

# **AJAX ONLINE PHOTO EDITING APPLICATION**

By

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**CERTIFICATION OF APPROVAL**

**Ajax Online Photo Editing Application**

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Information communication Technology Programme

Universiti Teknologi PETRONAS

In partial fulfillment of the requirement for the

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Approved by,

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(Mr. Mohamad Noor Ibrahim)

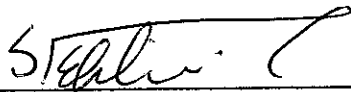
UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

January 2008

## **CERTIFICATION OF ORIGINALITY**

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



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**SEYED MOHAMMAD EBRAHIMI**

## **ABSTRACT**

The use of web based applications is growing day by day and web applications are improving to be as efficient as possible. In today's world web applications that can function on a variety of platforms or in a variety of contexts, which do not need installation and that are easy accessible insure a business' competitive edge. This project is an online photo editing application using Ajax, the objective for creating an e-commerce (Electronic commerce) web application is to satisfy clients by providing easy accessible service, which is fast, cheap and the most important factor which is saving users precious time. Functionalities provided by this web application were as follow:

1. cropping image
2. resizing image
3. rotate image
4. applying objects and text open image uploaded
5. printing or saving the edited image

Ajax helped in so many ways to achieve this goal, Ajax's fast speed and low usage of bandwidth with organized system structure made creating such a system possible. A system in which data, format style, and functions were all organized in the system structure. Comparison played a major role in the development of Ajax online photo editing, similar applications like picture2life were analyzed, their weaknesses and strengths pointed out and by that a system was developed which tried to capitalize on the weaknesses and learn from the strengths. The requirements for this part of the project are obscure and volatile; hence in order to develop this project prototyping base methodology was used.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Background

One of the major concerns of information technology (IT) in the present historical moment is making the Web and web applications as efficient as possible. This insures a business' competitive edge in this era where operating systems and applications are increasingly accessed and stored on the Internet. Web applications that can function on a variety of platforms or in a variety of contexts have been difficult to attain.

The project is an e-commerce (Electronic commerce) web application, what is generally meant by e-commerce is the buying and selling of products or services over the internet and other computer networks. In today's world with technology advancing with a phenomenal speed, online services and trades has grown astonishingly. This project is a type of e-commerce which is conducted electronically but also has an amount of physical item transportation in some way.

The main objective of this web application is providing an online service, image editing and photo printing. The web application is both profitable from the web designers side and it satisfies users need by providing easy accessible service, which is fast, cheap and the most important factor which is saving users precious time. The designing of this web application will also require, conducting research on the latest integrating client side technologies, like AJAX with server side scripting language, on the principles of HCI for better website interface development and on the current systems using AJAX for design to discover its strength and weaknesses.

## **1.2 Objective**

The purpose of creating such an application is generally a business process that relies on an automated information system which is going to be done with Web-based technologies. Stated below are the objectives which this project will hope to attain:

- Utilise theoretical knowledge acquired through past years practical real life experience by Analyzing, designing, implementing and testing of an outstanding system which fulfils user expectations with the highest available technology both on server and client side.
- Developing an online photo editing application, that can operate fast and efficient using Ajax.
- Developing a structured system which can improve the drawbacks of similar existing projects and provide a satisfying experience for its users.

## **1.3 Problem Statement**

### ***1.3.1 Cost and Time***

One of the major problems people around the world face is time, time is priceless and limited, applications which can save clients time and money are highly valued in today's online business. According to Alan D. Smith and William T. Rupp (2003), the value of Internet commerce to the customer is an important aspect since online applications and file sharing save time and money.

Printing a digital image needs client's time, to go out (transpiration) provide the digital photo stores with the data and wait for at least 1 hour to get his or her images printed. This time depends on the number of images and the image resolution. Further on the client needs transportation which that as well, will cost them money.

### ***1.3.2 Performance***

There are websites that provide online photo editing which many of them are slow and designed for areas with high speed connection and those of them that are fast and Ajax based like **Picture2Life** have bugs and drawbacks which will be listed in detail in the literature review.

### ***1.3.3 Design***

**Picture2Life** is very advanced in terms of site functionalities and has grown so much over the years. But the problem with this website is the human computer interaction which arises from the crowded page, and the lack of site navigation. For a web application to be successful in its area, the site creator should be able to take in to account all the clients concerns, both novice and advanced clients. In order to create a user friendly and fast providing service application, all these design issues will also be encountered by creating a web application based on all the human computer interaction notices.

## **1.4 Possible solutions**

### ***1.4.1 Cost and Time***

The use of Ajax and a system based on JavaScript will surely make things more difficult in the terms of graphical display and changes are very much harder than using flash, but it will increase the speed of transferring the data from the client to the server in a large amount. Using Ajax clients do not need to refresh the page which they have altered and changes can be done without wasting time.

### **1.4.2 Performance**

Most of current online image editing applications have the use of flash to make their systems look neat and sophisticated but this causes the application to run slow. Eliminating the use of flash and run the system based on JavaScript, is the strategy which will be taken to overcome this problem.

### **1.4.3 Design**

According to website designer expert *Karl Ribas (2005)*, developing a friendly website where user does not get lost and is not very crowded is a crucial matter. The website would be visually pleasing and at the same time optimized for high search engine rankings. My application will be easy to use; the flow will be clear, the functions straight forward and very easy to use.

### **1.5 Project scope**

The scope of this system is based on similar online photo editing applications, but using Ajax to make it faster and more satisfying. The Structure of system is similar to an existing Ajax based online photo editor. Here is the system:

**Picture2Life** which is a system, with a lot of commands including the ability to create slideshows and collages from the pictures you upload. In this Ajax based system user can upload as many pictures as they want (up to 3MB each and 10MB in total), either by selecting them from their hard drive, dragging and dropping them and more Commands are presented to users as a tag cloud and once they select the appropriate tag they then get the advanced option of the command i.e. sliders to control saturation or contrast. The system to be is similar to the existing application with differences in the



terms of speed and functionality. The functionality covered in this project is mainly base on these five elements:

- 1) cropping image
- 2) resizing image
- 3) rotate image
- 4) applying objects and text upon image uploaded
- 5) printing the edited photo and delivering the image to respected user

Which will be further discussed in the literature review.

## **1.6 Tools Required**

### ***1.6.1 Software Requirement***

Server Side Application:

- Apache Tomcat
- MySQL 5
- PHP 5
- Windows base OS

Client Side Application:

- WebBrowser

Support: Internet Explorer 5.0 and above, Mozilla core including Fire Fox and Netscape.

- JavaScript
- Flash

## ***1.6.2 Hardware Requirement***

### **Client Side:**

- Pentium IV
- 64 MB of RAM
- Hard disk space (depends on the need of the user)
- Server Side:
- Processor of 2.13 GHz or Centrino
- 1 GB of RAM
- 100 GB of hard disk

## **CHAPTER 2**

### **LITERATURE REVIEW AND THEORY**

#### **2.1 What is AJAX?**

Ajax, or AJAX, is a web development technique used for creating interactive web applications. The main purpose of this technique is to make web pages feel more responsive by exchanging small amounts of data with the server behind the scenes. What is meant by the previous statement is that the entire web page does not have to be reloaded each time the user requests a change, which is a result to increase the web page's interactivity, speed, functionality, and usability. Ajax is not an object, but rather a practice the working together of several pre-existing technologies (Jesse James Garret, 2005).

Ajax improves online applications, since it is a cross-platform technique. Ajax can be used on many different operating systems, computer architectures, and Web browsers as it is based on open standards such as JavaScript and XML, together with open source implementations of other required technologies. The technique comes with Speed and invisibility makes for a very slick user experience and that the smaller server resources footprint helps server scalability (2005, Adam Heunis).

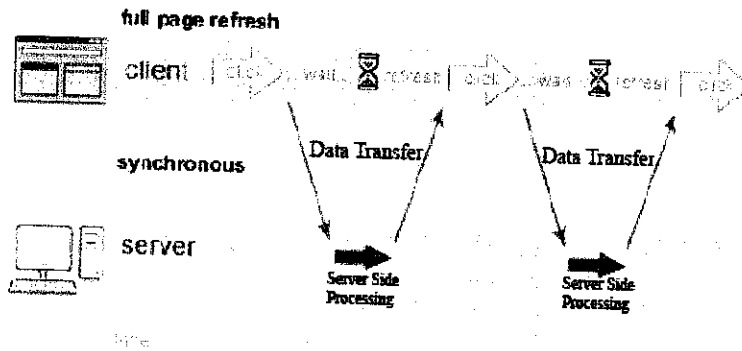
### **2.1.1 System Architecture**

Generally AJAX technology represents a generic application model that would enable more interactive, more responsive, and smarter Web applications. To understand the system architecture in an AJAX technology there is need for understanding the first fundamental design of HTML and normal client-server communication

The Web was originally designed for browsing HTML documents. As a result, the classic Web application model adopts a "click, wait, and refresh" user interaction paradigm and a synchronous request/response communication mechanism:

1. "Click, wait, and refresh" user interaction paradigm: A browser responds to a user action by discarding the current HTML page and sending an HTTP request back to a Web server. The server completes some processing and then returns an HTML page to the browser. The browser refreshes the screen and displays the new HTML page.
2. Synchronous "request/response" communication model: The browser always initiates requests, whereas the Web server merely responds to such browser requests. The Web server never initiates requests—the communication is always initiated one-way. The "request/response" cycle is synchronous, during which the user does not have to wait.

