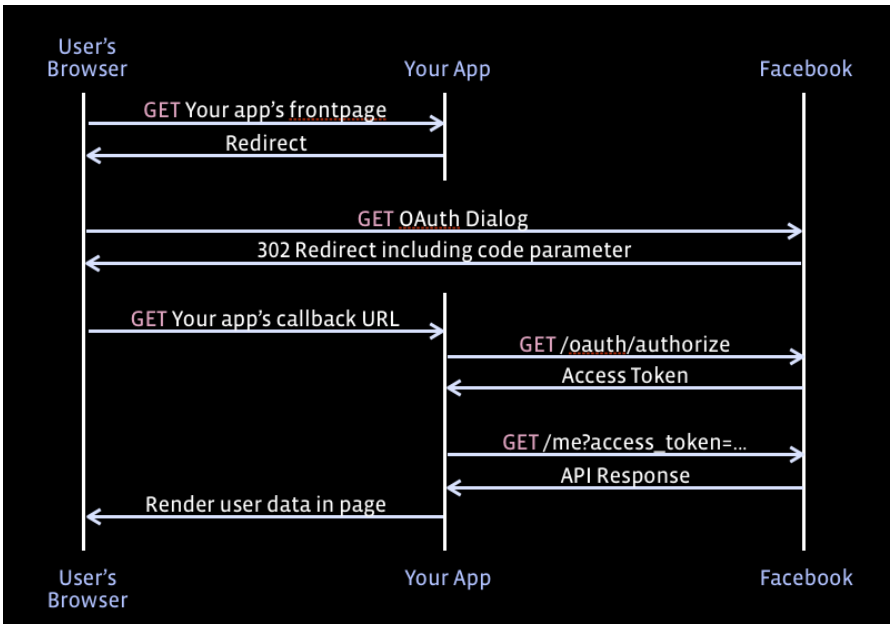

Figure 12. Authentication process Facebook

4.2.2 Authentication Twitter

Twitter offers different authentication methods and with a range of OAuth authentication styles depending on which API is being used:

- REST API→ OAuth signed or unauthenticated requests
- Search API→ unauthenticated requests
- Streaming API→ OAuth signed or HTTP Basic authenticated requests

For our application we will need the authentication process since we want to post and read Twitter data on behalf of the user through the application. What we need then is to use what it is called ***3-legged Oauth.*** But first we will explain the ***sign in*** process so that the reader can understand all the steps in the authentication process.

Sign in with Twitter

The browser and mobile web implementations of sign in are based on OAuth protocol. The next steps show how to obtain an access token for the sign in flow so that the Fad Project application can interact properly with the Twitter API.

- Step 1: Obtaining a request token

  The first thing one developer must know is that the application must get a request token by sending a signed message to "POST oauth/request token". It is required one parameter, *oauth callback*, which must be a URL-encoded version of the URL in which the user of the application will be redirected to when they complete step 2. The remaining parameters are added by the OAuth signing process.

The application should examine the HTTP status of the response. The correct value of the answer must be 200, another value indicates a failure in the request operation. The body of the response will contain the *oauth_token*, *oauth_token_secret*, and *oauth_callback_confirmed* parameters. It is necessary that the application verifies that *oauth_callback_confirmed* is true and stores the other two values for the next steps.

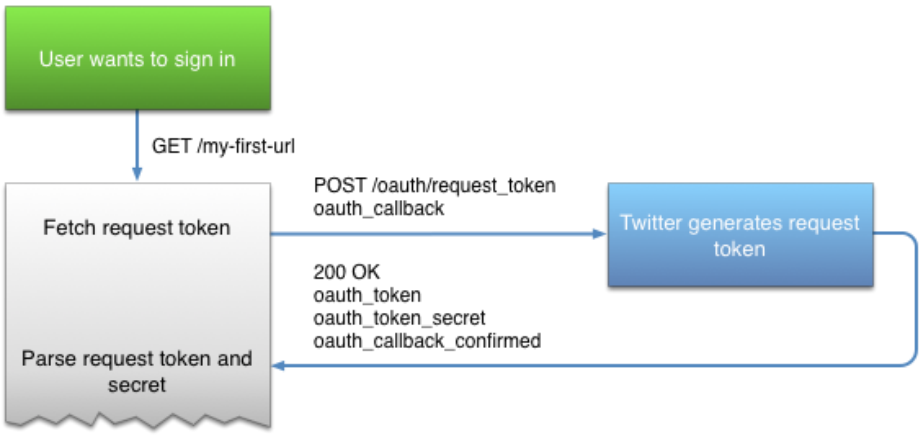

Figure 13. Request token Twitter

- Step 2: Redirecting the user

In this step is direct the user to twitter so that they may complete the appropriate flow. This flow means that the user is asked to allow the application and give permission so that the application can tweet and make other actions in behalf of the user. Then Twitter will redirect back to the URL passed in the previous step.

Figure 14. Sign in Twitter

To direct the user, it is necessary use *GET oauth/authenticate* and include the *request token* obtained in the previous step as oauth_token parameter.

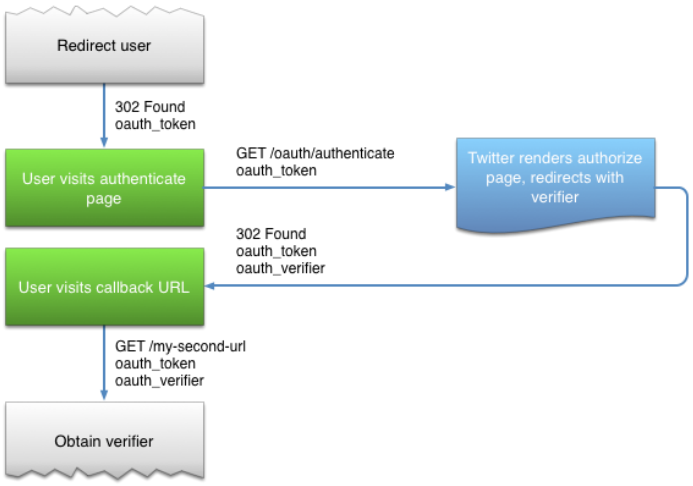

Figure 15. Redirect user Twitter

The sign in endpoint will behave in one of three ways depending on the user's status:

1. *Signed and approved*: If the user is signed in on twitter.com and has already approved the calling application, they will be immediately authenticated and returned to the callback URL with a valid OAuth request token. The redirect to twitter.com is not obvious to the user.
2. *Signed in but not approved*: If the user is signed in to twitter.com but has not approved the calling application, a request to share access with the calling application will be shown. After accepting the authorization request, the user will be redirected to the callback URL with a valid OAuth request token.
3. *Not signed in*: If the user is not signed in on twitter.com, they will be prompted to enter their credentials and grant access for the application to access their information on the same screen. Once signed in, the user will be returned to the callback URL with a valid OAuth request token.

Below is shown the flowchart of the possible states of the sign in:

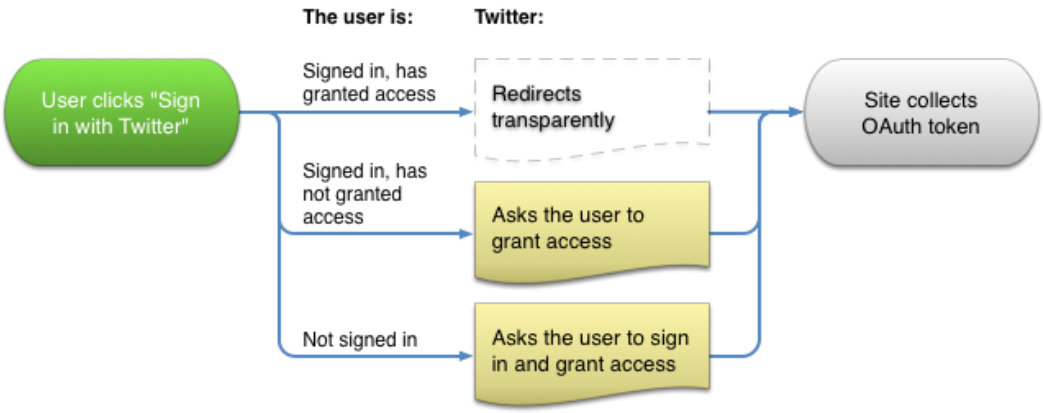

Figure 16. States of sign in Twitter

If the authentication is successful, the application will receive a request with the *oauth_token* and *oauth_verifier* parameters.

- Step 3: Convert the request token to an access token

To convert the request token into a usable access token, the application should make a request to *POST oauth/access token*, with the *oauth verifier* parameter.

A successful response contains the *oauth_token*, *oauth_token_secret*, *user_id*, and *screen_name* parameters. It is necessary to store the *token* and *token secret* for future authenticated requests to the Twitter API.

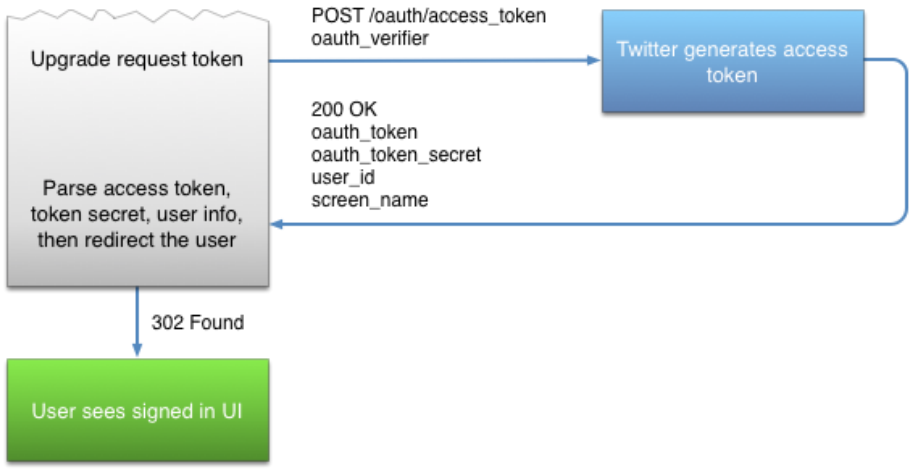

Figure 17. Access token Twitter

3-legged authorization

The 3-legged OAuth flow allows the application to obtain an **access token** by redirecting a user to Twitter to authorize the application. This flow is almost identical to the flow described in Implementing Sign in with Twitter, with two exceptions:

- The *GET oauth/authorize* endpoint is used instead of */oauth/authenticate*
- The user will **always** be prompted to authorize access to the application, even if access was previously granted.

The states for the 3-legged authorization are shown in the following figure.

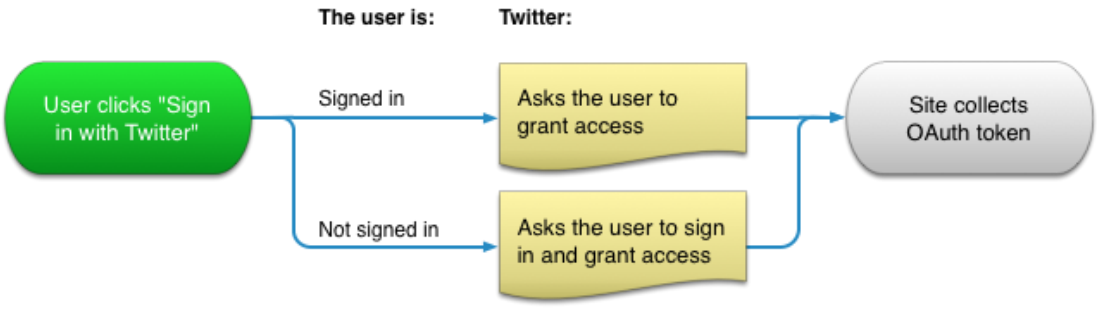

Figure 18. 3-legged authorization

4.2.3 Authentication LinkedIn

The LinkedIn API uses OAuth as its authentication method as well. It uses one of OAuth's benefits, which is the availability of many third party and open source libraries, allowing developers to authenticate with LinkedIn quickly and in a similar manner to how they authenticate with services such as Twitter or Google among others.

It is important to know that when an application acts on behalf of one LinkedIn user, the application must be able to identify the users, protect their privacy and it will be used properly since LinkedIn can tell which application and user are making the request.

LinkedIn is following the OAuth protocol version 1.0a. The flow with this version of the protol is shown below:

- The developer of the application *Fad Project* must request an API key from LinkedIn (*consumer key*)
- When the application needs to authenticate the user, it makes a call to LinkedIn to ask for a *request token*
- LinkedIn replies with a request token. Request tokens are used to ask for user approval to the API.
- The application redirects the user to LinkedIn to sign-in and authorize the application to make API calls on their behalf. The application must provide LinkedIn with a URL where they should send them afterward ("callback URL")
- If the user agrees, LinkedIn returns them to the location specified in the callback
- Then, the application makes another OAuth call to LinkedIn to retrieve an *access token* for the member
- LinkedIn returns an access token, which has two parts: the *oauth_token* and *oauth_token_secret*
- After retrieving the access token, the application can make API calls and signing the users with the consumer key and access token

The following picture shows the OAuth dialog for LinkedIn authorization, where the user gives permission to one application to post and use other features on his behalf.

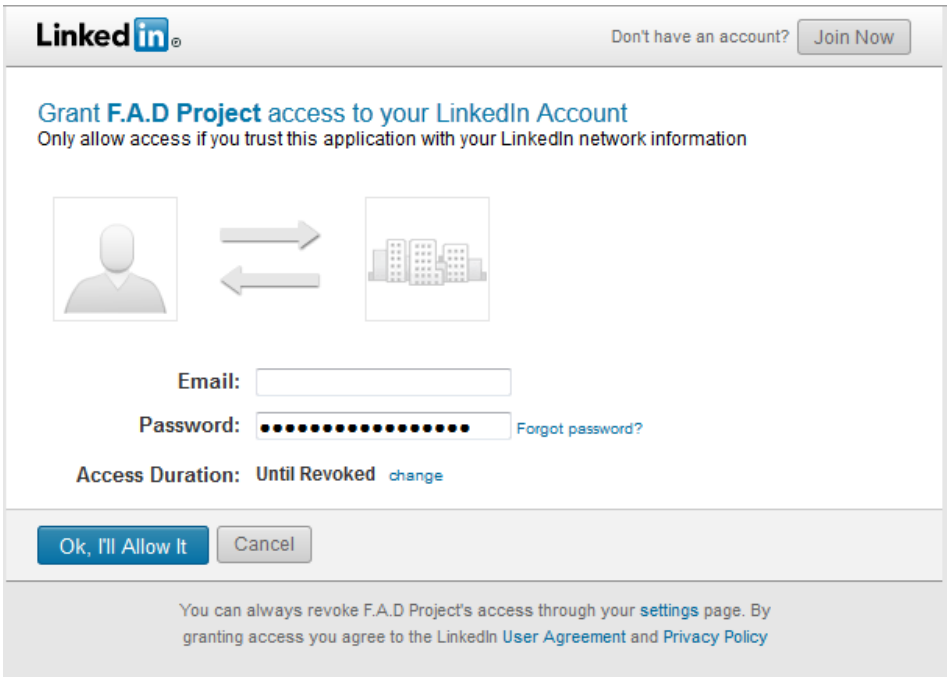

Figure 19. Oauth dialog LinkedIn

So that the reader could understand properly the process, the next flowing chart shows the flow of information exchanged between the actors of the requests and replies:

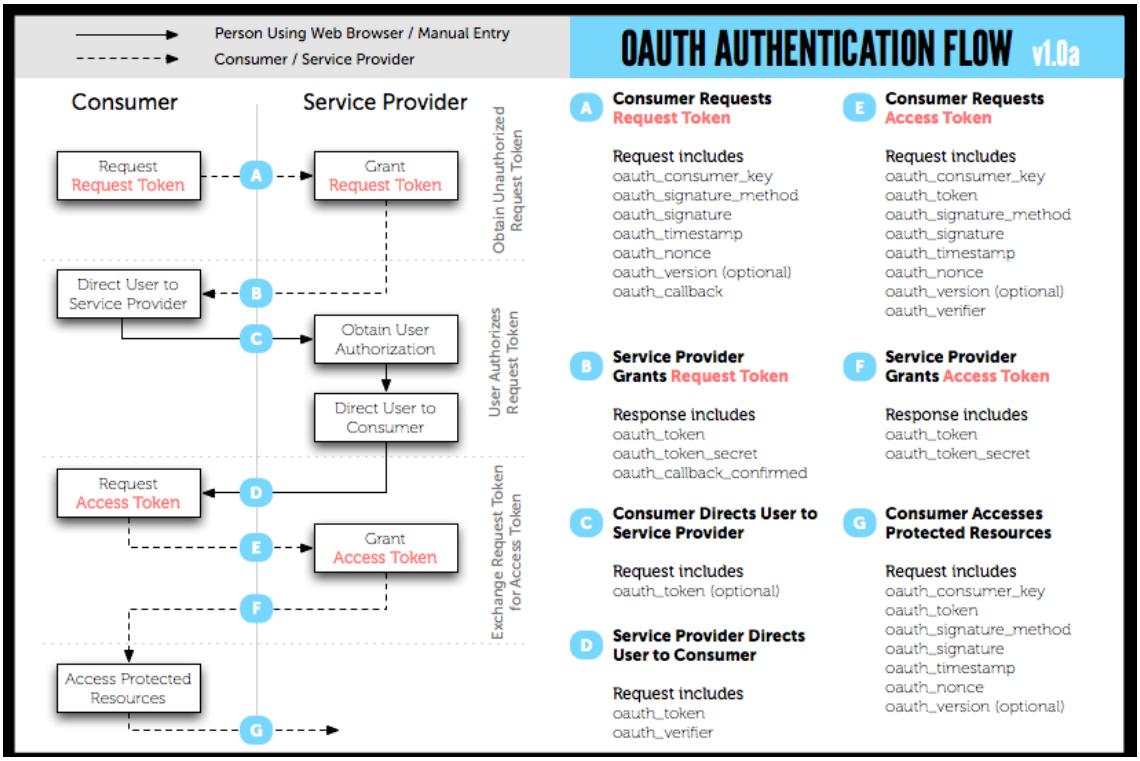

Figure 20. Authentication flow LinkedIn

Chapter 5

APPLICATION DESIGN

5.1 Introduction

This chapter explains the process of designing the application. That means the first ideas for the aggregator in an abstract level. The first step is to understand the flow of information: user-application, application-social media and application-database.