However, these two fundamental behaviors of the classic Web model do not work well for software applications. In the context of software applications, the classic Web application model creates many problems: slow performance due to "click, wait, and refresh;" loss of operation context during page refresh; excessive server load and bandwidth consumption due to redundant page refreshes; and lack of two-way, real-time communication capability for server initiated updates. (Figure 1)



**Figure 1: Full page refresh and synchronous communication.<sup>1</sup>**

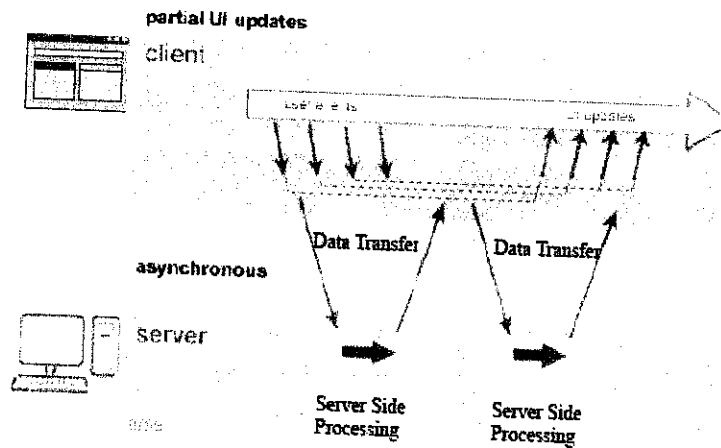
In the context of software applications, "click, wait, and refresh" and "synchronous request/response" result in slow, unreliable, low productivity and inefficient Web applications. These two basic behaviors must be altered to produce higher performance, more interactive, more efficient Web applications—precisely what the AJAX application model does. In the AJAX model:

1. "Partial screen update" replaces the "click, wait, and refresh" user interaction model. During user interaction within an AJAX-based application, only user interface elements that contain new information are updated; the rest of the user interface remains displayed without interruption. This "partial screen update" interaction model not only enables continuous operation context, but also makes non-linear workflow possible.

2. Asynchronous communication replaces "synchronous request/response model." For an AJAX-based application, the request/response can be asynchronous, decoupling user interaction from server interaction. As a result, the user can continue to use the application while the client program requests information from the server in the

<sup>1</sup> [www.coachwei.com/ajax/image001.gif](http://www.coachwei.com/ajax/image001.gif)

background. When new information arrives, only the related user interface portion is updated. (figure 2)



**Figure 2: Partial UI updates and asynchronous communications.<sup>2</sup>**

Because the essence of AJAX is partial screen updates and asynchronous communication, the programming model is not tied to a specific data exchange format (such as XML), specific programming language (such as JavaScript), or specific communication mechanism. For example, Google could have developed GoogleSuggest using VBScript when running on Internet Explorer. In fact, most of the data exchanged in GoogleMap is actually in GIF image format, not in XML. In addition, much of the data exchange in Gmail is actually based on HTML, rather than on XML.

In summary, AJAX is not specific to a particular programming language, data exchange format, or network communications object. It is a Web application model that employs partial screen update and asynchronous communication.

<sup>2</sup> [www.coachwei.com/ajax/image002.gif](http://www.coachwei.com/ajax/image002.gif)

## 2.2 Picture 2 life

As it was discussed in the problem statement, there exists a similar online application called **Picture2life**. Here are some of the cons of **Picture2life** published by Stan Schroeder February 26th, 2007:

Picture2Life's GUI leaves a lot to be desired. Some of the commands are unnecessarily crammed into a very small rectangle next to the image, and the options are presented as tags. There's quite a bit of options, including some options none of the other applications included in this roundup have, for example animation and collage creation, and a live preview of all applicable effects at once. For general users it is usually better to have fewer options, but better organization. The user will have a hard time enjoying the service of this website because the GUI is, simply, too crowded (Figure 3) and inadequate for this type of application.

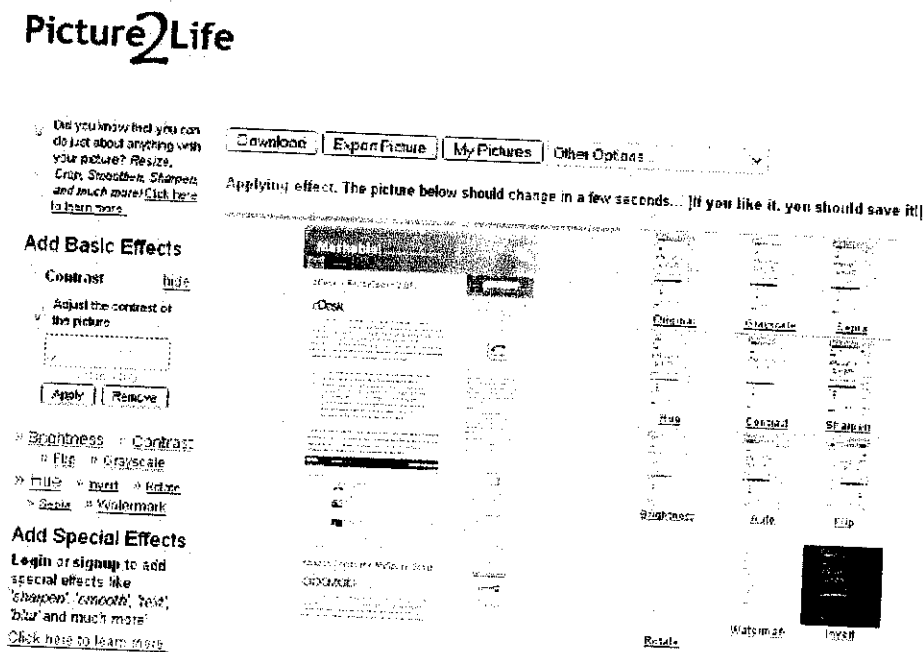


Figure 3: picture2life page layout

Picture2life is simply too Crowded in the terms of menu interface; does not have a lot of tools; and it automatically scales down images.

### **2.3 How can Ajax provide better quality and performance?**

Based on the Programming Atlas by Christian Wenz (2006), there are some important and highly valued facts which can prove the advantages and disadvantages of Ajax in designing these sorts of applications, comparing to other internet programming techniques. This part of the paper will go through the advantages this technique brings, the disadvantages arising from Ajax, and the disadvantages are treated.

#### **2.3.1 Advantages of Ajax**

Listed below are the two major advantages of Ajax, which separates Ajax from other programming techniques:

##### **2.3.1.1 The usage of bandwidth**

By generating the HTML locally within the browser, and only bringing down JavaScript calls and the actual data, Ajax web pages can appear to load relatively quickly since the payload coming down is much smaller in size. This is a very important term in my design. User can easily drag and drop the objects or change the color the brightness of the image which he or she has uploaded, without refreshing the page. With Ajax, the JavaScript of the page can be produced locally in the web browser and not brought down with the first page of the document.



### *2.3.1.2 Placement of data, format, style, and function*

Another benefit of the Ajax approach is that it tends to make programmers to clearly separate the methods and formats used for the different aspects of information delivery via the web. Using the technology my hands are open, in the term that in designing the web application I am free to adopt and adapt whatever works for my website, Ajax is generally propelled by the development motive itself to adopt separation among the following:

1. Raw data or content to be delivered, which is normally embedded in XML and sometimes derived from a server-side database.
2. Format or structure of the webpage, which is almost always built in HTML or XHTML and is then reflected and made available to dynamic manipulation in the DOM.
3. Style elements of the webpage: everything from fonts to picture placement are derived by reference to embedded or referenced CSS.

### *2.3.2 Disadvantages of Ajax and solutions to overcome these issues*

This part of my literature goes through the drawbacks which come along using Ajax technique and solutions in which developers came up with, to handle these kinds of problems. As we all know there are always two sides to every coin and Ajax is no different, bringing its share of disadvantages for both the user and server side.

### *2.3.2.1 Browser integration*

The dynamically created web page will not record itself in the browser history engine; this causes the problem for the "Back" function. Meaning if the user attends to a page and uses the "Back" button it will not function properly.

There are various solutions to this problem which have been developed by the expertise. One of the well known solution is using of the invisible IFRAMEs to invoke changes that populate the history used by a browser's back button.

However there are other issues in Browser integration, which many of Ajax users nowadays face. Based on the research from Bill Higgins, *Advantages of the Ajax*, 2006 dynamic web page updates make it very difficult for a user to bookmark a particular position of the web page application. A well known solutions to this problem is the use of URL fragment identifier which allows users to return to, the application in a given position. How is that?

Well, many browsers nowadays allow JavaScript to update the fragment identifier of the URL dynamically, so that Ajax applications can maintain it as the user changes the application's state. This solution also improves back-button support. It is, however, not a complete solution.

### *2.3.2.2 Response-time concerns*

The term network latency which usually means the interval between user request and server response is a major issue in which needs to be considered carefully during Ajax development. If there is not a clear feedback to the user, users might not understand changes to which the page has been effected by. There is the possibility that users might experience delays in the interface of the web application, something which they might not expect or understand. Additionally, when an entire page is refreshed there is a time

needed for the re-adjustment of the eye when the content changes. The lack of this re-adjustment with smaller portions of the screen changing makes the latency more apparent.

One of the best ways to overcome this matter is the use of visual feedback (such as throbbers) to alert the user of background activity. These visual feedbacks just as the one that Google has, that red rectangular box in which is wrote loading, can be in various formats, shapes and colors to inform the user of the process.