Once we know how our application will interact with the rest of parts the structure of the aggregator we must divide the interface for showing all the features to the user in a simple and friendly environment.

Finally it is necessary to fix the technology that it will be used in the aggregator. Programming software, database, and all the software needed to develop the application.

5.2 Main Structure

Since the aggregator to develop is Web based, the user must access to the application through the browser. This means that the aggregator must be hosted in a Web server. The user will interact with the aggregator, and the aggregator must exchange information (request) with the social networking services, or their APIs.

One of the goals of the project is to make the experience of the user easier, for example removing the need of open several browsers and have to sign in all the social media only for check the last updates. For this reason we will use one database to store the user data, not only the application data (username and password), but also the profile data of the user, to avoid the sign in process. Hence, the application must interact with the database to store and get the information from the tables.

As we know, to interact with the social media the application must use the libraries and APIs offered by each service (see previous chapter for more information), get and translate the information and show to the users properly. Then some of this information will be stored to identify the user in the next use of the aggregator with the tokens provided by the social networking services.

It is clear then, that the user must register first in the application with one username (unique) and password. After this step, users must decide which nets they want to use with the

aggregator. Since not all the users have a profile in all the social networks, the application must offer the possibility of register at least two social media. Otherwise users will not be able to use the application since use a social network aggregator with one social media has no sense, there is no aggregation possible. After register the social media, users are able to use the application.

The next time users want to use the application it will be no necessary to register (sign in) again, since the user´s data is stored in the database. Hence, users must log in with the username and password they gave to their account in the aggregator and they will be able to use all the features of the application.

Following these patterns, we can define the flow of information and how are the interactions among all the actors of the process.

5.3 Diagrams

Here it is showed some diagrams about the flow of the information so that the reader could understand better all the actors involved in the working flow.

5.3.1 Register

As the reader can see in the following picture, the user interacts with the application to register on it. The application should contact with the social networking service in which the user wants to register. Then it will appear the OAuth dialog where the user must give the proper permissions. After this, the user is redirected to the application (callback URL given) where the application will make some API calls to get some profile information from of the user. Once the application has all the information requested, it will store this information in the database for future uses.

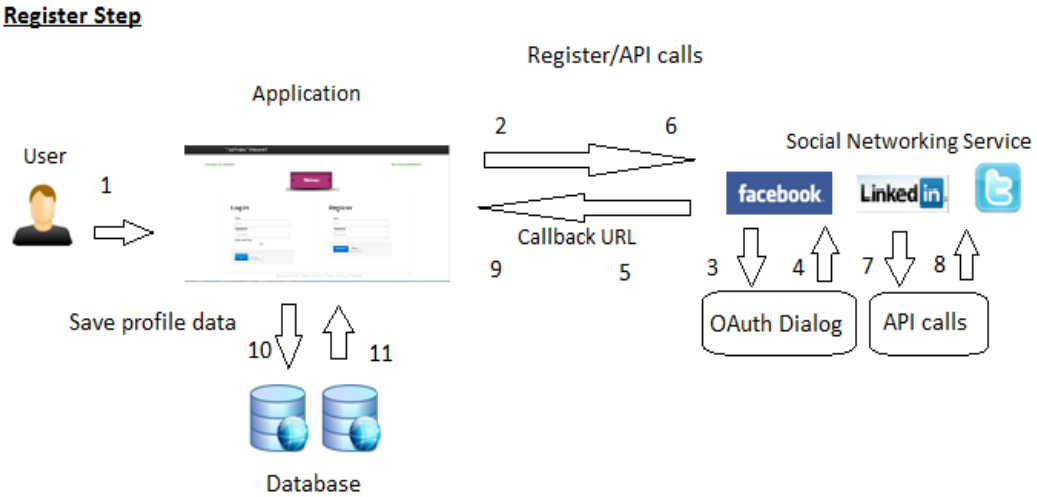

Figure 21. Flowchart Register

5.3.2 Log in and Use of the application

When a user is already registered in the application he must be logged in to use the application. Now, the first step is to retrieve the information stored in the database for that user. We said before that for using some functionalities of Facebook (comment and like features) is required to be logged in this social network, so it is necessary contact again with the social media and throw the sign in formulary. Once the application has all the information the user is able to use all the features available in the application: Easy Social Networks, Fast Post and Normal Social Networks. Every time the user uses one Easy Network or Fast Post, the application must make API Calls to take the information from the proper social media. Is because of this that the flowchart shows the interaction between the application and the social networking services.

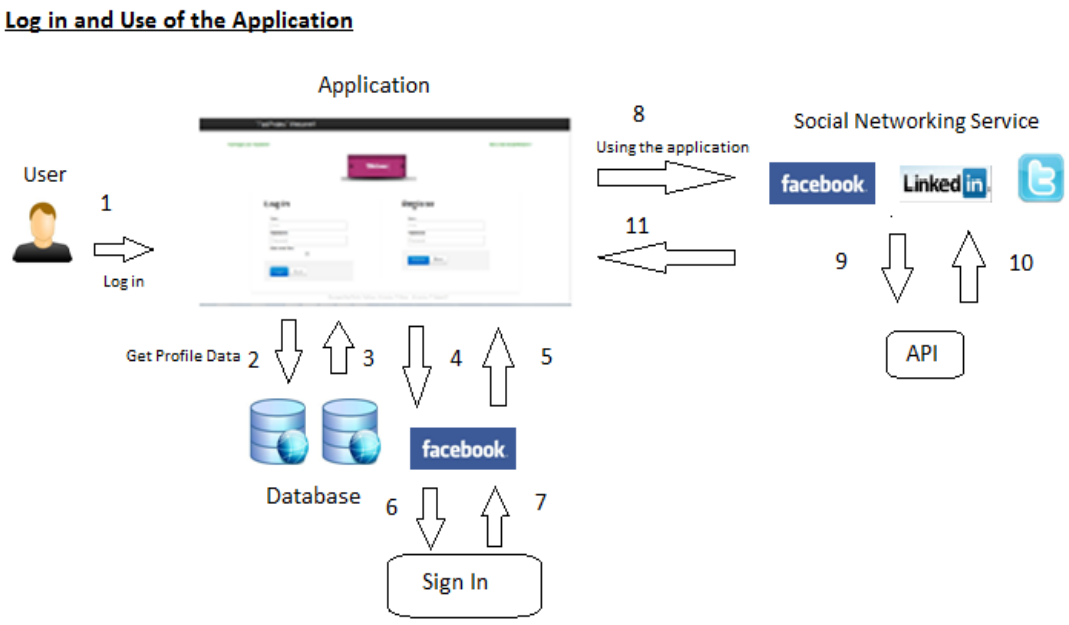

Figure 22. Flowchart Login and Use the application

5.4 Interface

The interface of the site is pretty important for the success of the project, since a not well designed interface could lead users to give the application up. Here the goal is to make a simple and intuitive site in which the users do not need help to use the application properly.

The structure of the aggregator must present a Welcome page in which the user could log in or register into the application. If register, the site should redirect to another page in which the users can add their social media to the application. Then the user will be leaded to the Main page. On the other hand if the users already have an account in the aggregator, the application will lead them to the Main page after getting the user´s data from the database.

The social network aggregator has three main features: Easy Social Networks, Fast Post and Normal Social Networks. So the Main Page must be divided in three areas with these options. From this page the application must lead the user to the selected option. Each option must present a simple appearance, easy for the users and with the main options of the real networks.

Finally, form the Main page the users should make the log out from the application and be redirected to the Welcome page again.

5.5 Used Technologies

Here it is presented the technologies and software selected to develop the social network aggregator.

5.5.1 Apache HTTP Server

Apache HHTP server is an HTTP web server based on open source for Unix, Windows, Macintosh and others which implements protocol HTTP/1.12 and the notion of virtual site. This project is developed within the HTTP Server (httpd) from the Apache Software Foundation.

This server is highly configurable, it offers database authentication but some users claim because of the lack of graphical interface to help in its configuration. Since 1996, Apache is the most widely used HTTP server. In 2005 about 70% of the websites in the world were using Apache HTTP server. But after that date it suffered a decline in its market.

The popularity of this server make it one easy option to choose since there are a lot of information about it and error reports. The advantages of this software are shown below:

- It is a modular server, what means that it has one core section and several modules that give it the rest of the functionalities for the server, for example “mod_ssl” or “mod_rewrite”.
- Open source
- Multi-platform
- Extensible

- Popular. As we said before, the popularity of the software make easy the fact of find new updates, reporting bugs and finding all the information connected with the software.

The user must configure the Apache HTTP server in the *httpd.conf* file. The used version for this application is Apache server 2.2.18.

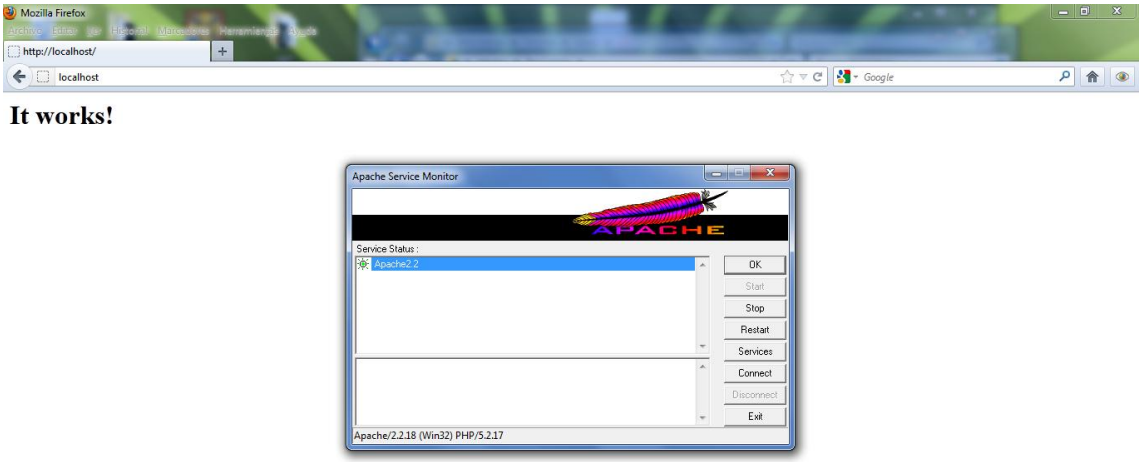

Figure 23. Apache console and localhost verification

5.5.2 PHP

PHP is a general-purpose scripting language that was originally designed for Web development and it can be embedded into HTML code to produce dynamic Web pages. The code is interpreted by a Web server which has PHP processor module and generates the results. In our case the Web server with PHP module is *Apache HTTP server*. This language can be deployed on the mayor part of the Web server but it is also possible to use the stand-alone shell on almost every O.S. PHP is free software release under the PHP License which is incompatible with the GNU (General Public License.)

PHP was originally created by Rasmus Lerdorf in 1995. The main implementation of PHP is now produced by the PHP Group and serves as the formal reference to the PHP language.

Nevertheless there some critics about the PHP language, for example they say that include weak support for Object-oriented programming, thread safety, unit testing, exception handling, step-through debugging, inconsistent naming and poor performance when compared to rival frameworks and languages. In the past there was numerous security issues

found within the framework. Despite numerous criticisms from computer scientists and programmers, PHP remains the most popular server-side scripting language in the world. [7]

Some advantages of PHP language are shown below:

- PHP is a language multi-platform.
- Connection capacity with the mayor part of Database drivers. The best use it could be with MySQL.
- Modular. This feature makes this language powerful and gives to it the capacity of being adaptable.
- It is widely-documented.
- PHP it is free, what means it is an easy option for all users.
- It allows object-oriented programming techniques.
- It is no necessary declare variables.
- It has exceptions handlers.

The version used in the application development is PHP 5.2.17 (windows version).

5.5.3 MySQL

This is the world´s most used relational database management system (RDMS). MySQL is open source and runs as a server providing multi-user access to a number of databases. It was owned and sponsored by single for-profit firm, the Swedish company MySQL AB, now owned by Oracle Corporation. Although is open source software there are some commercial version that offers additional functionalities under several paid.

MySQL is also used in many high-profile, large-scale World Wide Web products, including Wikipedia, Google, Facebook or Twitter.

The MySQL server incorporates a unique feature called "storage engines", that allows to select the type of internal storage for each table, based on which best suits a particular situation. The selection, again, makes the developer at the table level, and does not affect how the server interacts with the client: SQL commands are the same whatever the chosen storage engine. The client does not need to know how data is stored.

MySQL has a dozen own storage engines, more outboard motors developed by third parties that may be incorporated to the server. Some of the best known are: MyISAM, InnoDB, HEAP, NDB.

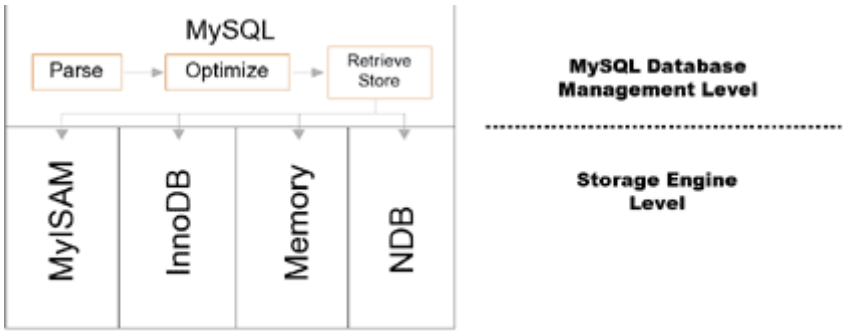

Figure 24. MySQL engines

In this application we use MySQL 5.5. Some of the features of these engines are:

- Transactional
- Record-level locks
- Restriction on foreign keys
- Easy data recovery
- High concurrency safer in writing
- Rollback
- The data is saved to disk

We will use MySQL to save the user´s data (tokens, user name, password and other data taken from the social networking services by the Fad Project application).

Our tables (users, users_fb and users_linkedin) have the following fields: *id, oauth_provider, oauth_uid, oauth_token, oauth_secret, username, password_app, id_user_app.* They have been created with the following sentence:

```
CREATE TABLE `users` (
`id` int(10) unsigned NOT NULL AUTO_INCREMENT,
`oauth_provider` varchar(10),
`oauth_uid` text,
`oauth_token` text,
`oauth_secret` text,
`username` text,
`password_app` varchar(10),
`id_user_app` varchar(10),
PRIMARY KEY (`id`)
) ENGINE=MyISAM  DEFAULT CHARSET=latin1;
```

Database Structure Diagram

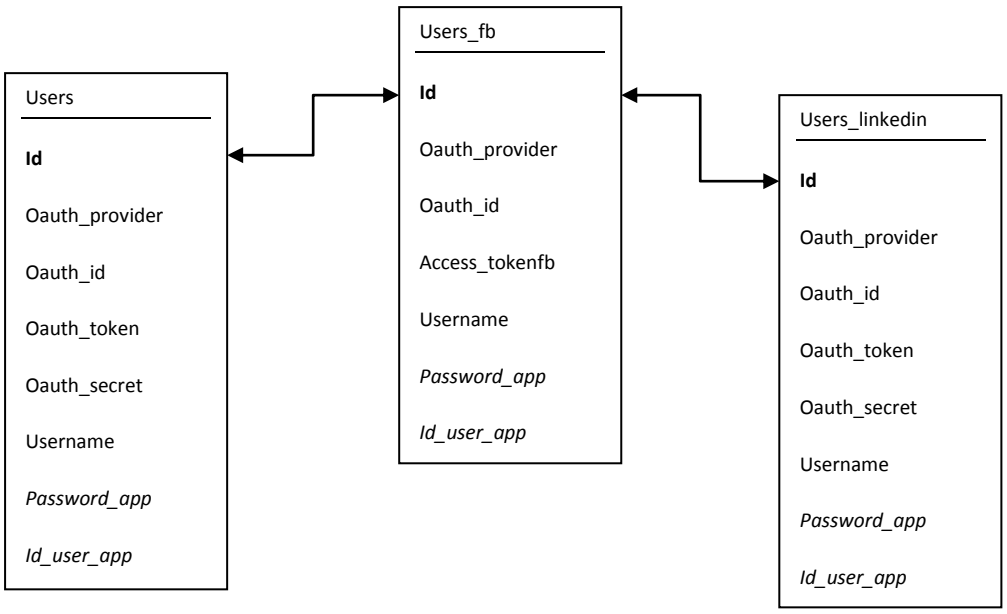

Figure 25. Database Structure

5.5.4 NetBeans

NetBeans is a platform framework for Java desktop applications, but also is an integrated development environment (IDE) for developing with Java, JavaScript, PHP, Python, Groovy, C, C++, Scala, Clojure and some others.

The IDE is written in Java and it is possible to run it on Windows, Linux, Solaris and Mac OS. This platform allows applications to be developed from a set of modules. It also offers reusable services common to desktop applications, allowing developers to focus on the logic specific to their application. Some of the features of the platform are shown below:

- User interface management (e.g. menus and toolbars)
- User settings management
- Storage management (saving and loading any kind of data)
- Window management
- Wizard framework (supports step-by-step dialogs)
- NetBeans Visual Library
- Integrated development tools.

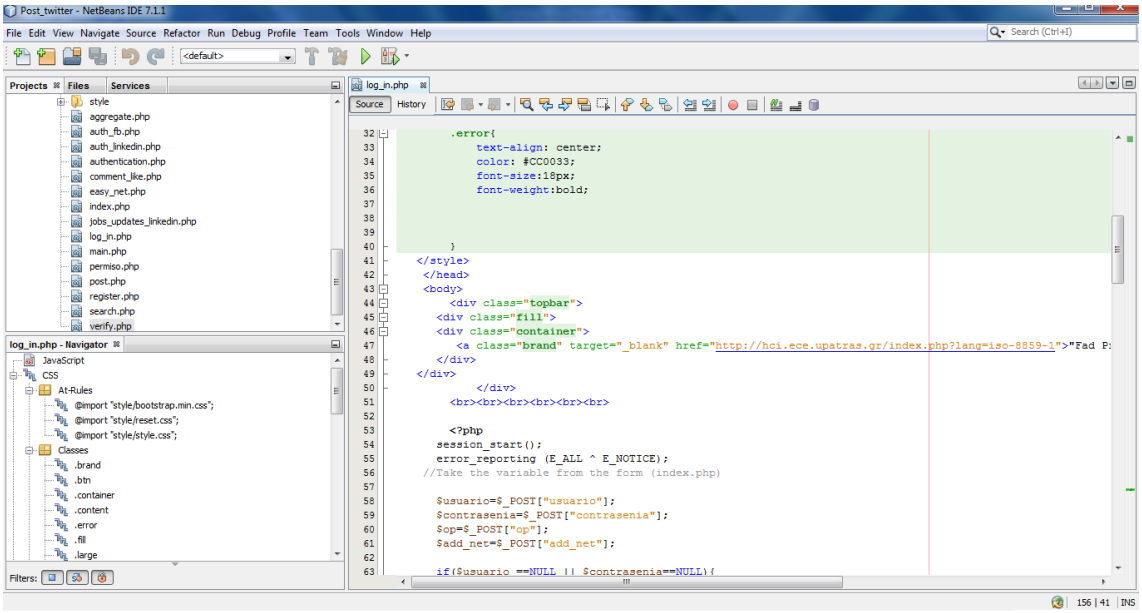

Figure 26. NetBeans screenshot

On the other hand, NetBeans IDE supports development of all Java types: Java SE, Java ME, web, EJB and mobile applications out of the box. One important thing of the IDE is its modularity. That means that all the functions of the IDE are provided by modules, and each module provides a well defined function, such as support for the java language or editing. It contains all the modules needed for Java development in a single download, allowing the user to start working immediately. Modules also allow NetBeans to be extended. It is important focus on the fact that it allows new features, such as support for other programming languages which can be added by installing additional modules.

With the NetBeans IDE download Bundles users can choose to download NetBeans IDE bundles tailored to specific development needs. Users can also download and install all other features at a later date directly through the NetBeans IDE. There are different types of bundles offered by NetBeans:

Web and Java EE

It provides complete tools for all the latest Java EE 6 standards, including the new Java EE 6 Web Profile, Enterprise Java Beans (EJBs), servlets, Java Persistence API, web services, and annotations. NetBeans also supports the JSF 2.0 (Facelets), JavaServer Pages (JSP), Hibernate, Spring, and Struts frameworks, and the Java EE 5 and J2EE 1.4 platforms.

Ruby

The versions prior to 7.0 include a Ruby editor (with code completion, and syntactic and semantic highlighting), debugger, and full support for the Ruby framework. But NetBeans release 7.0 and above no longer supports Ruby (and Rails).

Java ME

It is a tool for developing applications that run on mobile devices; generally mobile phones, but this also includes entry-level PDAs and Java Card.

PHP

NetBeans supports PHP since version 6.5. It includes:

- syntax highlighting, code completion, occurrence highlighting, error highlighting, CVS version control
- semantic analysis with highlighting of parameters and unused local variables
- PHP code debugging with xdebug
- PHP Unit testing with PHPUnit and Selenium
- Code coverage
- Symfony framework support
- Zend Framework support (since version 6.9)
- PHP 5.3 namespace and closure support
- Code Folding fo Control structures

Since we are used to work with NetBeans environment we have selected NetBeans IDE 7.1.1 with PHP Bundle to develop the application. Since it also offers database administration service we can check our database from the same environment.

Chapter 6

DESCRIPTION OF THE SOCIAL NETWORK AGGREGATOR

6.1 Introduction

In this section, we will explain in detail all the necessary steps to develop the ***Fad Project*** application. First, it is shown how to join as a developer in the social networks we want to use in our application. Then we will explain how the application is working, the files that made the application works and all its features.

6.2 Join as a Developer

If we want to interact with the social networking services through one Web-based application, it is necessary to join as a developer in all the social networking services involved in our design.

Twitter Developers

We first need to set up a new Twitter application. To do this, we will enter in Twitter Web site and click on "developer" and "create an app" links. After this we will fill in the fields for our site accordingly. It is important to select *Browser* in *Application Type*, and set the *Callback URL* to the proper path were the files are hosted. This must be something like http://localhost.com/folder/name_of_the_file.php (http://localhost/ won't be accepted because it doesn't have a domain name).

Finally we must select *Read & Write*, fill in the captcha, click "Register Application," and accept the Terms of Service.

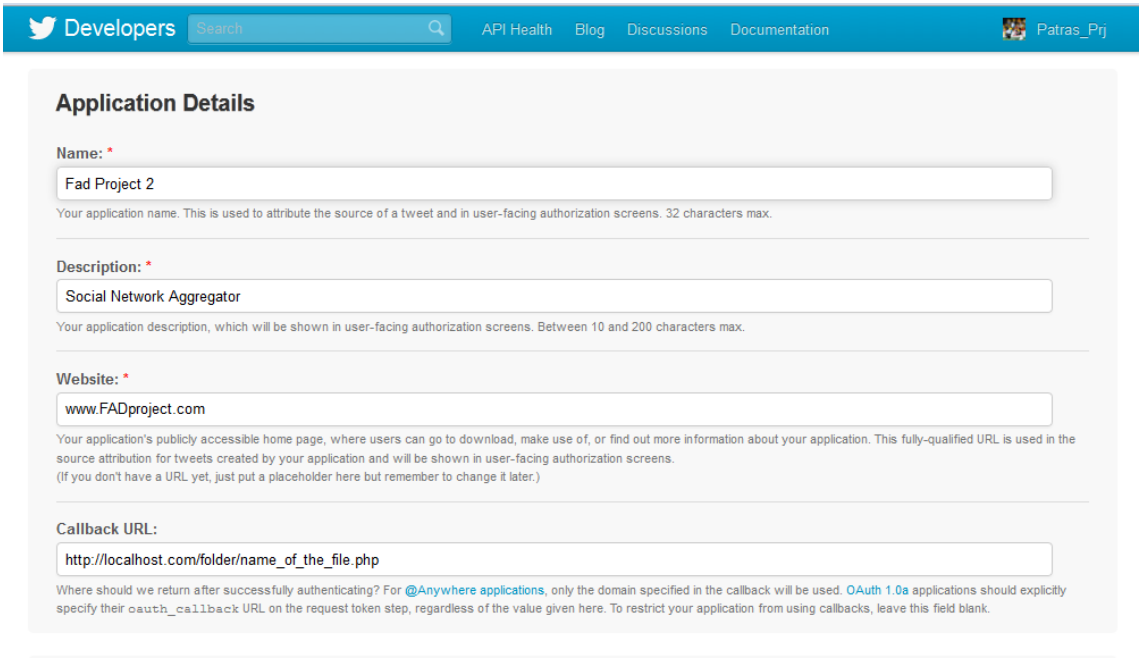

Figure 27. Create application Twitter

We need to save the *Consumer Key* and *Consumer Secret* since we have to use it to interact with the API of Twitter. Following these steps, we became Twitter developers and the application has been setting up.

Facebook Developers

In the same way as we did with Twitter, we need first create a Facebook application, since we are going to use the Facebook Graph API. This does not necessarily mean that our application will be on Facebook (although we can). But we just need a Facebook application to access the API with the *APP ID* and *APP SECRET*.

After click on Facebook developers and Apps links we will be prompted to log in and allow the Developer application to access our account. After accepting we will be redirected to the Developer App homepage. Here we have the option of create new app, what we need.

Once we have introduced the name of the application we can configure it. It is shown below:

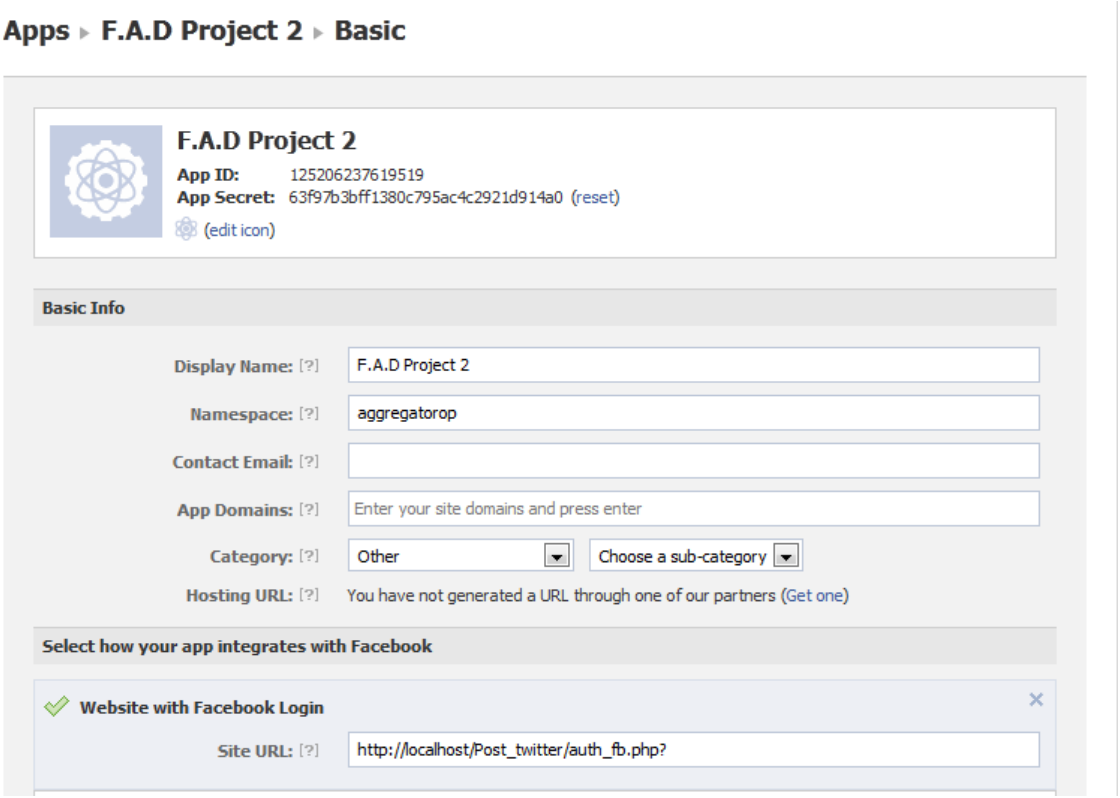

Figure 28. Creating Facebook application

After fill in all the fields, and select how the application integrates with Facebook we must save the APP ID and APP SECRET, since we need it to interact with the API of Facebook. After these steps we only need to create another one application on LinkedIn and we will have all we need to start with the code of the Fad Project application.

LinkedIn developers

As in the other social networking services, the first step is to go to the developers section in LinkedIn Web site and click Add New Application.

Figure 29. LinkedIn Developers

Now we must fill in all the fields of the formulary. Note the some important fields such as "Integration URL", "OAuth redirect URL" and "Agreement Language". Integration URL must be our project URL and Oauth redirect URL is the URL where the user will be redirected after give permission to the application. On the other hand, agreement language defines the display language of the user agreement screen.

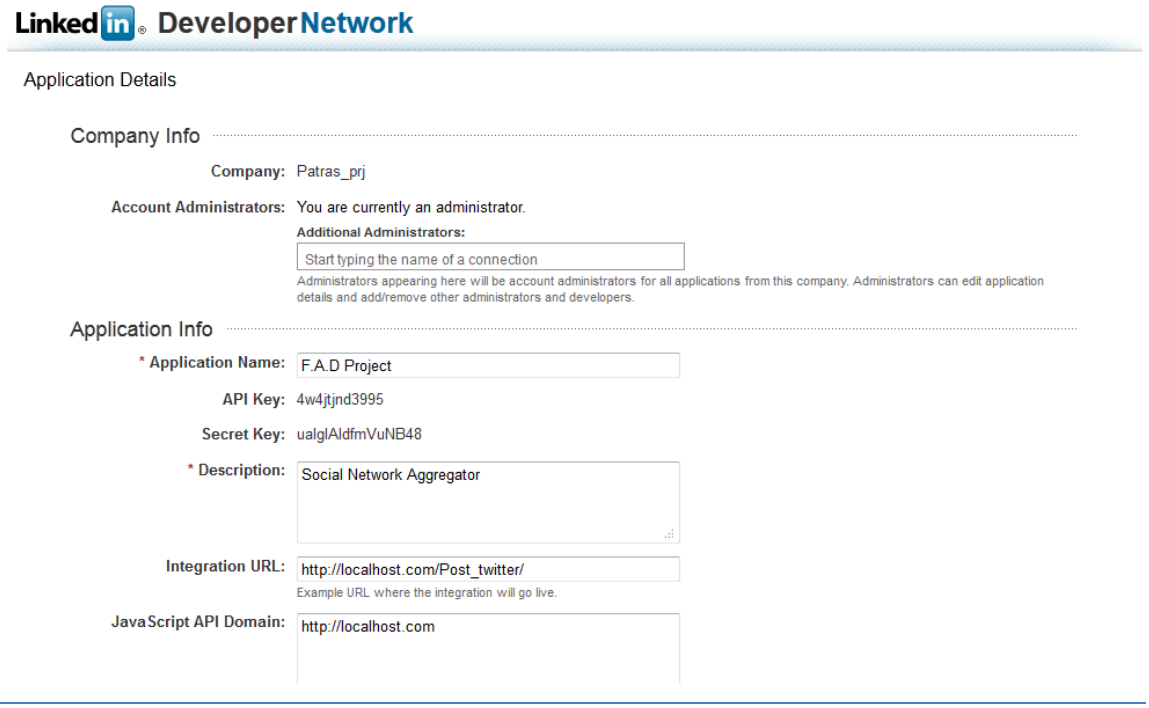

Figure 30. Creating application LinkedIn

After completing these steps, we have all the applications created in all the social media, so what we need now is to start with the code that will define the Fad Project application.

6.3 Login and Register Steps

We will start with the Welcome page, where the user has the possibility of *log in* the application (if it is already user of the application) or *register* (the user wants to create a new profile in the application).

The design of the page is quite simple. It shows two formularies offering the 2 options: Log in or Register.

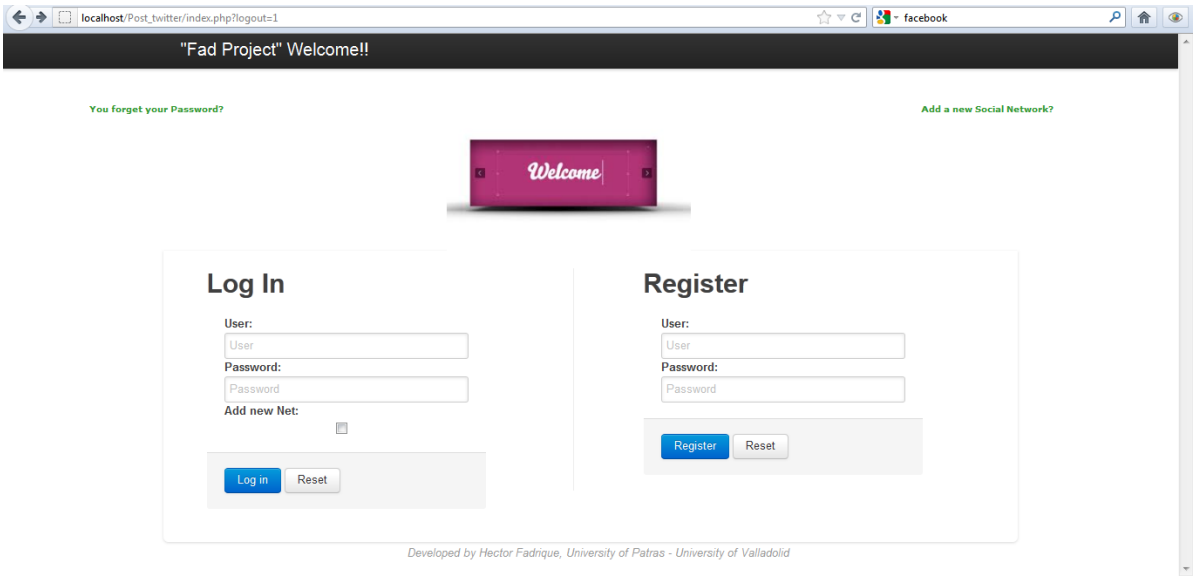

Figure 31. Welcome page Fad Application

The user must register first to use the application. Otherwise it will appear one message "You must register first to use the application".

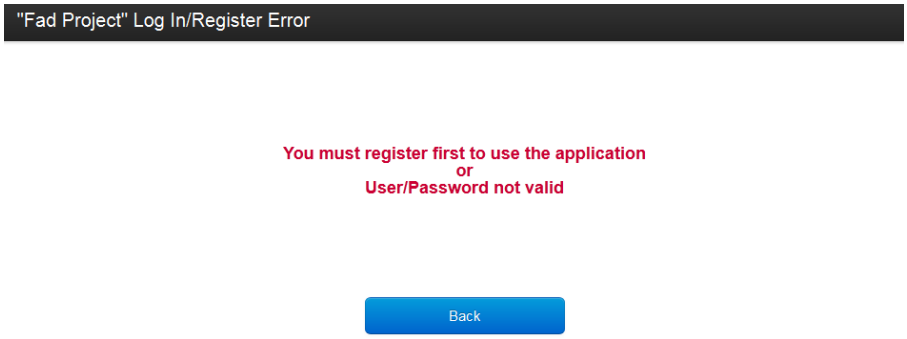

Figure 32. Error Log in Fad Project

The site presents two formularies. The ***Log In*** formulary has the fields: *User* (username in the Fad Project application), *Password* (password in the Fad Project application) and *Add a New Net*. The Fad Project offers the possibility of administrate 3 different social media (Facebook, LinkedIn and Twitter) but is not necessary to administrate all of them to use the application. In fact the user has to register in al least two social media to use it. For example, could be one user that only has Facebook and Twitter but not LinkedIn, so he could register first to use these two social media and use the application. After some days he decides to open a new profile in LinkedIn and administrate it through the Fad Project. To do this is not necessary create a new user in the Fad Project. He must Log In with his username and password and selects *"Add a New Net"* and he will be redirected to "register steps" where the users of the application select which social media they want to use through Fad Project application.

On the other hand, the ***Register*** formulary has the fields: *User* (username in the Fad Project application) and *Password* (password in the Fad Project application). These values will be stored in the database so that the application can validate and get the information from one user during the log in step.

The welcome page has also some help links: *"You forget your password?"* and *"Add a new social network?"* that offer help to a new users and guide them through the application.

The welcome page has been made from the file **index.php** and when a user submits the information in one the formularies the information is sent to **log_in.php**, where the information sent is evaluated.

Log_in.php

What we do in the log_in.php file is to evaluate the information passed from the index.php formularies. The first evaluation in the document is check if all the fields of the formulary have been filled, if not we will show one error text and redirect again to the previous page. Then the document splits in two parts: Register option and log in option.