### *2.3.2.3 Search engine optimization*

Websites that use Ajax to load data which should be indexed by search engines must be careful to provide equivalent Sitemaps data at a public, linked URL that the search engine can read, as search engines do not generally execute the JavaScript code required for Ajax functionality. This problem is not very relevant to my project since search engines work on the text and content of the image rather than main changes on image quality and effects.

### *2.3.2.4 Reliance on JavaScript*

Ajax relies on JavaScript, which is often implemented differently by different browsers or versions of a particular browser. This issue must be solved by testing the JavaScript on multiple browsers to check for compatibility issues. As we see commonly the use of JavaScript code written twice, one part for IE, another part for Mozilla compatibles, although this not called a major problem with the release of the new IE7 and with the now common use of JavaScript abstraction libraries like the Prototype JavaScript Framework. .

An issue also arises if the user switches off the JavaScript support in his or her browser, thus disabling the functionality built into the page and come to think about it, it really cannot be solved since the user can do a lot of things to cause problems.

#### 2.3.2.5 *Web analytics*

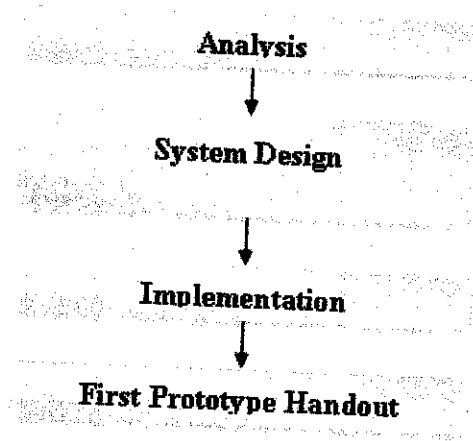
Many web analytics solutions are based on the paradigm of a new page being loaded whenever new or updated content is displayed to the user, or to track a series of steps in a process such as a check-out. Since Ajax alters this process, care must be taken to account for how to instrument a page or a portion of a page so that it can be accurately tracked. Analytics systems which allow for the tracking of events other than a simple page view, such as the click of a button or link, are the ones most likely to be able to accommodate a site which heavily utilizes Ajax.

## **CHAPTER 3**

### **METHODOLOGY**

The infrastructure of the system is rather huge and complicated. What is meant by this statement is that this system consists of large number of user involvement with the functionality provided by the website. The requirements for this part of the project are obscure and volatile; hence in order to develop this project prototyping base methodology is used. Prototyping base methodology performs the analysis, design and implementation phases concurrently, and all three phases are performed repeatedly in a cycle until the system is completed. In this methodology, the basics of analysis and design are performed and work immediately begins on a system prototype, a 'quickanddirty' program that provides a minimal amount of features.

Based on the on the flow chart below Analysis is the first step in this project. This will follow by the System Design in which the structure of the connection between the server and the client and client's connection to the functionality of the web application is initialized. By that the implementation and the first Prototype will be discussed upon. The steps are arranged in the following graph (Figure 4):



**Figure 4: Project Flow**

### **3.1 Analysis**

#### **3.1.1 Functionality of Photo editing application**

The most important aspect of an online application is to fulfill user's requirements. Photo editing website does the exact thing; it provides series of functions depending on the users need. These desired functions provided by this web application:

1. cropping image
2. resizing image
3. rotate image
4. applying objects and text open image uploaded
5. printing or saving the edited image

All of these functions provided by this web application are in real time and very fast. A big advantage this online photo editing application has to other similar applications is

that most of them are really slow (most of them couldn't even be uploaded in the internet provided inside the campus) and none of them actually deliver that image in a printed version and at the users specific address.

### ***3.1.2 Web Application Process***

The web application works significantly both on the client and server side. Here is an overview of the steps in which the system works in the bird's eye of a view.

#### ***3.1.2.1 User Login/Registration***

The first process taken in this web application is the login. The user enters the first page; when the first page is shown to the user to options appear:

- 1. New user:** If the user wishing to enter the website has never registered before gets the chance to enter his/her detail in the registration page, by that they can enter their user name and password.
- 2. Member:** This category of users are of those which have already registered and used this system before, so they just open the first page and enter their information (user name and password) in the login form.

### *3.1.2.2 Image selection*

Firstly user opens the main web page, decides the image that he or she wants to operate on. Uploading the image consists of firstly the image being processed upon and resized in to the same size of the object which is later going to be implemented.

### *3.1.2.3 Image uploading*

The picture is then uploaded on the server using PHP coding and it is stored on the server. The process in which the picture is being uploaded is hidden from the user's point of view and is done behind the curtains.

### *3.1.2.4 Object sending*

In this step the server sends the photo back to the client's side website together with the objects, which are in small size (decided upon the image resizing mentioned in the first step) and can be clicked upon to see the full image size.

### *3.1.2.5 Object initiation and photo processing*

User may choose whichever functions that the site provides in order to change their picture to the way which satisfies them. The functions are mentioned above in the functionality of the web application. If the user chooses to insert a specific object here is how the process is going to be, which ever object is clicked by the user an instant will be developed and in a timely manner sent to the server.

The process of my website differs from a normal web application not using Ajax technology. In a normal web application this process takes time and each time a



change is made the whole page must be sent to the server and refreshed on the client side which is both time consuming and very frustrating, why is that? To answer this question let's consider a common scenario, we have all used web logs and customized them upon our own desire, has it ever occurred to you when you have changed the page and the internet goes out? Probably yes, user loses all their information and has to start all over again when the internet is back.

But in my case, even if the internet is out a backup will be provided for the user on the server side. All of this process is done in the photo processing step.

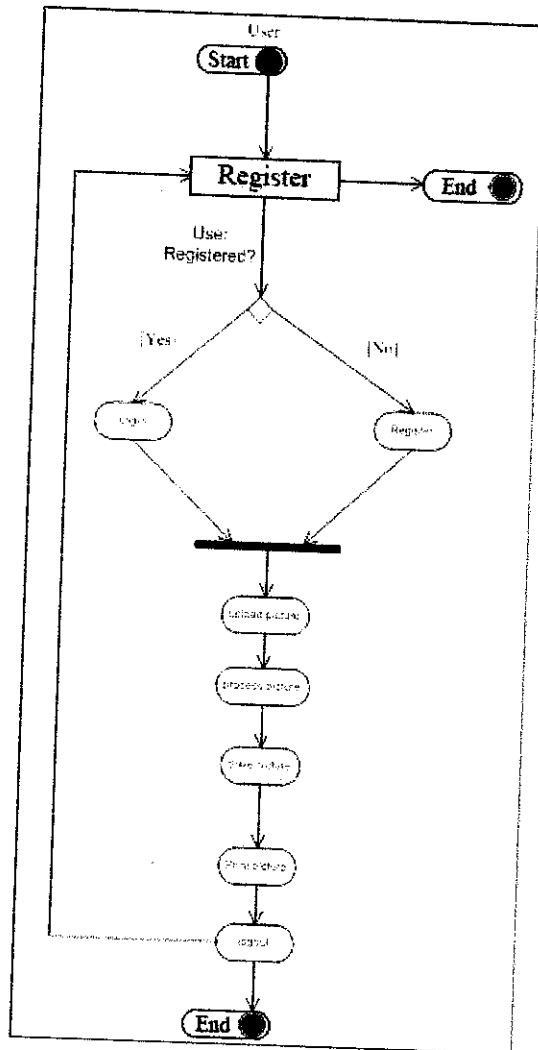
#### *3.1.2.6 Finalize, save and printout*

Finally, the final button is clicked whenever the user is finished processing the image. When the user clicks the final button a final draft will be sent to the server indicating that the editing is finished and its time to print out the photo and deliver the edited picture.

#### *3.1.2.7 Logout*

At the end of the process, the user can choose to logout, or go through the process of editing another image all over again. By logging out the users will find themselves in the homepage or they can still logout by just closing the webpage, their session will be expired after a while.

The flow of this web application is pretty simple; it is a step by step procedure which if done right the user will end up with his/her picture. The simple process flow of the system is shown in the diagram bellow (Figure 5):



**Figure 5: system flow**

## **3.2 System Design**

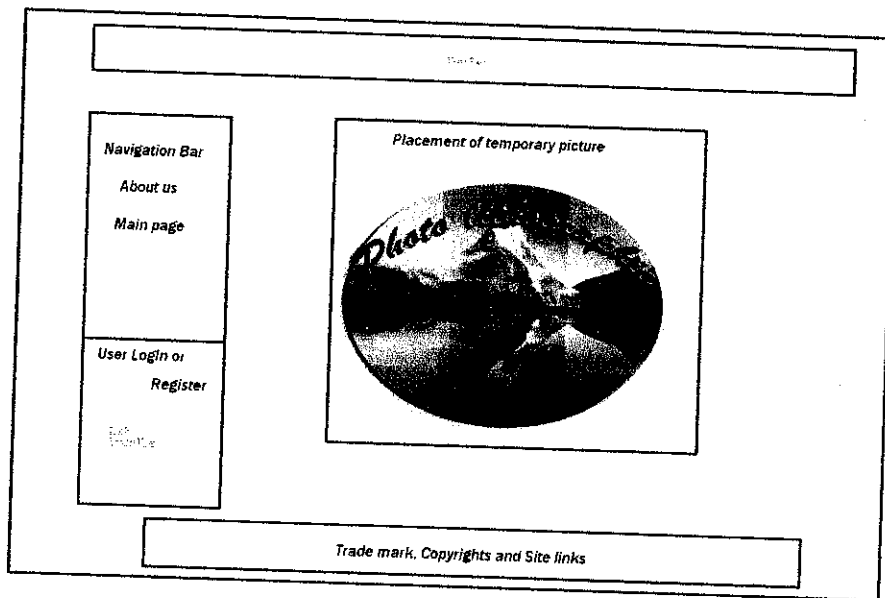
The first prototype is usually the first part of the system that the user will use. This is shown to the users and project supervisor who provide comments, which are used to ReAnalysis, ReDesign and ReImplement a second prototype that provides few more features. This process continues in a cycle until the analysts, users and supervisor agree that the prototype provides enough functionality to be installed and used in the organization. After the prototype is installed, refinement occurs until it is accepted as the new system. (Dennis, 2005, p.10)

### **3.2.1 User Interface:**

This is the first stage in the chapter 3 methodology. The main purpose of this section is to show and provide a basic sketch of how the user interface is possibly designed. The placement of the elements in which are needed for a page to be developed and the basic flow of how the pages in the main website are going to be based and in which order they operate are shown in the figures bellow.