If the user is trying to log in the application we check if the user is actually registered and has all the necessary information stored in the database. If not it shows an error text and redirect to the previous page (see Figure 29). If everything is correct, the application gets all the necessary information from the database for this user and put it into session variables to use it during this session.

Finally, in the login option it is evaluated if the user wants to add a new net to his account (in that case he will be redirected to "register steps") or if it is a normal log in action. In that case it will be lead to the main page of the application: **main.php**

```
if ($op=="register"){
//Checking whether id_user already exist
    $checkuser = mysql_query("SELECT id_user_app FROM users WHERE id_user_app='$usuario'");
    $checkuser1 = mysql_query("SELECT id_user_app FROM users_fb WHERE id_user_app='$usuario'");
    $checkuser2 = mysql_query("SELECT id_user_app FROM users_linkedin WHERE id_user_app='$usuario'")
    $username_exist = mysql_num_rows($checkuser);
    $username_exist1 = mysql_num_rows($checkuser1);
    $username_exist2 = mysql_num_rows($checkuser2);
    if($username_exist>0 || $username_exist1>0 || $username_exist2>0 ){
        echo "<p class='error'>This user name is already used</p>";
    }
     else{
  //save data into session vars
  $_SESSION['id_user_app']=$usuario;
  $_SESSION['password_app']=$contrasenia;

  header('Location: register.php');


}
  }
  else{

if ($op=="login") {
$query = mysql_query("SELECT id_user_app,password_app FROM users_fb WHERE id_user_app = '$usuario' a
$data = mysql_fetch_array($query);
$query2 = mysql_query("SELECT id_user_app,password_app FROM users WHERE id_user_app = '$usuario' and
$data2 = mysql_fetch_array($query2);
```

Figure 33. Part of log_in.php file

On the other hand, if the user has selected the register option the application checks whether the username chosen by the user is available or if it is already used by other user. If there is no problem with the username, the user will be redirected directly to "register steps" given by **register.php.**

Register.php

The register page offers the users which social networking service they want to administrate through the Fad Project application. It is very simple and intuitive site but it also has a help link so that the users can use the application properly and without any doubt.

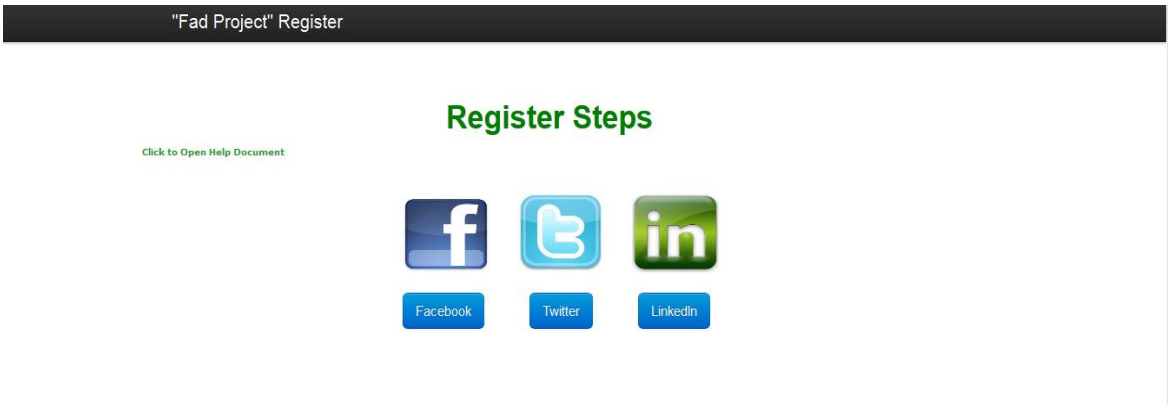

Figure 34. Register Steps Fad Project

As the reader can see in Figure 31, this page shows the three options for the social media that the application supports. The user will push the proper button and he will be redirected to the OAuth dialog (see Figure 14, 17 and 22) where the user should give permission so that the application could post on his behalf.

The user must register in at least two social media so that he can use the application. When the user has been registered in one net the application will redirect him to register page again so that he can continue registering in the other social nets. Once the user has been registered in at least two nets, it appears one button "Go to main page". This button directs the user to the main page.

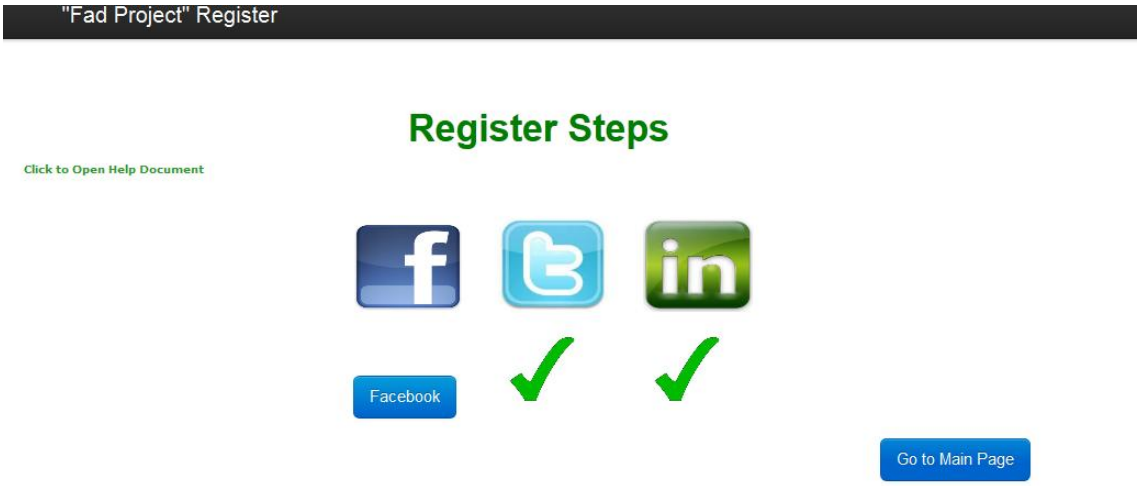

Figure 35. User registered

The required files for the registration process in the social media are **authentication.php** and **verify.php** (Twitter)**, auth_fb.php** (Facebook) and **auth_linkedin.php** (LinkedIn).

For the authentication in Twitter the first file used is authentication.php in which we follow the process explained in the section 4.2.2. From this file the user is redirected to verify.php. This document we get the useful information from Twitter, tokens, username, uid an so on, we store it in our database for a future uses and put the values into a session variables for this session.

```
//insert the variables
$twitteroauth = new TwitterOAuth($consumerKey, $consumerSecret, $_SESSION['oauth_token'], $_SESSION['oauth_
// Render the request token into a usable access token
$access_token = $twitteroauth->getAccessToken($_GET['oauth_verifier']);
// Save it in a session var
$_SESSION['access_token'] = $access_token;
// Getting the user's info
$user_info = $twitteroauth->get('account/verify_credentials');
// Print user's info

$_SESSION['info'] = $user_info;



//*** ++ Registration step in Database ++***

$link= mysql_connect('localhost','root','HectorFadri') or die (mysql_error("Database does not exit"));
mysql_select_db('maula',$link);//select the database
```

Figure 36. Verify.php code

The authentication step in Facebook happens in auth_fb.php. Here we define the permission to ask the user in the OAuth dialog and when Facebook redirect back to the application we get some information from the Facebook account, like we did with Twitter, store it in the database and put the values in the session variables.

Finally, the authentication in LinkedIn in the auth_linkedin.php file is quite similar to the previous authentications. We direct the user to the OAuth dialog to get the user permission

and after it we get some information from the LinkedIn account, store it in the database and save it in session variables.

6.4 Main Page

The Main Page is one of the most important pages of the application. Fro, here the users decide what they want to do, which social net they want to check or which social media they want to update among others options.

They design is quite simple and visual. It shows the three main options of application: ***Easy Social Networks***, ***Fast Post*** and ***Normal Social Networks***. It also offers the possibility of log out the application with the logout button.

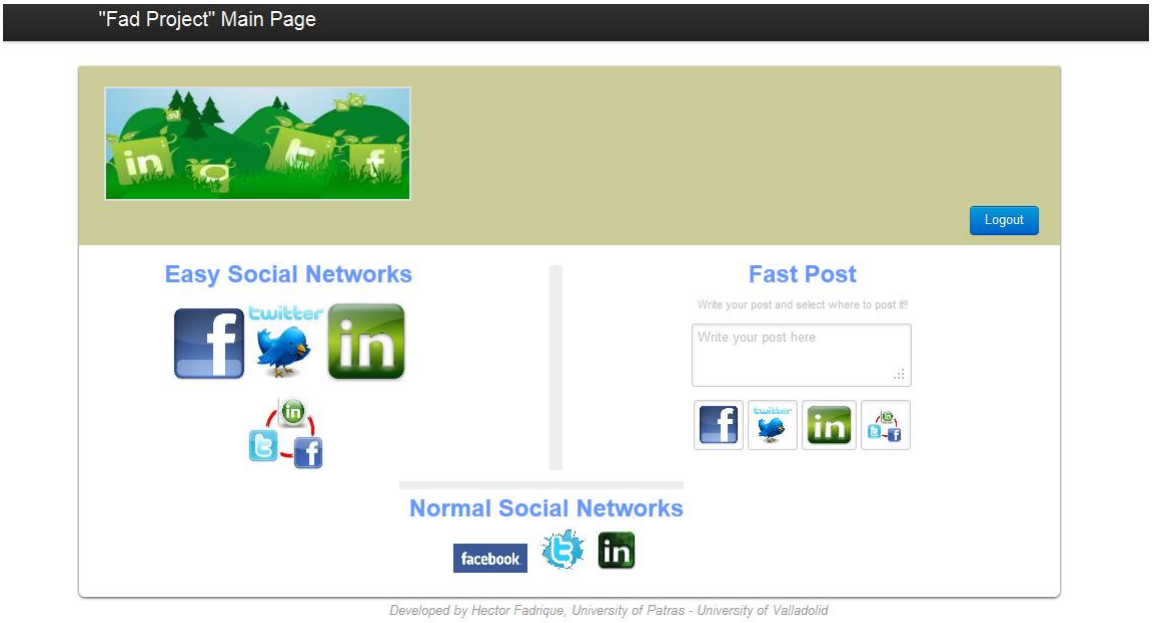

Figure 37. Main Page

Actually, this file **main.php** is only the layout and some links to other files. As the reader can see in the Figure 34, the Main Page is divided in three areas well differentiated. The section *Easy Social Networks* offers 4 different possibilities: Facebook, Twitter, LinkedIn or all the social media together. These easy networks offer the possibility of using the social networking services in an easy way. That means the basic features, such as check the wall or news feed, search for an event or hash tag, post, comment or like among other options. It is clear that it has not all the features of the real social media, but the aim of this application is that the users can administrate all their nets from the same place easily, so the Fad Project application offers the basic actions for the users. Check the updates of friends and connections and be able to update the social networks should be enough. Of course to administrate their accounts or other actions more complicated the users must visit the *Normal Social Networks*. One special feature of the Easy Social Networks is the fourth option, "*all together*" button. This button

offers the possibility of checking the updates of all the social networking services at the same time, this means in the same Web page.

The *Normal Social Networks* is based on three links that guides the user to the real social networking services. It opens the service in another browser and allows the user to enter in the real services if they need to do something more than the basic actions supported by the application.

Finally, the *Fast Post* feature offers the possibility of posting in an easy and simple way. The user only needs to write something in the text area and select where to post it. As we can see in the figure 34, the user can update Facebook, Twitter, LinkedIn or all at the same time, fast and simple.

With the aim of avoid errors with the session and with the users, it has been implemented the *Logout button*. This button has two goals. The first is to destroy the session created for the current user of the application so that all the session variables are removed and there is no available data from the user. The second is to lead the user to the index.php, what means to the *Welcome Page*, since the user cannot use the application any more, until he log in again.

6.5 Easy Social Networks

As we said before, the Easy Social Networks it is a simple and fast version of the real social networking services, with some basic functionalities such as, updates, news feed, search people, events, post etc. One of the important issues of the social media is the capacity of knowing the last news at the moment, it because of that the Easy Social Networks has a refresh each 240 seconds, so that the user could have always the last news.

It is divided in four links: Easy Facebook, Easy twitter, Easy LinkedIn and All Together. The three options (Easy Facebook, Easy twitter and Easy LinkedIn) have been developed in the file **easy_net.php.** This file is divided in three parts, each one for one easy social network.

Easy Facebook

The first part is the part of Facebook. The layout of the Easy Nets is quite similar. Basically it only changes the content not the design of the layout. As we can see in Figure 35, Easy Facebook shows the Facebook profile (picture, username and URL to the Facebook site) of the current user, in this case Manolo Peret. Inside the box we have two links “Show News Feed” and “Show Wall”. By default it is showing the Wall when a user enters in Easy Facebook (the last 5 post in the wall), but users can check the last updates of their friends by clicking on the News Feed link. After clicking on it, it will appear news feed information instead of the Wall data. The users can also check all the data in the Wall (not only the last 5) and News Feed by clicking on the “show all” link at the end of the page.

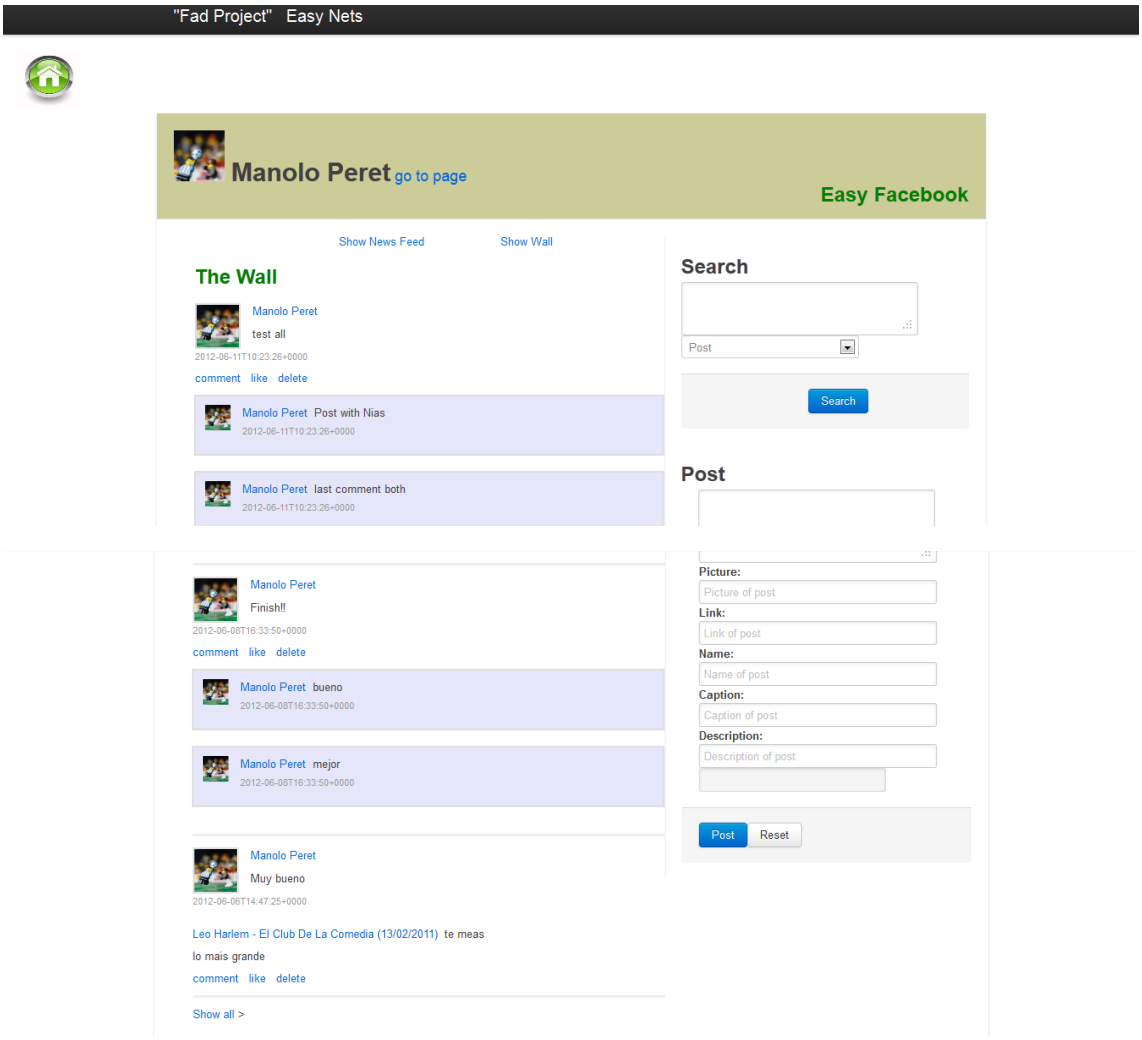

Figure 38. Easy Facebook

In the right column, the users have the chance of searching for information in Facebook net. The search is based on keywords, what means that the next page will show all the results that match with the keyword. The users are able to search in 3 different fields: Post, Groups and Events.

The search engine works in this way: The user writes the keywords he wants to find, for example “Blues show”. After this, the user selects where he wants to search, for example “Events”. Finally the user must click on search button. With information what we are doing is search all the public events on Facebook about “Blues shows”.

The information of this formulary is sent to another php file, **search.php**. This document is divided in two parts, since it is used to make the search for Twitter and Facebook. The first part is used to make the search in the proper API (Facebook or Twitter) and then show the result in a correct way. In the figure 36 we can see the results for our Blues show events.

The results are shown in the Search Page. This page shows all the information that matches with the keywords in the left column. Here it shows the picture of the event, name, link to find it on Facebook, posting date and location of the event.