#### **3.2.1.1 Stage 1:**

The diagram shown bellow (Figure 6) is the user interface layout for the first page which is going to be presented to the user. In this project the principles of HCI (Human Computer Interaction) has been used in order to develop an interface, good looking and easy to work with for the users.



**Figure 6: First page**

Many of the site design experts believe either directly specify the use of a left-hand navigation layout or strongly suggest its use. There is an overwhelming agreement from the Web design community on this layout principle. Nielsen, perhaps the most popular and influential Web usability expert today, explicitly states that the main site navigation "has to be on the left side of the page" (Nielsen 1999). Not using a left-hand navigation constitutes bad design, in his opinion, and compliance with common practice is the most important design factor regarding Web usability.

IBM's Web design guidelines: Visual layout and elements<sup>3</sup> also explicitly recommend displaying navigation and site identity in an inverted-L arrangement. Researchers at IBM speculate that users are comfortable and familiar with this arrangement and, according to their own studies, a left navigation performs well. Schaffer (2002) also claims not justifying navigation menus to the left "violates too many

<sup>3</sup> [http://www-3.ibm.com/ibm/easv/eou\\_ext.nsf/Publish/602](http://www-3.ibm.com/ibm/easv/eou_ext.nsf/Publish/602)

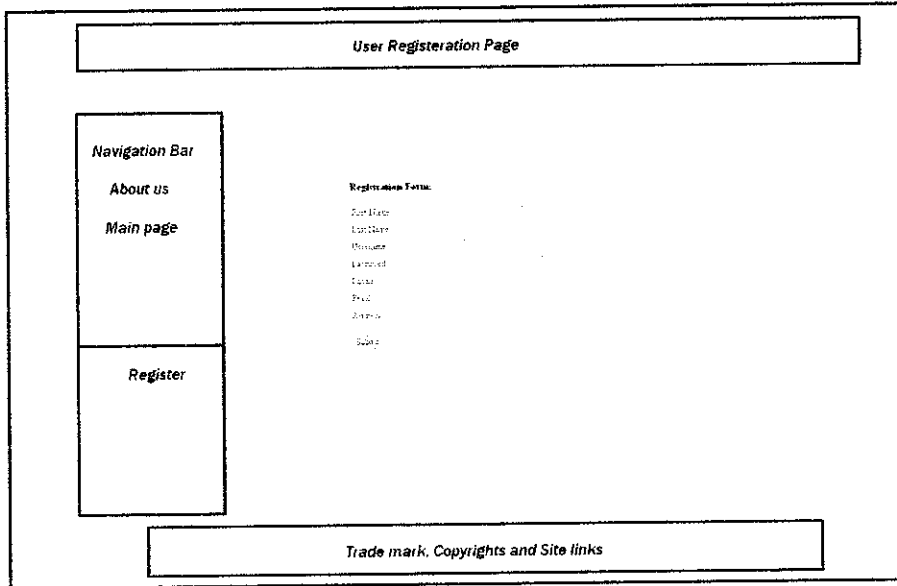
principles". Other popular Web design guides (e.g. Veen 2000) do not directly prescribe a left-hand navigation or inverted-L arrangement, but strongly imply their use.

Hofer and Zimmermann (2000) report results of a study conducted on four different navigation positions on a page: top, right, bottom, and left. Forty subjects were divided equally into four groups and assigned one of the four navigation arrangements. Task completion time was recorded with a stopwatch. Their results show that a left-hand navigation performed much better than any other position on the page by a factor of two. The right-hand test condition yielded the longest times for task completion.

Based on Nielsen 1999 the reason left-hand navigation was chosen over right-hand was the interaction with the browser's back button. The back button is located in the upper left corner of most browsers. Obviously, this function would be closer to a left-justified navigation than to a right-justified navigation. A right-justified navigation, then, increases the distance and subsequently the interaction time between the navigation menu and the back button. Consequently, when implementing a page layout with a right-justified navigation, it is essential to include linking mechanisms that avoid user reliance on the browser's back button. This can include history back links or a clickable path of the user's location within the site's information structure, commonly referred to as a "breadcrumb trail". Also based on Nielsen's guides the trade mark and copyright menu is best placed at the bottom of the page which as shown, where exactly where I plan to put them.

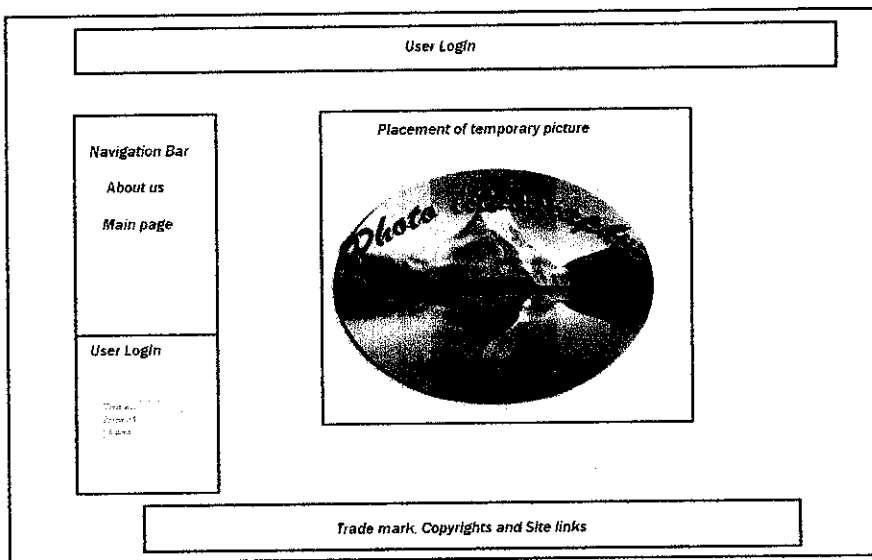
### *3.2.1.2 Stage 2:*

The diagram bellows are the interface layout for the login or Register page. This page is necessary to the web system to know the users which are using the website. If the user is using the system for the first time the page will be something like Figure 7, called the registration page:



**Figure 7: Register page**

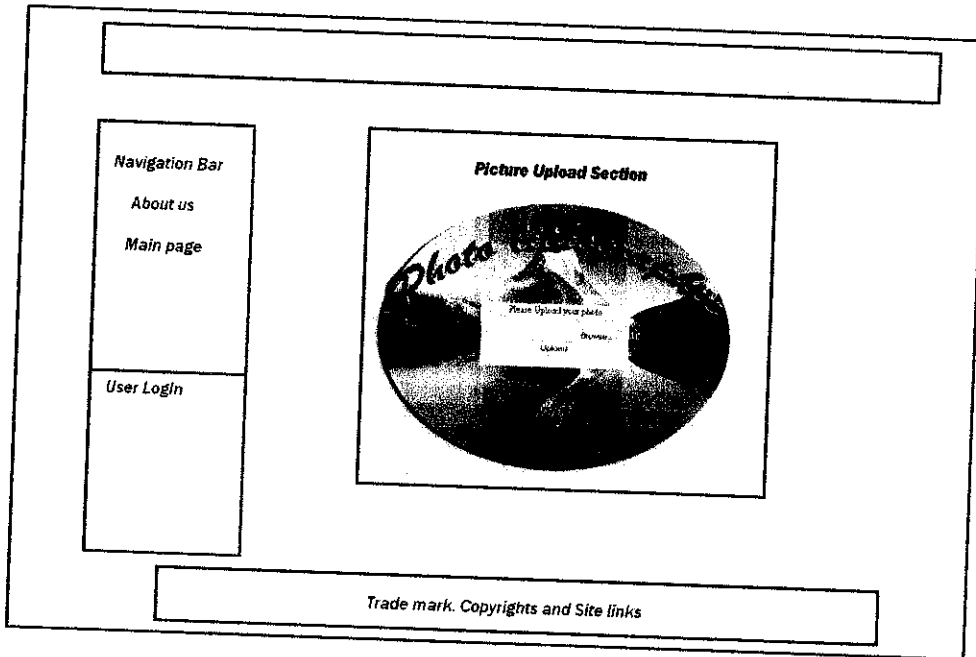
But if the user is already a member of this application then we have the user login page (Figure 8):



**Figure 8: Login Page**

### 3.2.1.3 Stage 3:

In this step the user has registered or has logged on the page, where by the user will need to upload the picture in which he or she needs to process on (Figure 9):



**Figure 9: Picture upload page**

From here on the Functionality of the webpage (Cropping, Resizing and...) will kick in.