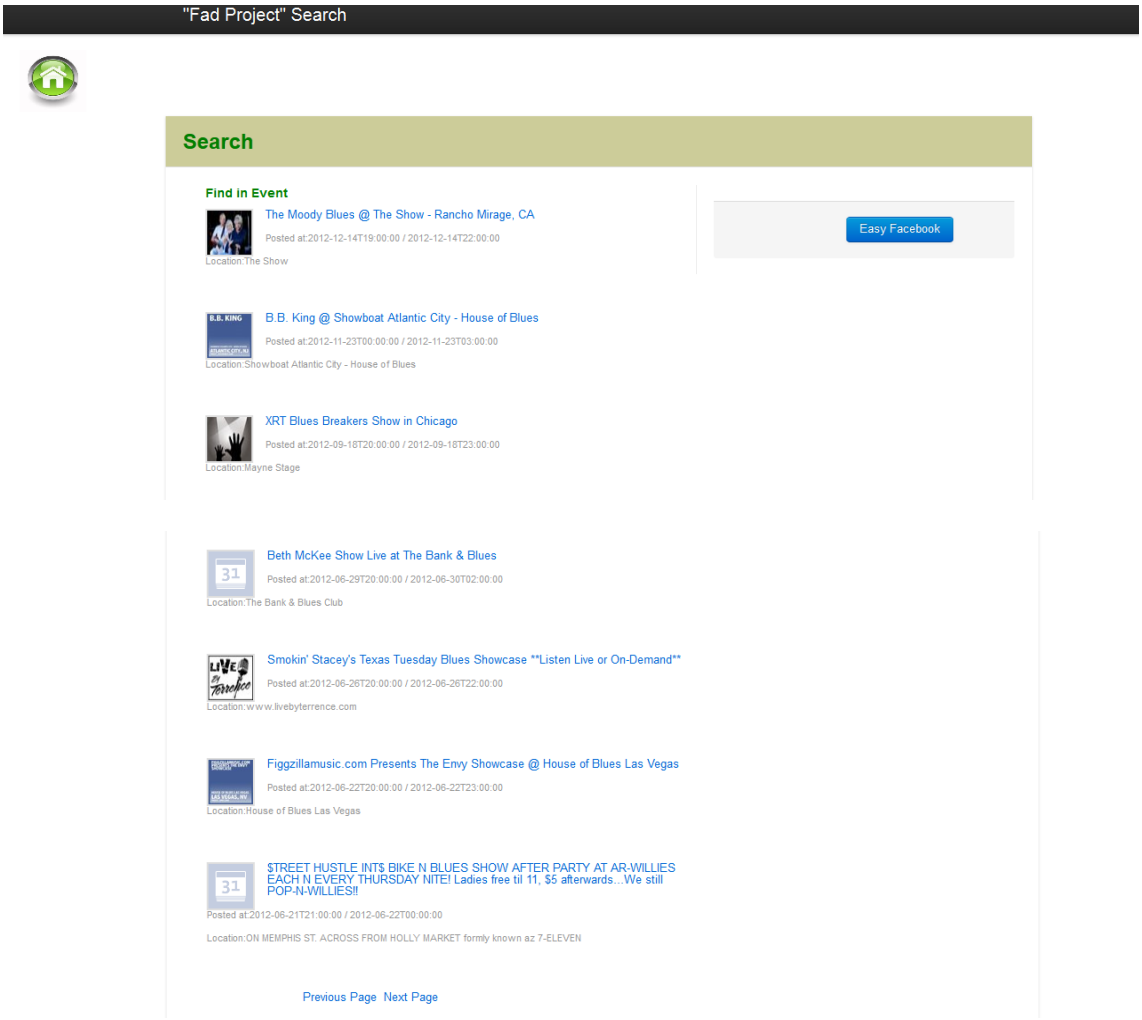

Figure 39. Easy Facebook Search

At the end of the page there are two links: *Previous page* and *Next page*. Since there is a lot of information on Facebook, different users and Events, Groups and so on, it is necessary to paginate the information found, so that the user can navigate and manage all the information.

In the right column the users have the “Easy Facebook” button with which they will be redirected to the Easy Facebook page. But if the users want to go straight to the main page, they must user the “Home button” in the left side, on the top of the page. This button is located in all the pages of the application to make the experience more comfortable for the users.

The other options for the search engine works in the same way. Some changes are related with the information to show. For example if the users are looking for one keyword in the Post field, it will appear the profile picture of the user who posted the keyword, all the text he posted, one link to his profile, and the posting date. Anyway the working order is basically the same, only changes the information to be showed.

Coming back to the Easy Facebook page, the users have another option, the Post. Here the users are able to update the information on their Facebook profiles. The user can update the Wall writing in the text area, uploading a picture, links, name, caption and description.

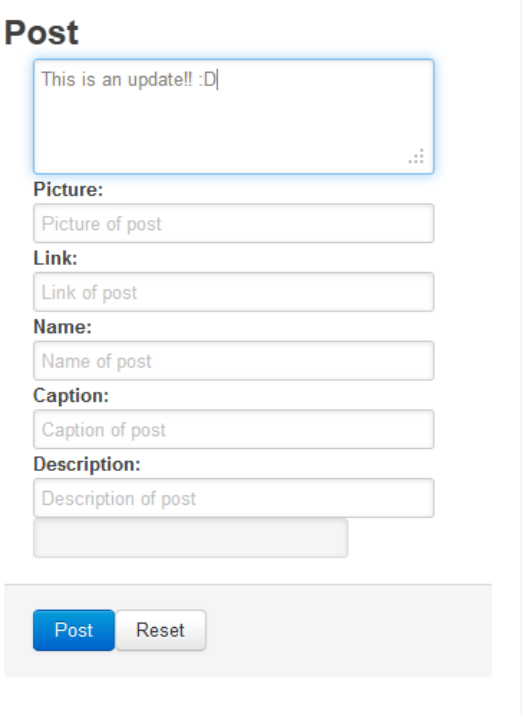

Figure 40. Post Easy Facebook

The result of the post can be checked in the following figure:

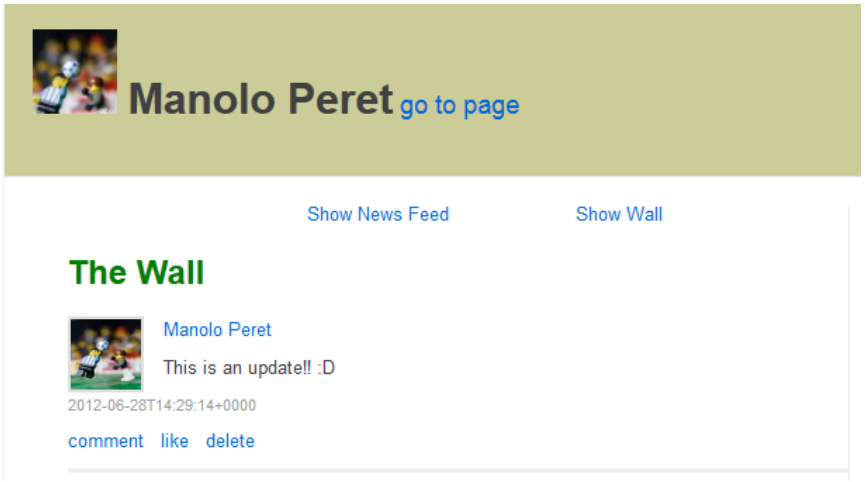

Figure 41. Information updated Facebook

The Post formulary sends the information to the **post.php** file. Here the application manages all the updates from the other social media supported by the application. As we can see in the

previous figure, the user can also “comment”, “like” and “delete” one post. When the users click in one of this links located in each post of the Wall or News Feed, the application sends the information to post.php where it interacts with the Graph API so that the information can be updated. After lead to the users to post.php, the user is redirected to the Main Page.

Easy Twitter

The Easy Twitter design is pretty similar to Easy Facebook design. The application shows the basic profile features of the user such as his username, profile picture and the link to go to his Twitter site.

Looking at the figure 39 we can realize that the last tweets are in the left column, while the Search engine and the Post formulary are in the right.

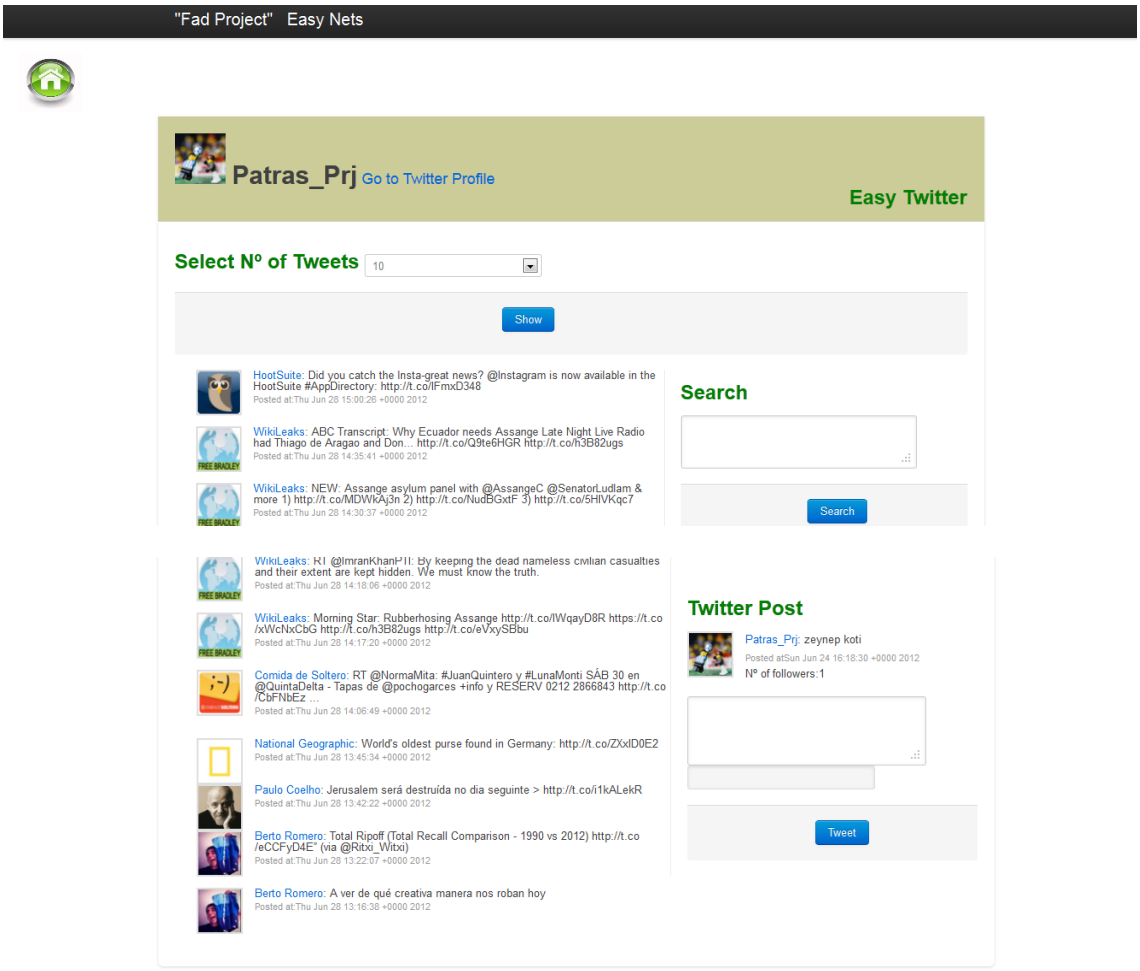

Figure 42. Easy Twitter

In this easy net the users are able to select how many tweets to see (Select Nº of Tweets field). Since Twitter only gives information for the last 200 tweets, users can select from the last 10 (by default) to 200 tweets. With the aim of make the user´s experience easier, when a user selects to watch more than 80 tweets it appears a link close to each tweet “go up” to go to the top of the page, without using the scroll bar.

The information provided in the tweets is very simple. It shows the profile picture of the person, company or group who tweet, one link to their Twitter profile, the text (tweet) and the date the tweet was posted.

The Search engine is very similar to the engine used in Easy Facebook. It is based in keywords and it finds every tweet in which appears the keyword, hashtag or username. To better illustrate, we will try to find the hashtag “#blink”. Writing #blink in the text area and using the search button we will be redirected to **search.php** file. The result is shown in the following figure.

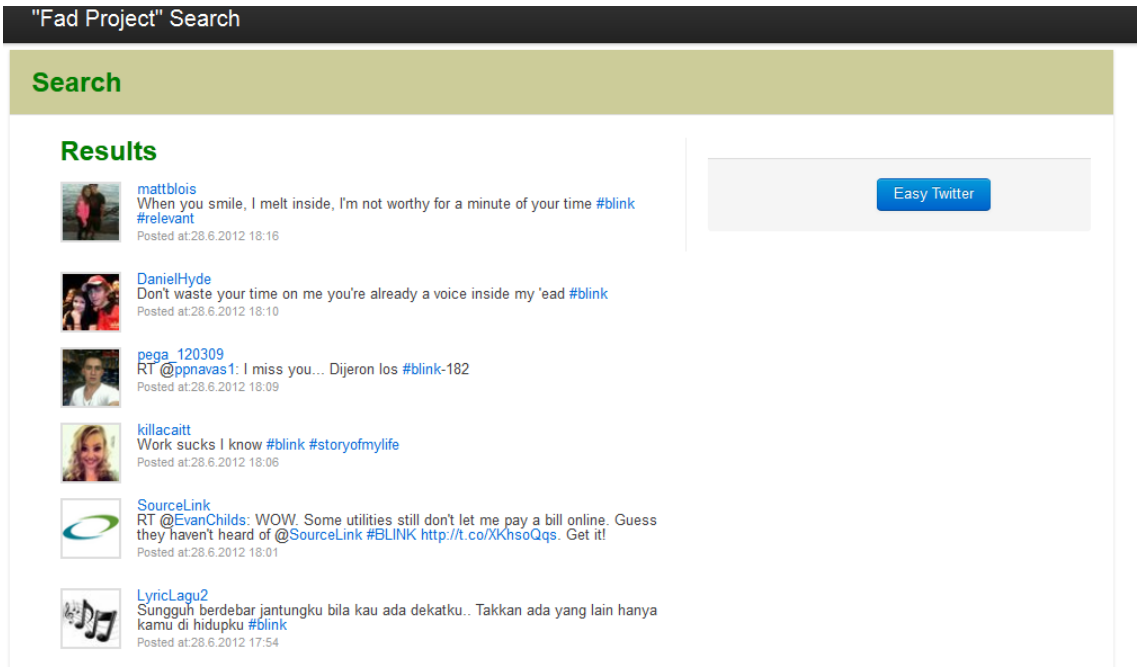

Figure 43. Twitter Search

The result is very similar than we saw for the Facebook Search. It is shown the profile pictures of the users, their names, the links to their Twitter sites, tweets and the date. This time, on the right column we have to lead the user to the Easy Twitter page instead of Easy Facebook.

Finally, it is implemented one formulary to tweet in Twitter showing the last tweet uploaded, the picture profile, number of followers and the characters used in the current tweet, since Twitter only permit 140 characters.

Figure 44. Easy Twitter Post

Easy LinkedIn

Since LinkedIn is just a different kind of social media, we treat it in a different way than the others. This is a social networking services oriented to working nets, find Jobs, make new connections, job seekers and so on. Although the design is the same than the others the updates are less important here.

In the left column we can two things. First of all it is shown the last updates of the connections and the last updates of the user. It shows the profile picture, name, link to the user´s site in LinkedIn and all the information updated. Under the last updates it is located the user´s profile in LinkedIn, the previous jobs, current job, education and connections.

Now in the right column there are three formularies: Job Search, People Search and Share. The Job Search engine is used to find new Jobs with all the important information. For example let´s search jobs in Microsoft company, located in Chicago. Writing Microsoft and Chicago as a keywords in the text area of the formulary and clicking the search button it will redirect us to **jobs_updates_linkedin.php** file. Looking at the figure 43 we can see the results of the search. It shows the company name, the job poster, the description of the job, location and salary if it is indicated. As we did with the other nets, since the amount of information could be enormous, we must paginate the information so that the user can check all the possibilities.

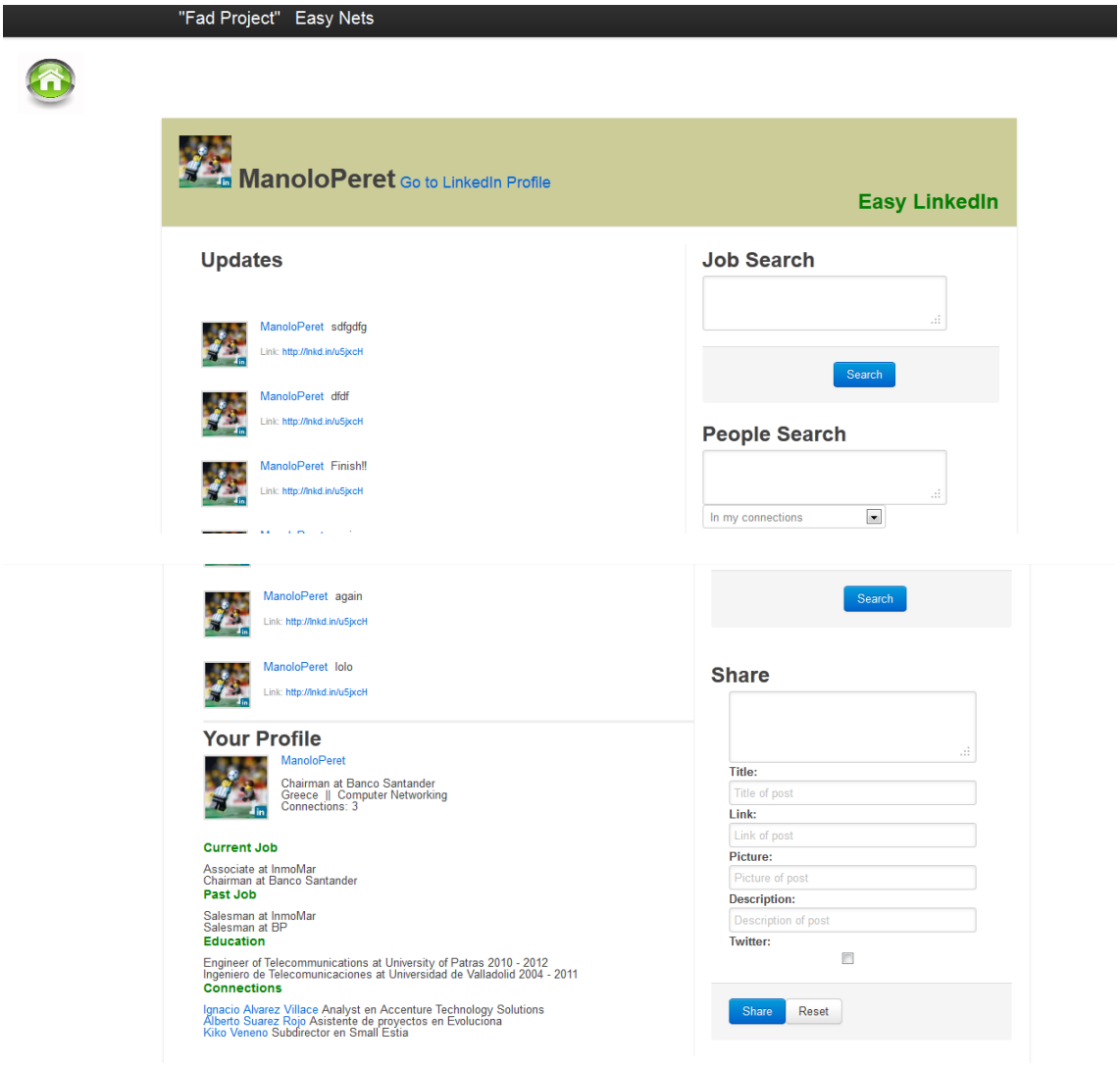

Figure 45. Easy LinkedIn

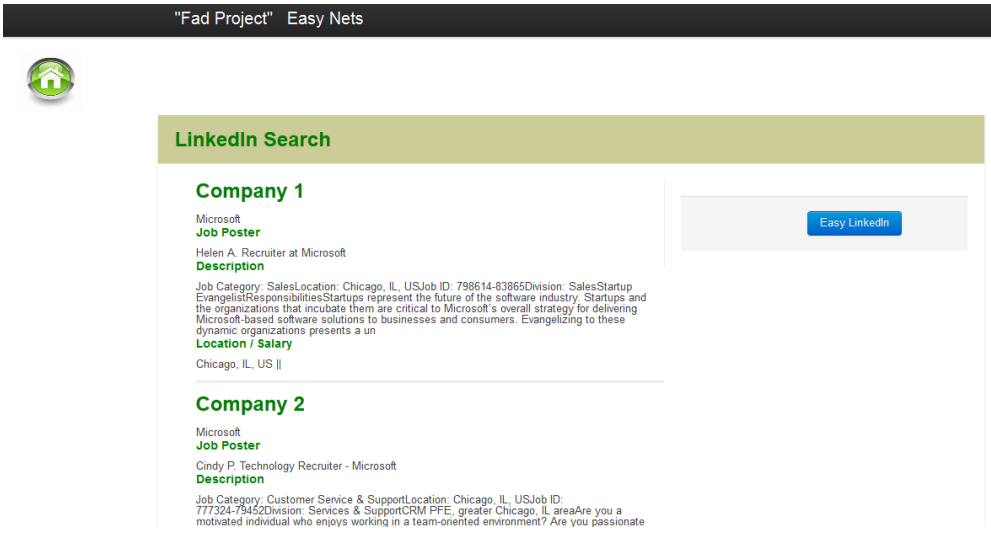

Figure 46. Job Search LinkedIn

Other possibility for search is the “People Search”. This feature allows the users to search for LinkedIn users, old connections, new connections or professionals all over the world.

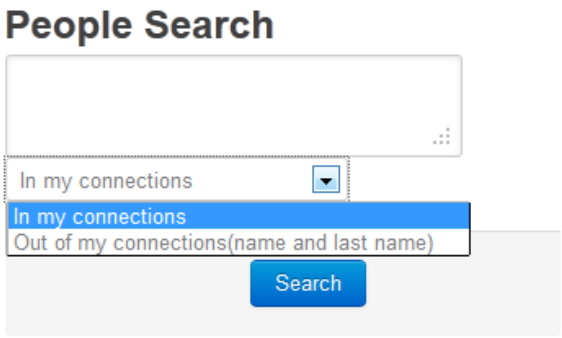

Figure 47. People Search Easy LinkedIn

The formulary has the text area in which the user has to write the name of the professional he is looking for and one field with two options: “In my connections” and “Out of my connections”. The difference between these two fields is that “In my connections” the search engine makes the searching using keywords so that the user can search by a name, company or other property that appears in the user´s profile. On the hand, the search based on “Out of my connections” makes the searching based on first name and surname of the professional. We can see one example of how it is working this feature. Let´s search for Mike Green in LinkedIn network, with the field Out of my connections. After make the search we can check the results in figure 45.

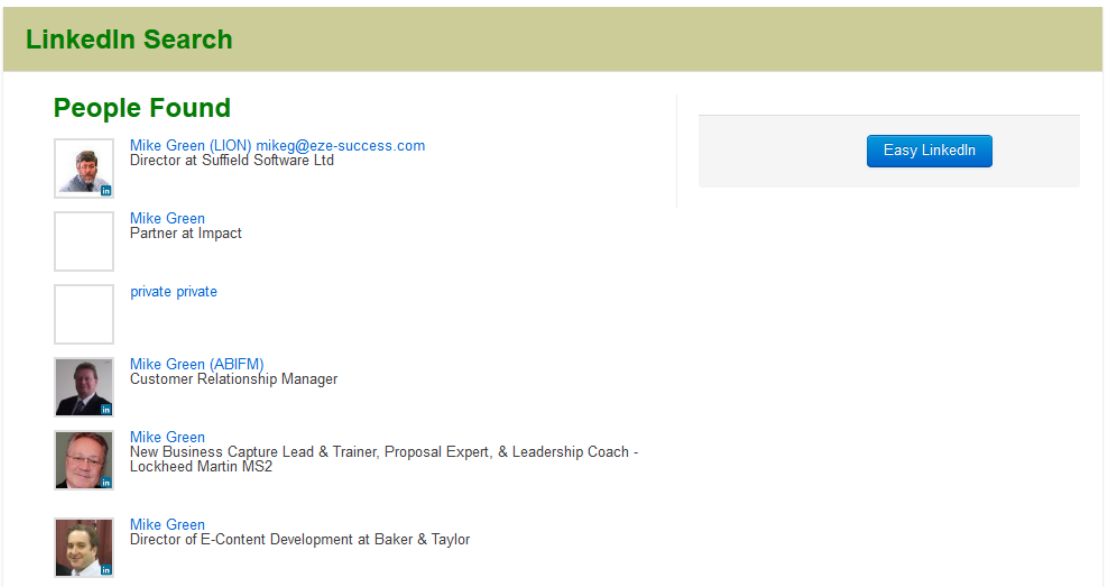

Figure 48. People Search Easy LinkedIn

We can see again that the information recovered is simple and useful. It shows the picture of the professional, name and surname, link to the user profile and the headline. As we did with other searching features, when the amount of information recovered is too big it is necessary

paginate the information. With the links “previous page” and “next page” the user can check all the information in simple and comfortable way. It is important to point that some profiles are closed to the public. Because of this, some profiles will appear with “Private” name and surname.

The last feature of Easy LinkedIn section is the Share formulary. This formulary has the same function as Post in Easy Facebook or Easy Twitter.

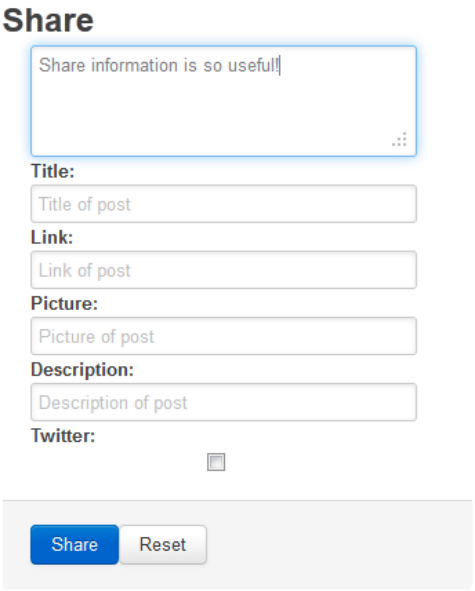

Figure 49. Share with Easy LinkedIn

This formulary has the text area, title of the post, share a link, pictures description and it also has the capability of share with twitter account, but only if the professional has activated this feature in his LinkedIn profile.

All Together

This is the last button in this section. Since one of the goals of this application is to save time to the users so that they can check the last updates easily and faster. Because of that, it is necessary to offer the possibility of check all the updates in the same place, and this is what the “All together” button does.

Although the design is similar than the other Easy Nets, here there are some changes. Here the user is able to check the updates, but in the case of Facebook is able to comment, like and delete post as well. This page is executed in **aggregate.php.** This document is divided in three parts, each one for each Easy network. We can see how it looks like in the figure 47.

We introduce in this file, another refresh (240s) so that the users could have this page open and check from time to time all the new updates in their social networks easily and faster. If

the users need more features such as update one net or look for specific information, they should change to one of the Easy Networks.

Figure 50. All Thogether button

With this feature we have all updates in the same place, so the users are able to know the last news in their social media in simple and easy way. Now it is time to make the updates easier and this is possible with the Fast Post feature.

6.6 Fast Post

The Fast Post feature was created with the aim of updating each social network from the same place. The design of this feature is quite simple since it is only a formulary. The Fast Post has the text area where the user must write the post or update, and four buttons. By clicking this

buttons, the information in the text area will be sent to the **post.php** file, where the application will decide which social network must be updated.

Figure 51. Fast Post

The can update one of our social networking services supported (Facebook, Twitter and LinkedIn) or all this nets at the same time.

With the introduction of this feature the users will not need to sign in all the social networks each time they want to update his status. Here, the users are able to write the updates and share it in the selected network or even in all of them. Hence, it makes the experience of the users easier since they can administrate from the same site all their social networks.

6.7 Normal Social Networks

The Normal Social Networks it is the simplest feature of the application. It offers the possibility to the user of going to the real social networking services. Although the normal behavior is to check the updates and update the networks, sometimes is necessary change the configuration of the profile, create some events or create new connections. Since these features are not present in this version of the social network aggregator (1st version) it is necessary to offer the possibility of going to the real social networks so that the users can change everything there if they want to.

Figure 52. Normal Social Networks

If the user has already one profile created in these social networking services, the links will lead the user to his profile immediately the site in a new window. But whether the user has no profile in that net or he did not register this social network in our application, the link will only lead him to the sign in page of the social media.

Chapter 7

EVALUATION OF THE APPLICATION

7.1 Introduction

The main goal of this chapter is to test the application implemented in the previous chapters in a real case study.

For that purpose, this chapter will present an experiment in a real environment in which the application developed could be tested.

7.2 Evaluation of the application

Once the application has been developed, the next step should be to evaluate it. To do this activity, some experiments and people are required for testing the program. The evaluation is one of the most important steps in the moment of designing and implementing one application, since in this step the developers are able to know whether the results obtained have been the suitable ones, and act according to the tips or opinions suggested by the users.

The evaluation requires a real environment, some people who test the application and did not have any contact with the application before the tests. This will provide an objective opinion about the project form the exterior and will help to realize about the lacks and deficiencies of the application.

7.2.1 Scenario

The scenario selected to test the application was the laboratory of the *Human Computer Interaction Group*. Here users will enter in the laboratory alone. The developers will explain them the purpose of the project and how the application works. After this step, they developers will provide to the users the schedule, some actions they will perform to test the application. Users will enter one by one in the laboratory testing the application. Finally, after the schedule, developers will provide users some questionnaires so that they can evaluate the usability of the application.

7.2.2 Activities

The evaluation of the application developed consists in one schedule that users must follow so that they could interact with the application and after this, evaluate it. It is not a good idea to test the application letting the user interacting with the application, since all of them must follow the same routine, in order to delimit the evaluation process.

Once the developers have explained about what topic is the application, they will provide the schedule with the activities the users must follow. This schedule must present simple and easy steps so that the users can learn how to use the application and could evaluate it easily.

Users should follow the next schedule:

1. *Register in the application*
2. *Go to main page*
3. *Open the Help link (if it is necessary)*
4. *Check Facebook Wall in **Easy Social Networks***
5. *Check Facebook News Feeds*
6. *Search for one Event or Post in Facebook and manage the information.*
7. *Come back to Easy Facebook and go to Main Page.*
8. *Check Easy Twitter (in **Easy Social Networks**) and check the last updates.*
9. *Search for a "hashtag" or some topic in the search feature of Easy Twitter*
10. *Tweet something*
11. *Check all the updates together with the "all together" button in **Easy Social Networks***
12. *Go to main page*
13. *Post in one net with the **Fast Post** feature.*
14. *Go to main page and check if it was posted with the "all together" button*
15. *Log out*
16. *Log in*
17. *Comment or like a post in Facebook in **Easy Social Networks***
18. *Check all the updates together with the "all together" button.*
19. *Go to main page and Post in all the nets at the same time with the **Fast Post** feature.*
20. *Go to main page and go to Normal Facebook with the **Normal Social Networks** feature*
21. *Log out.*

After trying the application according with the previous instructions, users may fill a questionnaire about the application. The answers of the users will be used as a feedback to improve the application and get some conclusions.

7.2.3 Usability Tests

Usability testing is a technique used to evaluate an application by testing it on users. It gives direct input on how real users and testers use a system. This is in contrast with usability inspection methods where experts use different methods to evaluate a user interface without involving users.

This test focuses on measuring a human made product´s capacity to meet its intended purpose. It is useful for example, in web site or web applications, computer interfaces, documents and devices. The aim of these tests is to measure the usability of a specific object or set of objects.

One goal of these kinds of tests is to observe people while using the software or devices to discover errors and areas of improvement. Usability tests measures how the users respond in four areas:

- Efficiency
- Accuracy
- Recall
- Emotional response

It is important to focus in the point that usually, the fact of gathering information and opinions it is called market research rather than usability test. Usability test involves systematic observation under controlled conditions to determine how people can use the product.

This method of evaluation requires create a scenario or schedule so that the users could follow a list of tasks using the application while an observer watch and takes some notes. In this case, the users will be following one schedule while the developers are taking notes and conclusions.

The final goal of this test is to observe users in a realistic situation using the product developed. Hence, developers can realize about the errors, problems and areas of improvement. Some techniques popularly used to gather information during usability test include think *aloud protocol*, *Co-discovery Learning* and *eye tracking.*

7.2.4 Number of Users

One of the first questions that appear when a it is necessary to make the evaluation of one application is *what is the proper number of users to test the application?* Jakob Nielsen popularized the concept of using numerous small usability test, usually with only five subjects each, at various stages of the development process.

The claim of *five users is enough* was later described by the mathematical model that states for the portion of uncovered problem U:

$$U= 1-(1-p)^n$$

p= probability of one subject who identifies a specific problem

n= number of subjects

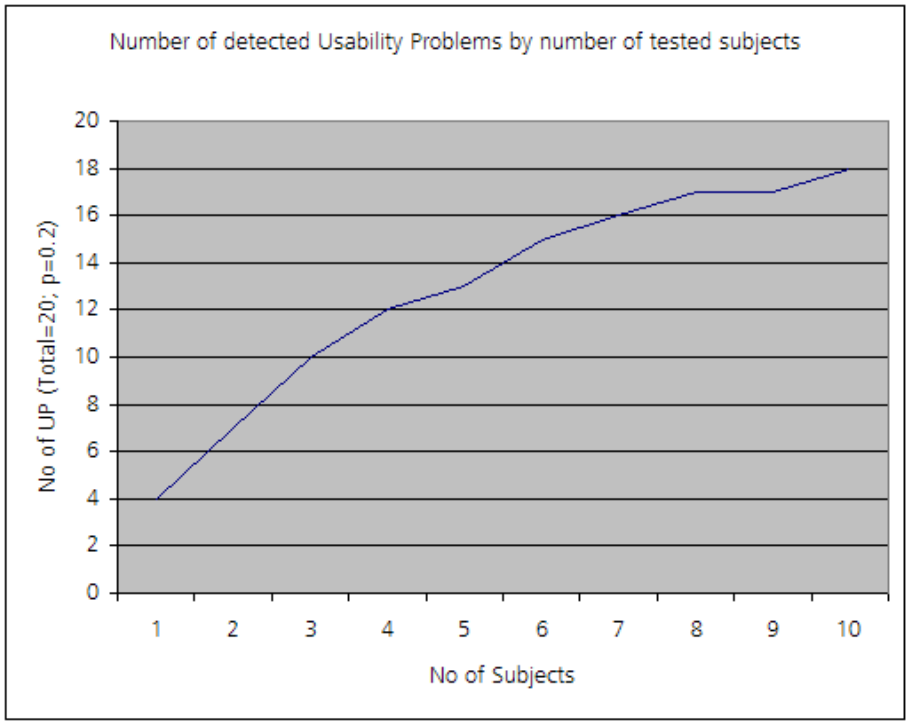

Figure 53. Virzi´s formula

Nevertheless, the evaluation done for the social network aggregator it has been done with simple users, so in this case we need about 20-30 users.

7.2.5 Method

The method of evaluation for the *social network aggregator* is simple and easy. Users should make the following steps:

1. Introduction to the application
2. Read the schedule
3. Try the application according with the schedule presented by the developers.
4. Fill the questionnaire
5. Write some positive and negative characteristics

7.3 Evaluation Results

The experiment was executed on 6th July 2012 in the Eastern building of the Electrical and Computer Engineering Department of the University of Patras. During all the evaluation process, 10 people took part testing the application. Some these participants were students in the University and some others members of the *HCI Group*.

With all the results of the proof and the results of test, it will be possible to analyze the results about the usability of the application.

7.3.1 Application Results

In this section of the chapter, it is showed the conclusions extracted from the answers in the questionnaires and comments from the users who participate in the evaluation.

The questionnaire used in the evaluation is called "*Questionnaire for User Interface Satisfaction".* It is based on *Lund A.M.(2001) Measuring usability with the USE questionnaire* but with some other changes from the original questionnaire. The users had to fill the following questionnaire:

Application Questionnaire Answers

- *Try to respond to all the items. Answers must be: 1,2,3,4,5 with the following meaning*
    - *1 = strongly disagree*
    - *2 = disagree*
    - *3 = neutral*
    - *4 = agree*
    - *5 = strongly agree*
- *For items that are not applicable, use: NA*

	Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	NA
1	It helps me be more effective						
2	It helps me be more productive						
3	It is useful						
4	It gives me more control over the activities in my life.						
5	It makes the things I want to accomplish easier to get done.						
6	It saves me time when I use it.						
7	It meets my needs.						