### 3.2.2 Database Design

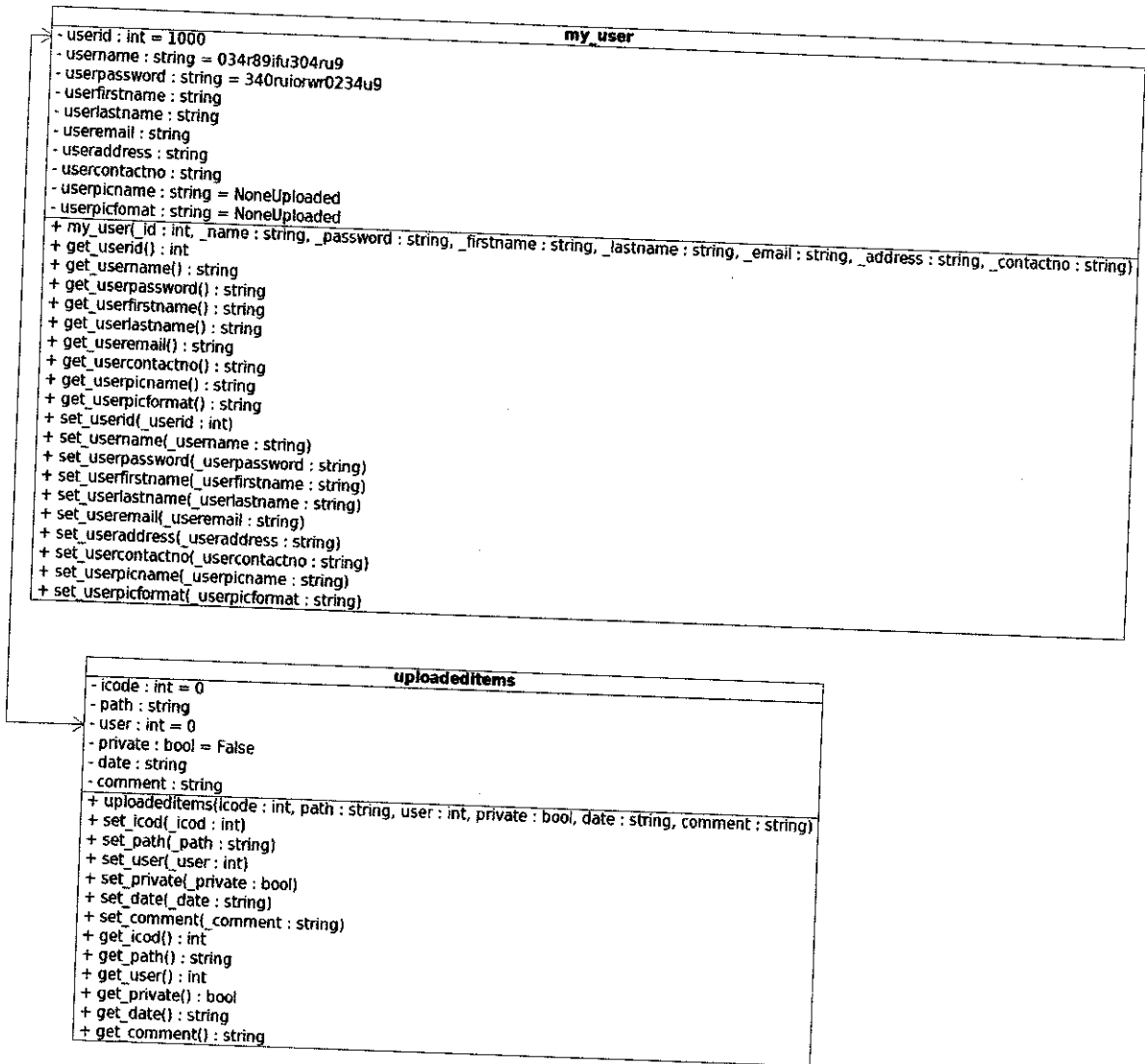
Database is one of the most vital elements in any programming application. It is the major part of my first semester of final year project, taking up most of my time. The structure of the system mostly depends on how the database is designed. The database of photo editing web application is designed in a way to be efficient, easy to understand, easy to edit and most important work.

For this system two main tables are used:

1. **my\_user:** This table is used to store the user's personal information which is requested during the registration (user name, password, first name and etc.) and then, the information here is used for the uploading image section.
2. **uploadeditems:** The second table and fortunately the last in the system is the table which the pictures are uploaded in. This table will get all the information regarding to the picture which the user is trying to upload

For a better and comprehensive understanding of the system database, here are the tables represented in an UML diagram (Figure 10):





**Figure 10: Database**

### **3.3 Implementation**

This section of the report is basically going to describe the steps and sections in the system development. A detail description of how the web application structuring took place and what techniques where used.

#### **3.3.1 *How Ajax Interacts***

Ajax efficiently interacts between the client and server side, makes it unique and fast without much troublesome. What Ajax basically does in this project, is that it only changes the content of the section users want updating. The web structure is based on two main layers, the top and the central area, the central area itself is divided in to three main sections, left, right and middle. For the web application program to run, Ajax sends a request to server by that the file is then ran on the server. After the file is processed on the server side an answer will be given, which then the Ajax technique used will divide this answer to three main parts.

- 1) Type of answer
- 2) Name of the answer
- 3) Content of the answer

Here are two of the most important Ajax programs which this web application runs by.

```
//#part I
//# Client
//This function creates an event for Ajax and allows Ajax to send data
using get to the server
function scrruner(scr){
    http.open('get', 'index2.php?name='+scr);
// a handle response assigns an event by which once the server replies
the client modifies the page
    http.onreadystatechange = handleResponse;
    http.send(null);
}
```

**Figure 11: Client Part 1**

This next coding sample of the Ajax program points out how the system responses when it receives information.

```
//#part II
//# Client
//After the response received
```

```

function handleResponse() {
var sChar=String.fromCharCode(2);

//checks if the process is completed the number 4 here is the return
status

    if(http.readyState == 4){

//reads the response

        var response = http.responseText;

//create array for updates

        var update = new Array();

        if(response.indexOf(sChar != -1)) {

//break the response base on character number 3

// here are the three levels of answers which Ajax (1- type of update
(layer,image or ETC 2- id of object 3- content )

            update = response.split(sChar,3);

            tar=update[0];

//check if the layer ID returns (fault tolerant technique)

            if(update[1] != ""){

//if the update [0] is 1 the result belongs to the "layer (DIV)"

                if(update[0]==1){

                    document.getElementById(update[1]).innerHTML =
update[2];

//if the update [0] is 2 the update belongs to the image section

                }else if(update[0]== 2){

                    document.getElementById('message').style.display = "none";

```

```
document.getElementById(update[1]).src =
update[2];
    }
}
}
}
}
```

**Figure 12: Client Part 2**

In this system JavaScript virtually changes the picture which the user is editing, it creates a preview for the user as well. Once the user clicks the update button the changes will be sent to the server with the Ajax technique. The system works in a way that if the user has not clicked the update button the server has no way of knowing the changes made to the user's picture. If however the page is closed or refreshed in any way the information will be as the last updated save on the server. Using Ajax to notify the server of the actions done in the client side makes the users feel satisfied by using this web application. The other criteria of Ajax and online photo editing which makes it very unique is that the changes made to the picture will firstly be saved in a temporary file. This temporary file gives the users the ability to never lose their original picture which they have uploaded. The temporary file can also be used to create a history for the pictures which users have edited, whereby they can just go back to a previous edition of their picture if not satisfied with the change, but this is section will hopefully be done in the future.

### **3.3.2 Web Application and Database Interaction**

In this project there exists a user folder; this user folder has many sections by which the system works upon. One of the main files in this folder is the info.php which stores the database information. Another important file called connection.php has the significant job of connecting the php server side application with MySQL. 3 main functions were created in this process. The 3 main functions created in the User folder are:

1) function Connections(): the information (\$server, \$username, \$password) which is in the info.php will be read by the connection function and by that it will create the connection with the database.

2) function Query(\$SQLw):

```
global $link, $db, $result;

mysql_select_db($db, $link);

$result = mysql_query($SQLw) or die($SQLw.'\n<BR>Invalid query: '
. mysql_error());

return $result;
```

Function query gets the query from the server side application and then gives the answer back to the web application as an array format.

3) function close: web application closes the connection with the MySQL using this function

### **3.3.3 Website Functions:**

#### **3.3.3.1 User System:**

##### **3.3.3.1.1 Registration: reg.php:**

This section of the program is where the user fills in his or her information and by that the system checks the whole form to see if the user has filled up the needed info.

##### **3.3.3.1.2 Login: index.php:**

index.php is in charge of checking the program to see if the user has logged in. the program checks the user name and password which the user has entered with the database, if the information entered is correct the server will tell Ajax to display the related links for a logged in user. If the information however is not correct the server will once again notify Ajax the error of that this user name and password is invalid and Ajax will notify the client side web application.

#### **3.3.3.2 Admin:**

##### **3.3.3.2.1 User**

###### **a) User information update:**

piedit.php, pisave.php: Piedit.php gets the information from the user (firstname, lastname) and sends this info to the server (pisave.php) the server updates this info and by that returns the result which is either successfully or aborted.