8	It does everything I would expect it to do.						
9	It is easy to use						
10	It is simple to use						
11	It is user friendly						
12	It requires the fewest steps possible to accomplish what I want to do with it						
13	It is flexible						
14	Using it is effortless						
15	I can use it without written instructions						
16	I don't notice any inconsistencies as I use it						
17	Both occasional and regular users would like it						
18	I can recover from mistakes quickly and easily						
19	I can use it successfully every time						
20	I learned to use it quickly						
21	I easily remember how to use it						
22	It is easy to learn to use it						
23	I quickly became skillful with it						
24	I am satisfied with it						
25	I would recommend it to a friend						
26	It is fun to use						
27	It works the way I want it to work						
28	It is wonderful						
29	I feel I need to have it						
30	It is pleasant to use						

Specific questions of the application:

a) *The application is useful for a quickly check of the networks: …… (1-5/NA)*
b) *It is easy to find the information I needed: …… (1-5/NA)*
c) *The information provided for the system is easy to understand: …… (1-5/NA)*
d) *The search feature was useful: …… (1-5/NA)*
e) *The application includes enough social media: …… (1-5/NA)*

List most negative aspects:

- ……
- ……
- ……

List most positive aspects

- .....
- .....
- .....

Usefulness

The first part of the questionnaire is about the usefulness (questions from 1 to 8) of the application. In order to measure this feature the users had to give their opinion about the application. Here it is showed the results for all the users in a line graphic.

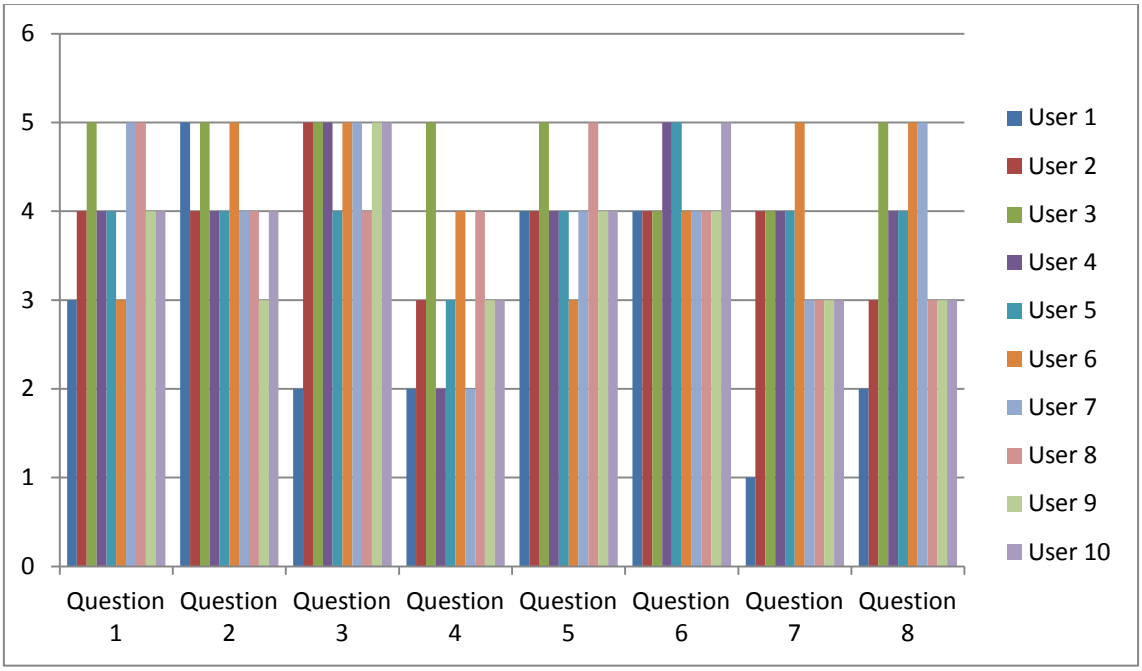

Figure 54. Usefulness test

Mainly, the users found the usefulness of the social network aggregator satisfactory. Nevertheless there some users that found a lack of functionalities in the application, since they are used to be free for using all the features of the normal social networks. Hence, they recognized that the application will save their time for checking and updating the social media, but they would like to implement more features.

To get some conclusions, it is important to make the average of the opinions of the users.

Data:

(3+4+5+4+4+3+5+5+4+4)/10 = 4,1

(5+5+5+4+4+4+4+4+4+3)/10 = 4,2

(2+2+2+3+3+3+3+4+4+5)/10 = 3,1

(5+5+5+5+5+5+5+4+4+2)/10 = 4,5

(4+4+4+4+4+4+4+5+5+3)/10 = 4,1

(5+5+5+4+4+4+4+4+4+4)/10 = 4,3

(4+4+4+4+5+3+3+3+3+1)/10 = 3,4

(3+3+3+3+2+4+4+5+5+5)/10 = 3,7

Final average:

(4.1+4.2+3.1+4.5+4.1+4.3+3.4+3.7/8 = **3.925**

We can conclude with these results that for the users the application is pretty useful since the final average is 3.925 in a rate from 1 to 5. If we translate this result to percentage, it means that 78.5 of the people who test the application think that the application is useful.

We can see the results in percentages in the following graph:

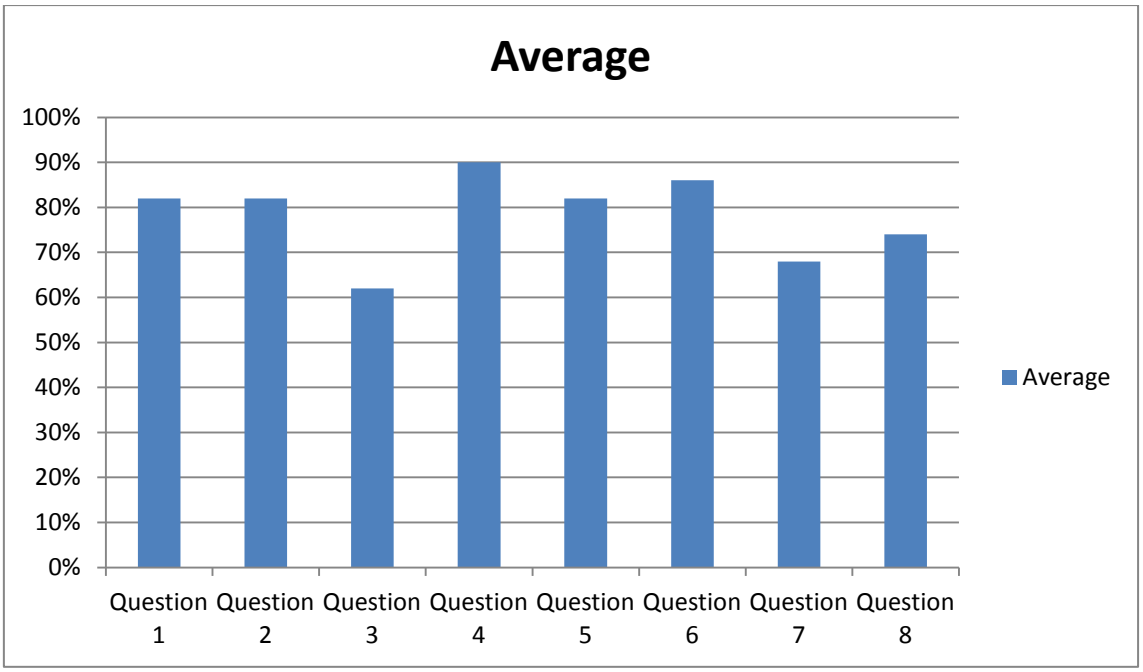

Figure 55.Average Usefulness

Easy of Use

The next part of the questionnaire is related with the use of the application (questions from 9 to 19). The easy of use for one application like this is very important, since what we are trying to do is to make the user´s experience easier. So if the application seems complicated to the users, they will not use it anymore.

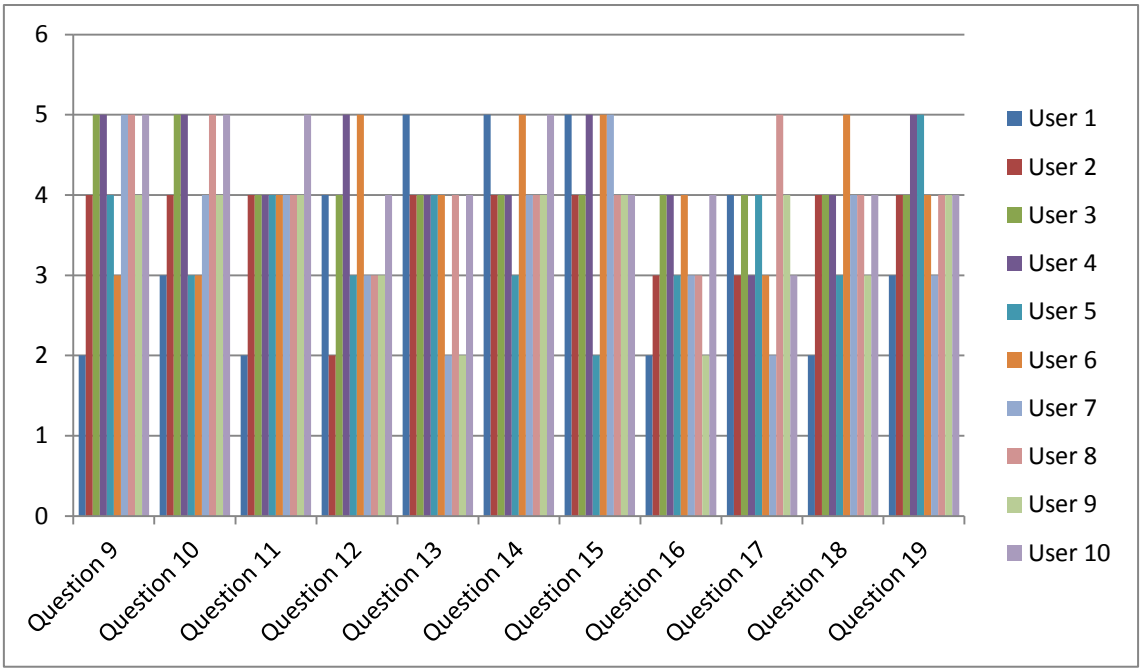

Figure 56. Easy of use Test

The mayor part of the users agrees with the simplicity and the facility of use that the application presents. It is true that during the development of the social network aggregator, one main goal was to make it simple and easy of use. Although the answers in this point of the questionnaire are so good for the application, it is true that during the testing process it happen some mistakes because of the user and it was no intuitive to recover again from it.

Data:

1. (2+3+4+4+4+5+5+5+5+5)/10 = 4.2
2. (4+4+4+3+3+3+5+5+5+5)/10 = 4.1
3. (4+4+4+4+4+4+4+4+2+5)/10 = 4.7
4. (2+3+3+3+3+4+4+4+5+5)/10 = 3.8
5. (4+4+4+4+4+4+4+5+2+2)/10 = 3.7
6. (5+5+5+3+4+4+4+4+4+4)/10 = 4.2
7. (4+4+4+4+4+2+5+5+5+5)/10 = 4.2
8. (4+4+4+4+5+3+3+3+3+2)/10 = 3.5
9. (4+4+4+4+4+4+5+2+3+3)/10 = 3.7
10. (4+4+4+4+4+4+3+3+5+5)/10 = 4.0

Final average:

11. (4.2+4.1+4.7+3.8+3.7+4.2+4.2+3.5+3.7+4.0)/10 = **4.1**

In this case, the results show that the application achieves one of the goals proposed at the beginning, the easy of use. With this result, 82% of users that test the application agree with the easy of use of the product.

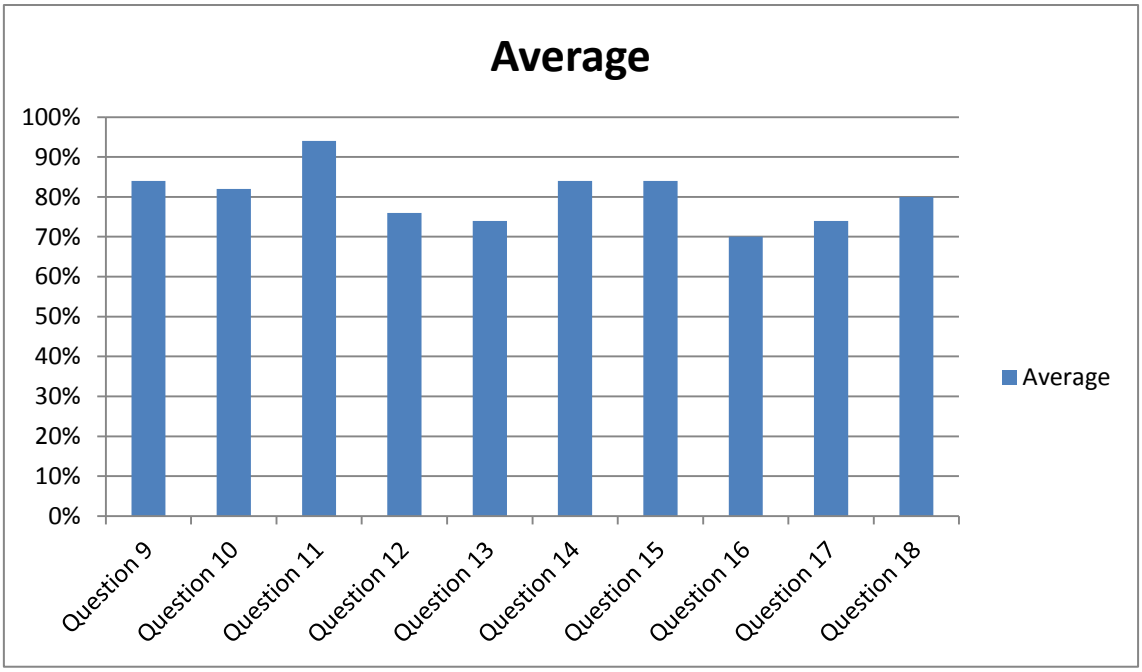

Figure 57. Average Easy of use

Easy of Learning

The third part of the questionnaire is related with the use of the application (questions from 20 to 23).This part of the questionnaire will show to the developers how friendly and simple is the application developed. If the user is able to learn and remember quickly how to use the aggregator and all its features, where are them located, how to use it… etc. that means that the application it is showed to the users as a simple solution to be used.

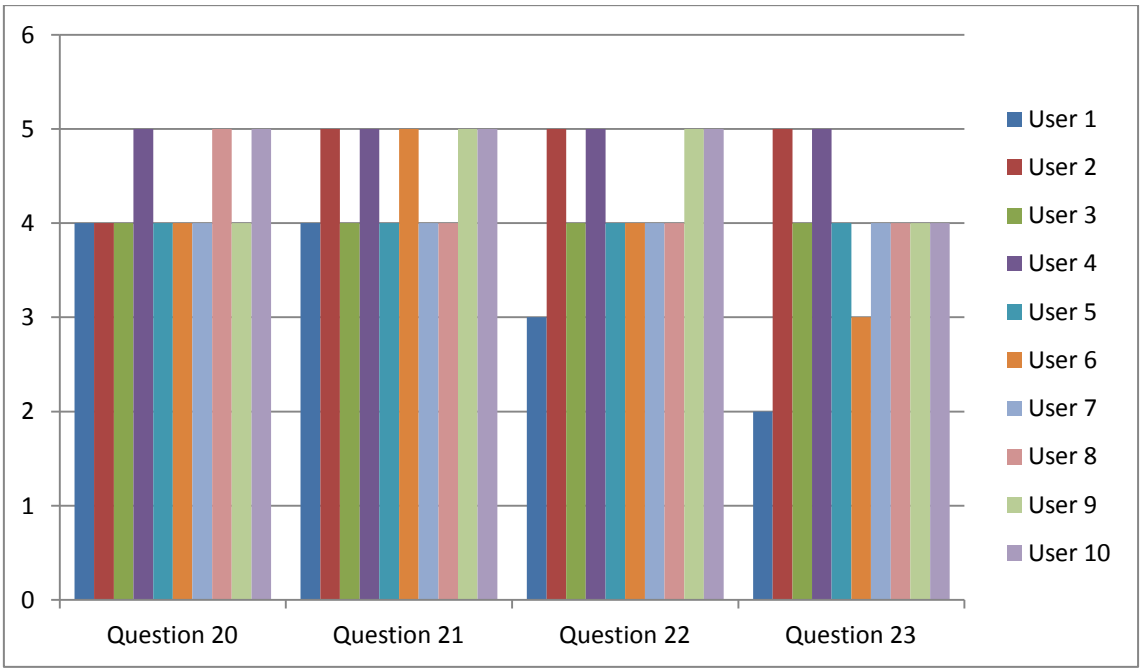

Figure 58. Easy of Learning Test

As the reader can see in the figure 55, almost all the users agree in this section of the questionnaire. But it is also true that some users could not identify as quickly as the others some basic things, for example home page button. This situation reflects that all the help the interface can give is welcome, for example small text under the button that says “Home Page”.

Data:

1. (5+5+5+4+4+4+4+4+4+4)/10 = 4.3
2. (4+4+4+4+4+5+5+5+5+5)/10 = 4.5
3. (4+4+4+4+4+3+5+5+5+5)/10 = 4.3
4. (4+4+4+4+4+4+3+2+5+5)/10 = 3.9

Final average:

5. (4.3+4.5+4.3+3.9)/4 = **4.25**

In this section the results show that the application presents a simple interface and behavior what do it easy to learn for new users. With this result, 85% of users that test the application think that the application is easy to learn.

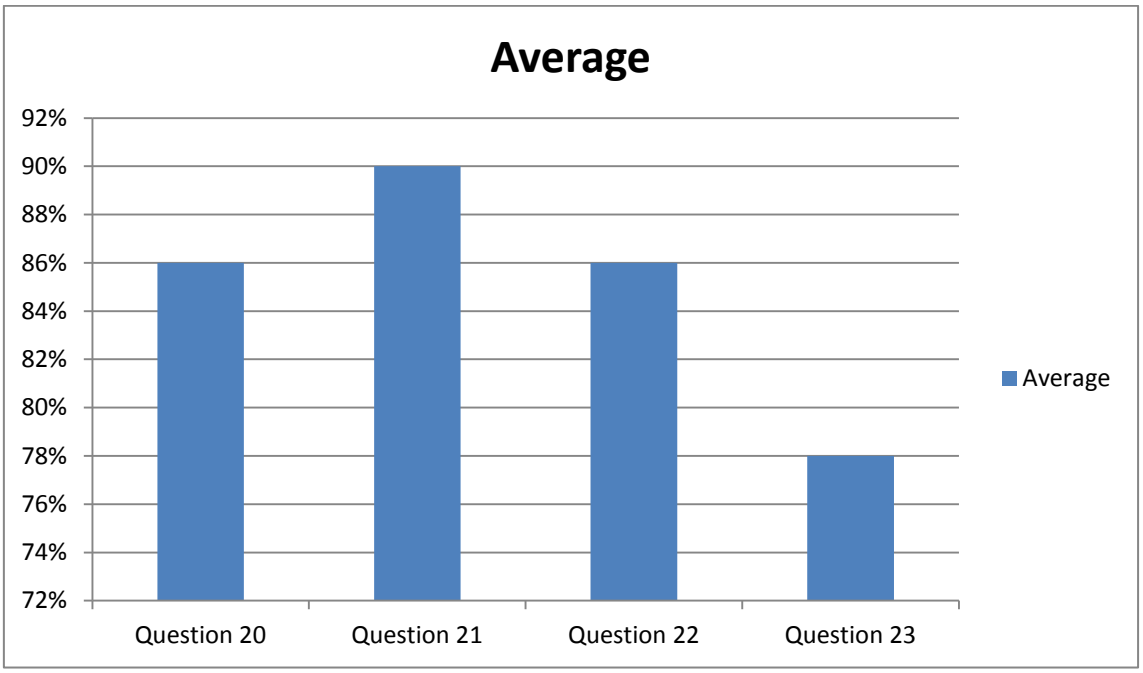

Figure 59. Easy Learning

Satisfaction

This part of the questionnaire is for the satisfaction of the user (questions from 24 to 30). In this part we will measure the satisfaction of the users with the social network aggregator. From this point the developers will know that they may introduce some changes in the product and enhanced some other parts.