###### **b) Password update:**

Pipedit.php, pipsave.php: pipedit also gets the information from the user but this time its the "password". This information gained will then be sent to the server (pipsave.php) the server updates this info and by that returns the result to the client.

### 3.3.3.2.2 Picture

#### ***a) Uploading and managing picture***

lupload.php: this is one of the most important sections of the program, a section where the first thing is the user sees which is to upload the picture. limage.php: this php file enables users to see the picture which is uploaded (thumbnail) and also allows users to upload more pictures. Note: if user uploads more than 10 pictures then the pictures are shown in the next page. imgdsp.php: this php file enables users to see the picture in a separate page. idel.php this file is for deleting the picture from the web application what it does it firsts deletes the picture from the server and after that deletes it from the database.

#### ***b) Editing the picture***

There exist five functions coming to edit the picture, these five functions are:

- 1) Resize (ires.php, iresf.php)
- 2) Crop (lcrop.php, lcropf.php)
- 3) Rotate (irot.php, irotf.php)
- 4) Add text (iatext.php, iatextf.php)
- 5) Add object (iaboj.php, iabojf.php)

Here is an explanation of how some of these php programs work:

Resize, ires.php: This section of the program edits the pictures which the user has previously uploaded. The main function it provides is to the resize the picture, it uses javascript to change the width and height and uses Ajax to send the information to the server iresf.php. iresf.php reads and changes the picture resize, it saves the edited picture,



the address of the uploaded picture and the information of the edited picture will be sent to the client side and displayed by Ajax technique.

**Crop, Icrop.php:** This function enables the user to crop the area of the picture which he or she wants it is done with javascript. The user clicks the update button Ajax sends the information to the server icropf.php. icropf.php reads the picture crop coordination's and by that it saves the cropped picture, the address of the uploaded picture and the information of the cropped picture will be sent to the client side and once again displayed by Ajax technique.

The same goes for iatext.php and iatextf.php which is for adding text, iaboj.php and iabojf.php which is adding object and irot.php and irotf.php which is for rotating the image.

### **3.4 First Prototype Handout**

To design this website Macromedia Dreamweaver was used, here is a couple of the web applications page in order by which the user interacts.

#### **3.4.1 First page**

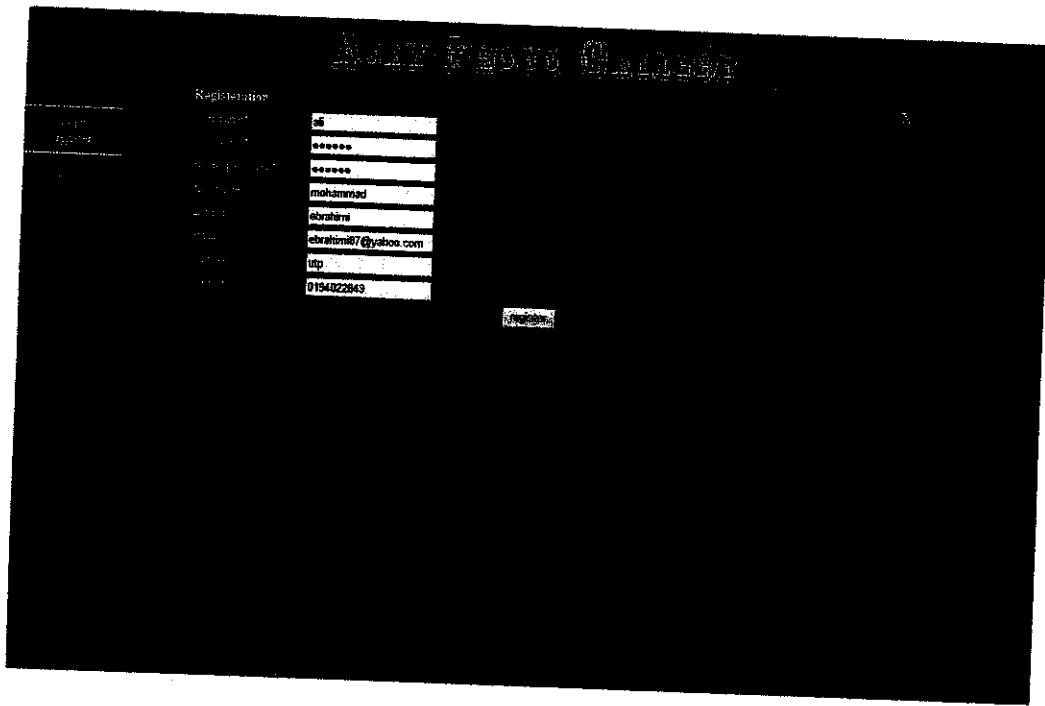
Figure 13 is the main public page which users will see when they use online photo editing. To view this page there is no need of login, so it makes it a public first page. In this page there are two main links, links to pages login and register.



**Figure 13: First page**

### ***3.4.2 Registration Page***

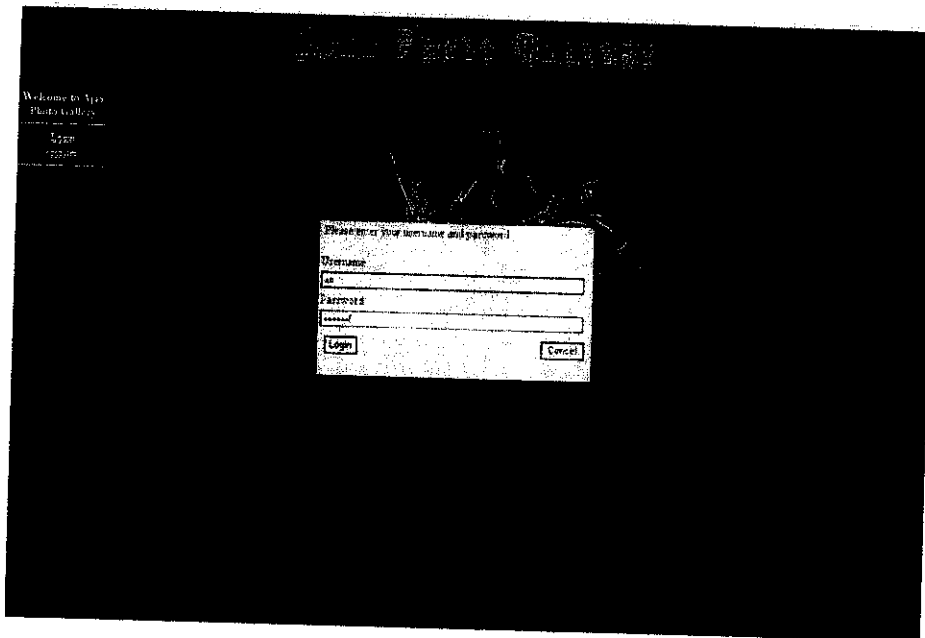
If there exists a new user, they would have to enter registration as there second page. This page has forms asking for the user information which Ajax sends to the Database on the server. As it is shown in figure 14 three of the eight forms are compulsory for the users to fill, the user name, password and the retype password are essential for the system to distinguish users from one another. The other forms are optional for users to fill in; clients can easily understand which forms are compulsory for them to fill with the stars shown next to the form.



**Figure 14: Registration Page**

### **3.4.3 Login Page**

For user which are already members or which have just registered with this system, they have to enter the login page in order to successfully use the websites functionalities. As shown in figure 15 this page has two forms, one asking for the user name the other for the user password which is stored in the database. Ajax will send these information's from the clients to the server side and by that the system will check if the usernames and passwords are valid or not. If valid the user will access the admin page if not they will get a message saying the user name and password is not valid.



**Figure 15: Login Page**

#### ***3.4.4 Admin First Page***

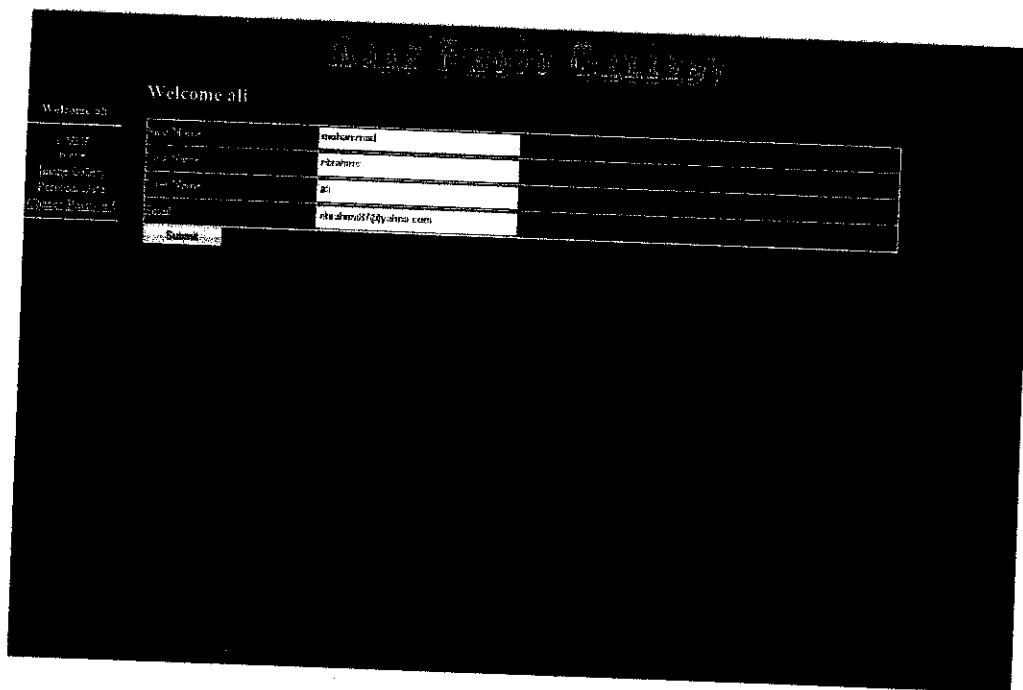
Admin first page is a secure page which will be shown to users who have successfully logged in to the system. Figure 16 shows that this page has five main links in the navigation bar, [Logout](#), [Home](#), [Image Gallery](#), [Personal Data](#) and [Change Password](#). Choosing Logout the user will exit the system, choosing Image Gallery the user can upload pictures or see pictures which he or she has already uploaded and so on.