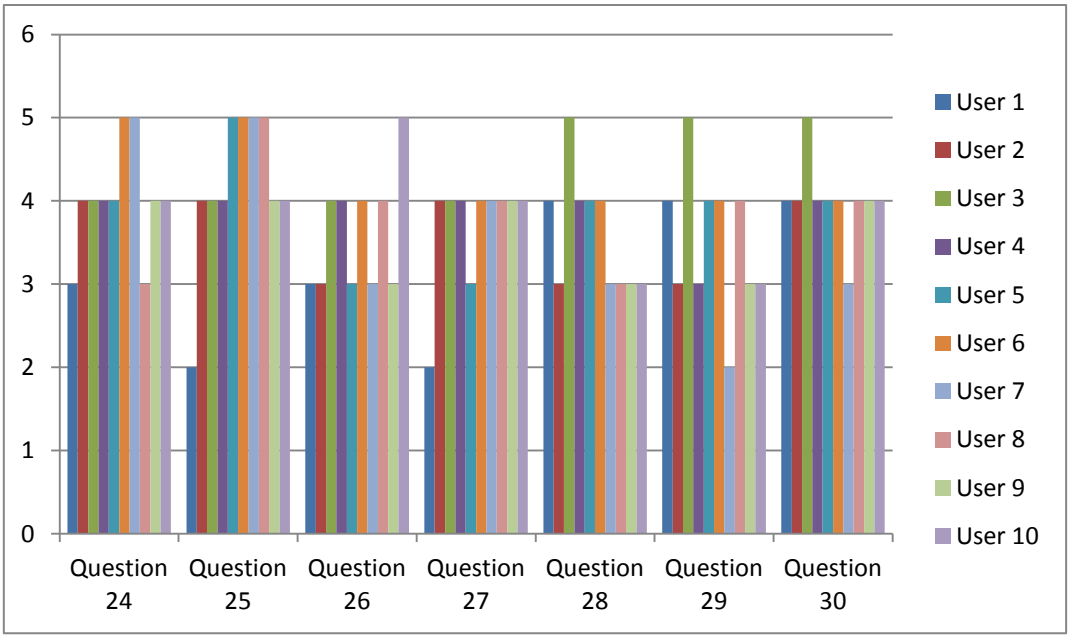

Figure 60. Satisfaction Test

Again with some differences, we can see that the mayor part of the users are satisfied with the social network aggregator, having always in mind that this is not a commercial tool and only the first step to create a competitive tool.

Data:

1. (5+5+3+3+4+4+4+4+4+4)/10 = 4.0
2. (4+4+4+4+4+2+5+5+5+5)/10 = 4.2
3. (4+4+4+4+5+3+3+3+3+3)/10 = 3.6
4. (4+4+4+4+4+4+4+4+3+2)/10 = 4.5
5. (4+4+4+4+5+3+3+3+3+3)/10 = 3.6
6. (4+4+4+4+5+2+3+3+3+3)/10 = 3.5
7. (4+4+4+4+4+4+4+4+5+3)/10 = 4.8

Final average:

8. (4.0+4.2+3.6+4.5+3.6+3.5+4.8)/7 = **3.88**

Finally, about the satisfaction with the application users gave a 3.88. This means that 77.6% of the users during the test felt satisfy with the application.

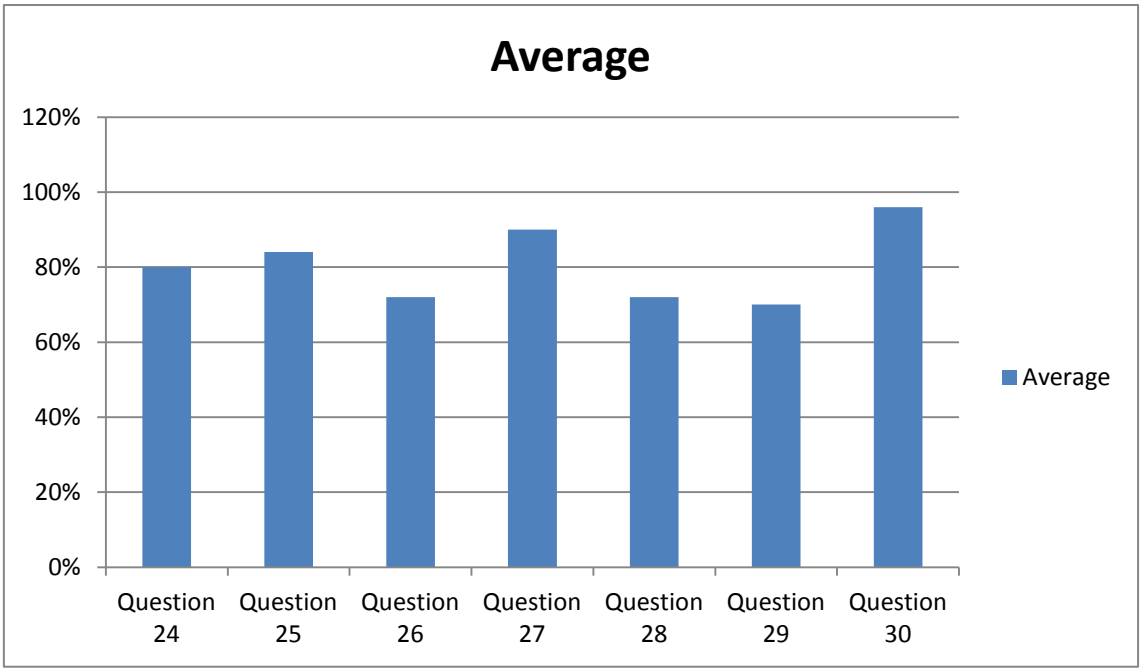

Figure 61.Average Satisfaction

With all these results we can make the overall average of the application. By linking all the section of the test the result show that 80.7% of the users are satisfied with the capabilities of the social network aggregator developed.

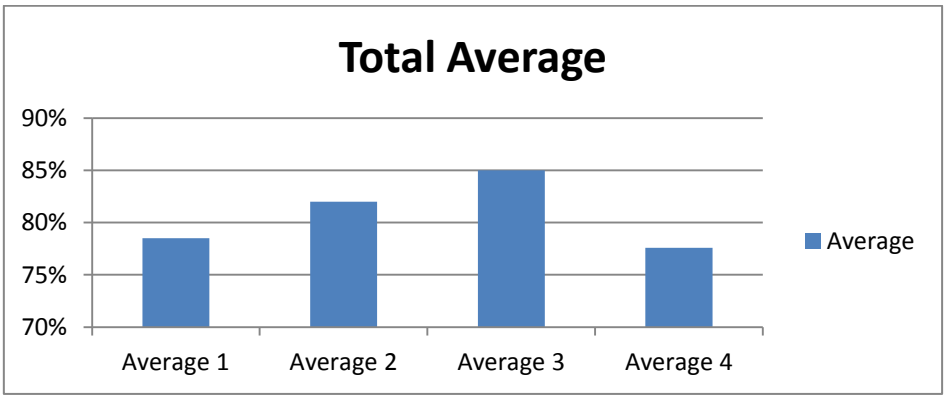

Figure 62. Total average

A)-D) Questions

All of the users interviewed agree in the point that this tool seems to be very useful for its main purpose: Being used for a quickly check of the last updates in the social media that users have and update the networks in a simple and easy way. Some of them found the information provided not enough but on the other hand they said that the application is simple and enough intuitive. The features of the application appear as useful as possible. With the search

feature, users can find users, news in posts or events, hashtags, trending topics and jobs among other results. Finally all of them agree in the point that the application should include more social media, although Twitter and Facebook are the two most used social networking services.

Some Ideas

The users agree in some advantages of the application. For example the mass post editor (Fast Post) appears is for them one of the important skills of the aggregator. The simple design of the application and the possibility of checking the updates from all the nets of the user at the same time and in the same site removing the need of open new tabs and sign in each network were so good evaluated by users.

On the other hand users find some parts to enhance. One example is after update one or more nets, the application should redirect the user to the networks updates to check if the process was successful or not. Some errors with the logout should be corrected and more features should be added in the future versions.

7.4 Enhanced version

After testing the application, it is a good idea to modify some basic aspects of the application that users found not useful or difficult to understand. One important thing of the evaluation in a real scenario, is to realize that some features seemed to be easy and intuitive for the developers but not for all users. Since the aim of the evaluation is to localize the errors, bugs and not clear parts of the aggregator, once the developers are aware of this bugs it is reasonable to change some them.

One thing changed after the evaluation is the Main Page button. After posting in one net, we saw that it appears a button form which the users were lead to the main page. Instead of this, users will be redirect straight to the last updates section, where they will check if the update was successful.

During the testing process it appeared some bugs with the logout that have been solved in the last version. Now when one user clicks the logout button in the application, the session is destroyed and they are logging out from the social media.

Chapter 8

CONCLUSIONS AND FUTURE LINES

8.1 Introduction

This chapter presents two parts. The first part shows the final conclusion of the document. In this section, we think about the application developed, the goals we fixed in the first chapters, what we wanted to do and what we achieved during this project.

The second part of this thesis talks about the future lines. This part is so important, the developer of the application realized that there are some other ways or new ideas that will improve the current application, solve other needs and make the project more interesting.

8.2 Conclusions

When the project started we fixed some goals to achieve with this application. The most important goals were to interact properly with the social media APIs, be able to administrate all the social networks from the same environment, update all the nets at the same time, and be able to get the updates and show them in the same site. After the work presented in this thesis the users who tried the application were satisfied, so the application works as it expected. The application can interact with all the APIs, the user is able to administrate all his nets from the same place, update all the nets from the same place and check the new updates from all the friends and connections.

It is clear that the application does not implement all the possible features that it can be implement. But since it is the "first step" to create a competitive *social network aggregator,* the main goal was the creation of a simple, friendly and easy application that allows users to do the basic activities in their social networking services (check last news and update nets) from the same platform, avoiding the need of open several browsers and sign in different networks. That means, make easier the experience of belonging to a several social media.

All the users agreed with the features of the application. Although it is not a competitive tool nowadays, it makes the user´s experience with the social media easier, what is one of our goals.

Developing this application, we realized about the possibilities of this topic. With shortly changes in the code, it is possible adapt this application for other uses, companies, Universities with different purposes. Having opened APIs, the social networking services have opened a door full of possibilities for the developers.

The application achieved all the initial goals we presented at the beginning. The users now have a simple and easy tool for administrate their social networking services from the same Web site. They can check the last updates of their friends, follow the last tweets in their Twitter nets, update their status and upload links, and pictures. They can also search for some information, hashtags, users, new connections, and Jobs.

Of course this application cannot substitute the real social media but it is important to emphasize that we are not looking for it. The aim of this project was to create a simple tool that can aggregate some social networks in the same Web site, and that it offers the possibility to the users of doing the basic things they do during the day: update the nets and check the new updates. From this point of view we can say that this project has been successful.

8.3 Future Lines

As we said before, this project is the first attempt of developing a social network aggregator, so it is clear that there are lots of ways for improving it. For sure, the first future works should go in the direction of add more functionalities to the application. This means, for example that the users could create new events on Facebook and accept or refuse it. These changes should not be so difficult, once the developer has the basic knowledge about the API.

Since LinkedIn is a professional networking service it could be useful add new social media to the aggregator, for example G+ when they permit to update the net with their API. If the aggregator supports several social media it could be a good idea that the users could select in which networks they want to post, something like a list, not only in Facebook or Twitter or all at the same time, but choose the networks and then post. For example maybe one user would like to update Facebook and Twitter, but no LinkedIn.

It should be interesting to expand the kind of uses of the application. For example, by implementing searching and report automatic statistics for trending topics or hashtag in Twitter network. This feature could be interesting for one company or small business that want to know what are the good and bad things of their service for his customers and followers in the social media. For do this it could be great that the user are able to select if they are companies, Universities or normal users, and change the interface and the features offered depending on the option selected.

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APPENDIX A: USER GUIDE

A.1 Introduction

The user manual is a guide or document which leads the user through the application. It solves all the possible doubts when the users want to use the application. So the main goal of the user guide is to give assistance to users of the application.

In this appendix we will explain how to use the application properly and solve the most common questions.

A.2 User Guide

Users have two options in the Welcome page: Register and Login. If it is the first time the application is used by the user, he must register to be able to use it.

A.2.1 Registering & Adding New Nets

The register steps are quite easy. It shows the 3 options supported by the application: Facebook, Twitter and LinkedIn. The user must register at least in two of them to be able to use the application. Otherwise, the application will not give permission to enter to the main page and of course to all its features. The registering process is simple, the application redirect the user to the OAuth dialog in which it ask the user about give the proper permissions to the application. In that dialog, the user must sign in the social media and allow the permissions requested by the dialog. Once the dialog is finished it redirects the user back to the application to continue the process. When the user has been registered in at least two social networks it will appear the option to continue the registering process or go to the main page.

The user must know that is not possible select all usernames to register in the application since is not allowed that two different users share the same username. So if one user select the same username than other user who is already registered in the database, the application will throw an error message “This user name is already used” and redirect to the Welcome page again.

If the user is registered only in two nets of the 3 available, he can add the third one using the login formulary and selecting the option “Add new net” in the formulary. By selecting this option he will be redirected to the register steps again where he can add the third net to his account.

The register step is necessary only once since after this process all the important information will be stored in the database of the application.

A.2.2 Login Process

Once the user has been registered in the application and all of his profile information has been stored in the database, he must log in to use the application. In the log in process is possible that the user has to fill a dialog in which he must sign in Facebook. This is the only way to be able to use the comment and like features in Easy Facebook since company announced the offline access is deprecated in the new API. That means the user must be logged in Facebook to use these features.

When the log in process is completed, the application will get all the information stored in the database so that the user could use all the features available in the application.

A.2.3 Password Recovery

Sometimes the users could forget the password or the username for the applications they use. To be able to continue using the application when one user forget the keys, it has been implemented an easy and simple way to solve the problem. The user only needs to register again with the same social network accounts they did the first time. They must write insert a new username and password and the old one will be updated at the moment.

But if the user uses another social media accounts (if he has several Twitter accounts for example) he will create a new user for the application, since it is a different social network.

In the Welcome Page there is a link which offers help in this matter to the users, see figure 50.

A.2.4 Using the Application

The users have 3 main options for the application: Easy Social Networks, Fast Post and Normal Social Networks.

The Easy Social Networks is a basic representation of the Facebook, Twitter and LinkedIn social networking services so that the user can check the last updates and update their profiles, comment, like, and search for information, events, jobs and so on. It also offers the “All together” button that shows the last updates for all the nets in which the user have been registered.

The Fast Post offers the possibility to Post or update fast and simple one or more social networks from the same site.

Finally the Normal Social Networks, offer the possibility of going to the real sites (Facebook, Twitter and LinkedIn) if the user needs it.

For more details about this features see Chapter 4.

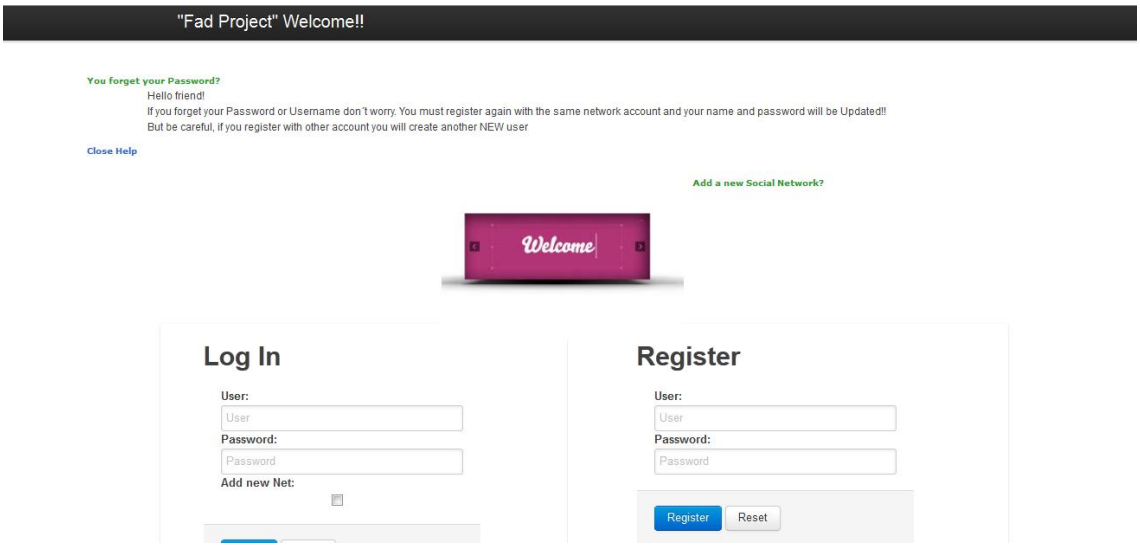

Figure 63. Updating Password

A.2.5 Log out

It is important to logout from the system once the user finished his activities with the application. Log out button destroy the session variables, what means that all the information about the previous user will be destroyed for the next session. Doing this, we avoid that another user in the same computer will enter the application and could have access to the information of the previous user.

Users can find the logout button in the Main Page and in the “All Together” site.