**Figure 16: Admin First Page**

### ***3.4.5 Personal Data Page***

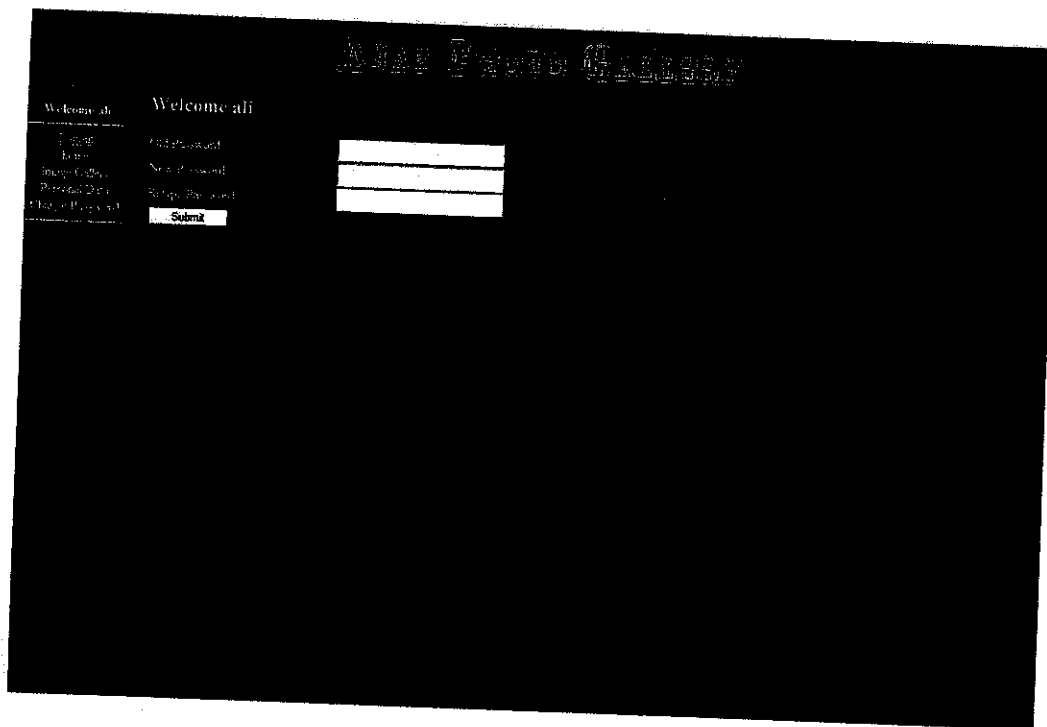
Figure 17 shows a page which clients can use to change their first and last name. the email and user name cannot be changed in this section, if users want to change those they better register for a new account.



**Figure 17: Personal Data Page**

### **3.4.6 User Password Page**

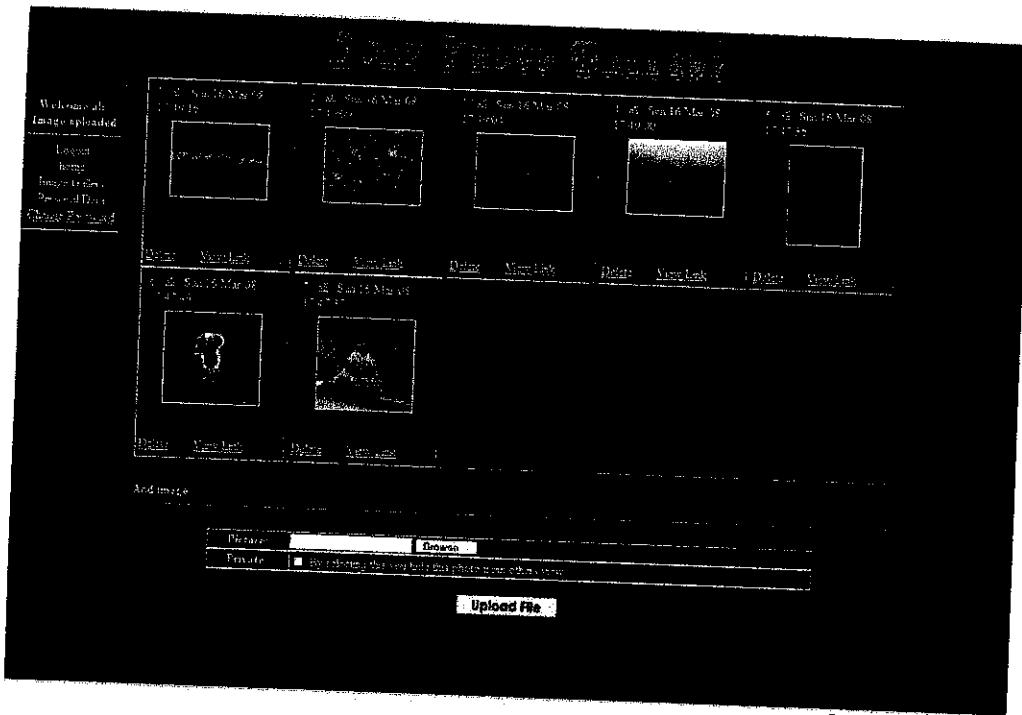
The user password page as shown in figure 18 will ask for the old password which the user entered to subscribe with this web application. With that they can enter a new password to change their old one. All three forms should be completely filled in; the new password entered in password and retype should be the same in order to progress.



**Figure 18: User Password Page**

### **3.4.7 *Picture Upload Page***

This page asks the users to upload pictures which they wish to edit. Figure 19 shows that the user has uploaded seven pictures, if these pictures exceed more than ten they will be shown in a second page. Clicking on each thumbnail displays the image in a separate page.

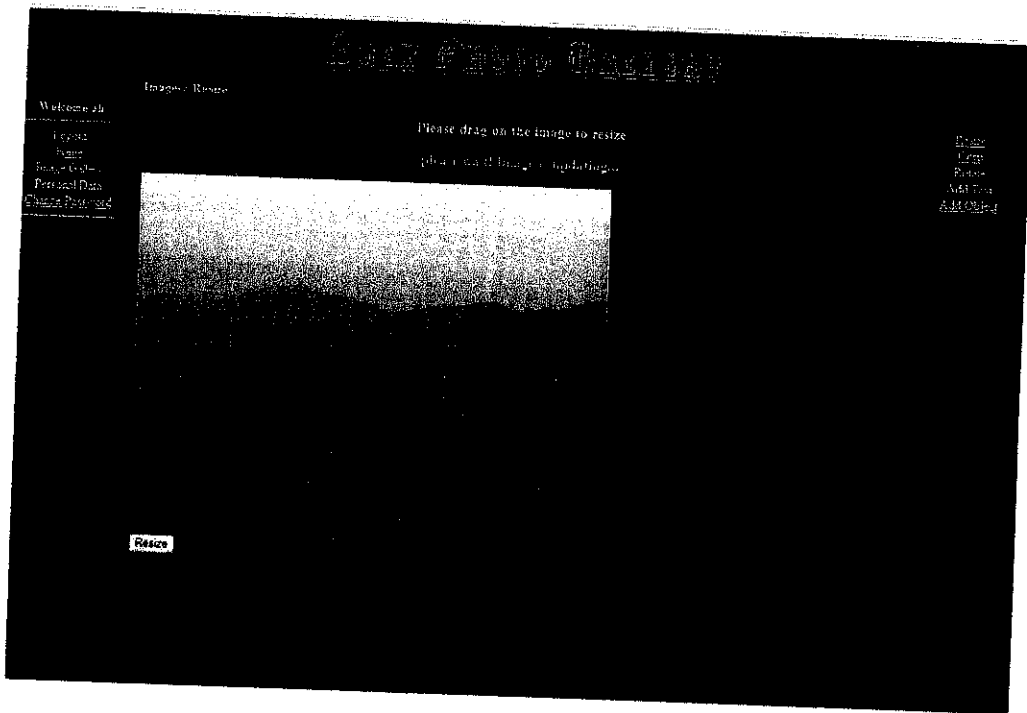


**Figure 19: Picture Upload Page**

### **3.4.8 Picture Resize Page**

Figure 20 shows the resize page, in this page the user clicks on the image drags it upon the main page and resizes it to the amount which he or she wants. Ajax will not refresh the page, as it is shown in the figure 20 once the resize button is clicked a red note will inform the user that Ajax is informing the change to the server side.

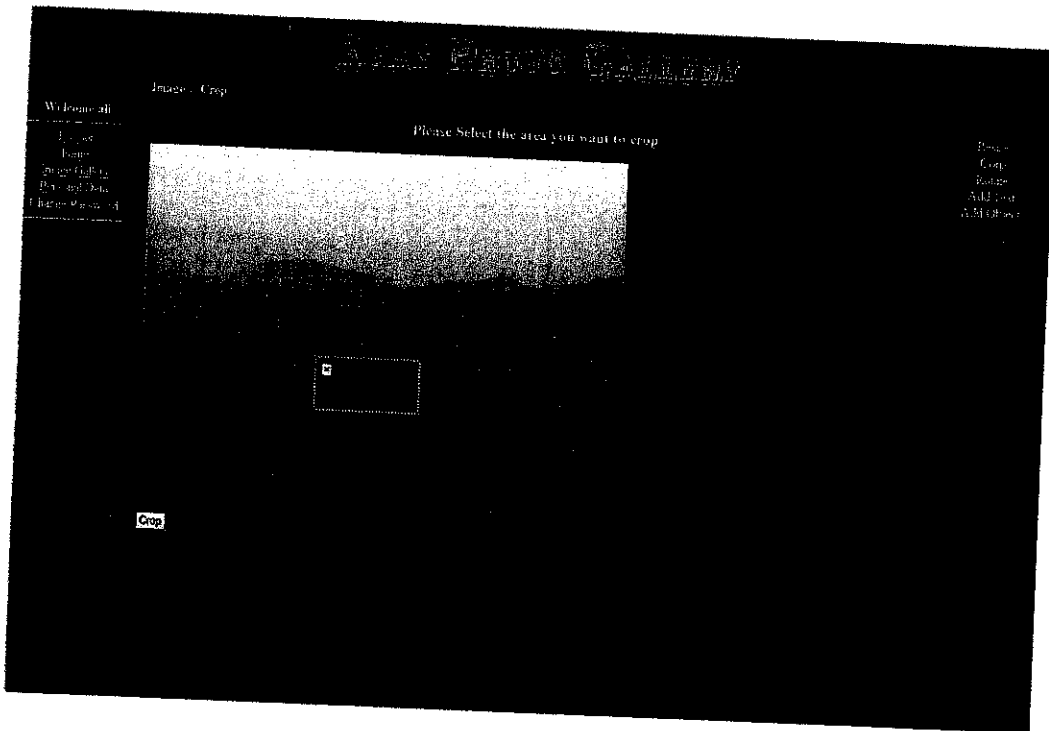




**Figure 20: Picture Resize Page**

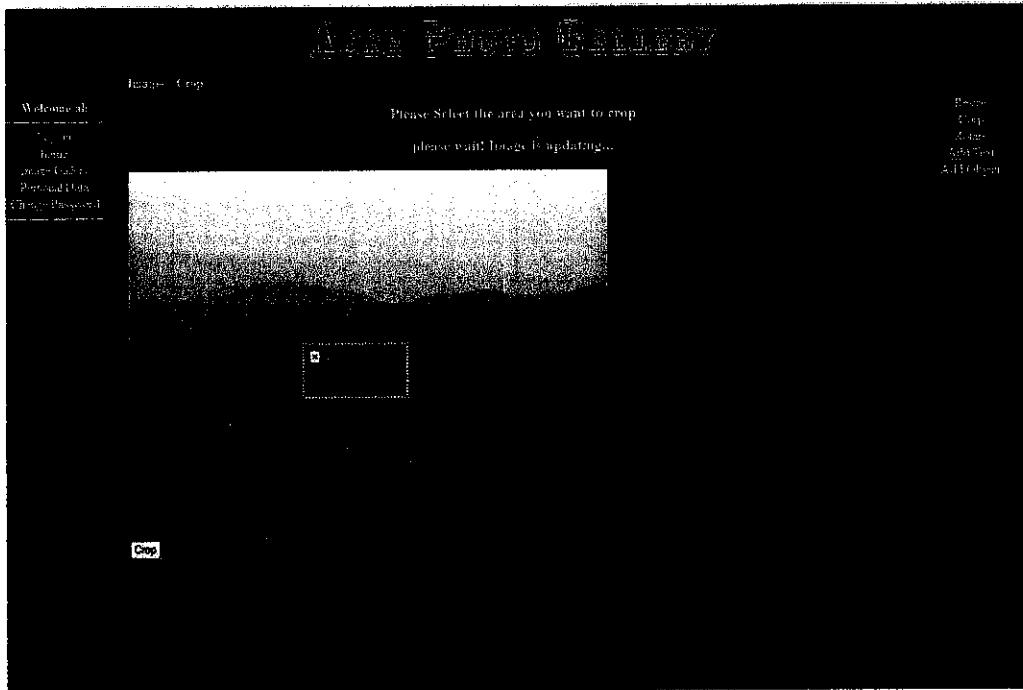
### **3.4.9 Picture Crop Page**

Figures 21, 22 and 23 shown below are the three steps in which an image is cropped. In the first step the user will click on the image, a box will appear the user can then increase or decrease the image.



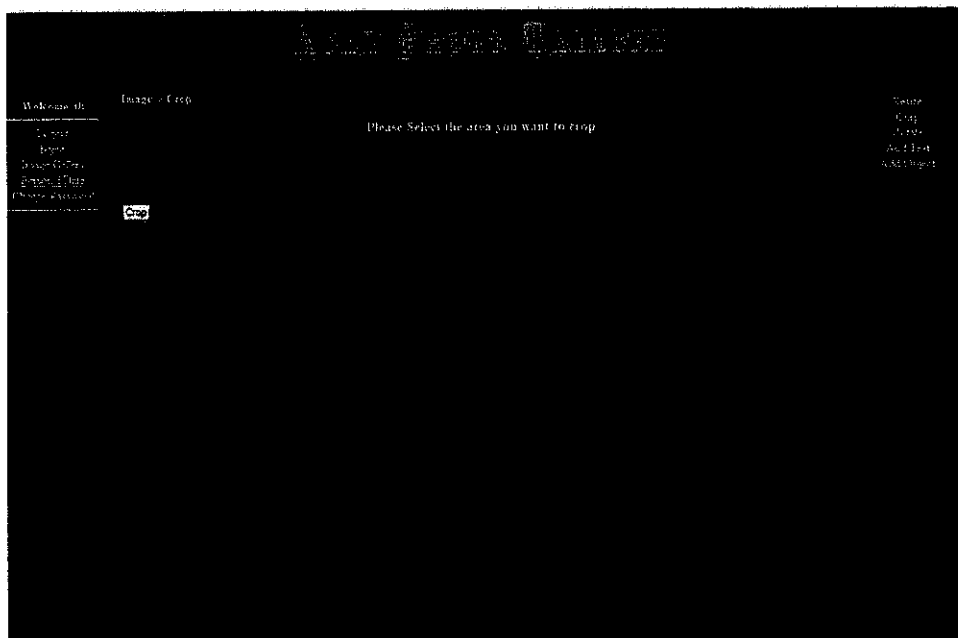
**Figure 21: Picture Crop Page1**

After selecting the area the user wants to crop, he or she should click the resize button; once again the red note will appear informing the user a change is taking process to the image.



**Figure 22: Picture Crop Page2**

After a short while as shown in the figure 23 the image will be cropped.



**Figure 23: Picture Crop Page3**

### 3.4.10 Add Text Page

One of the most brilliant functionalities this web application provides is adding text with different fonts and colors instantly on the page. As shown in figure 24 user can write a text in the box, select the size and font, click upon the color symbol which will show the different colors that can be applied to the text and by that click upon the add text button

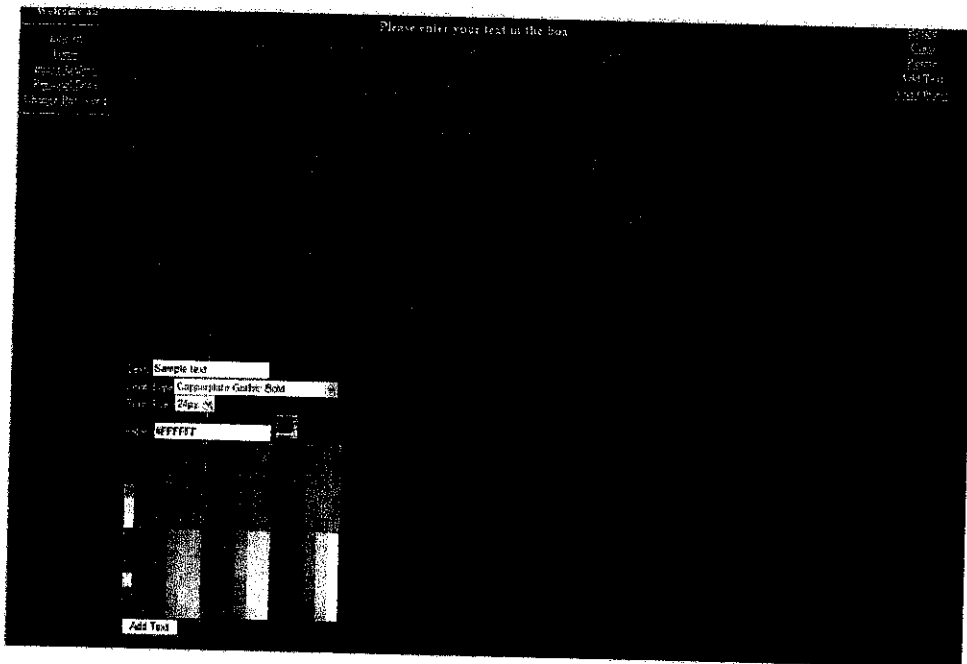
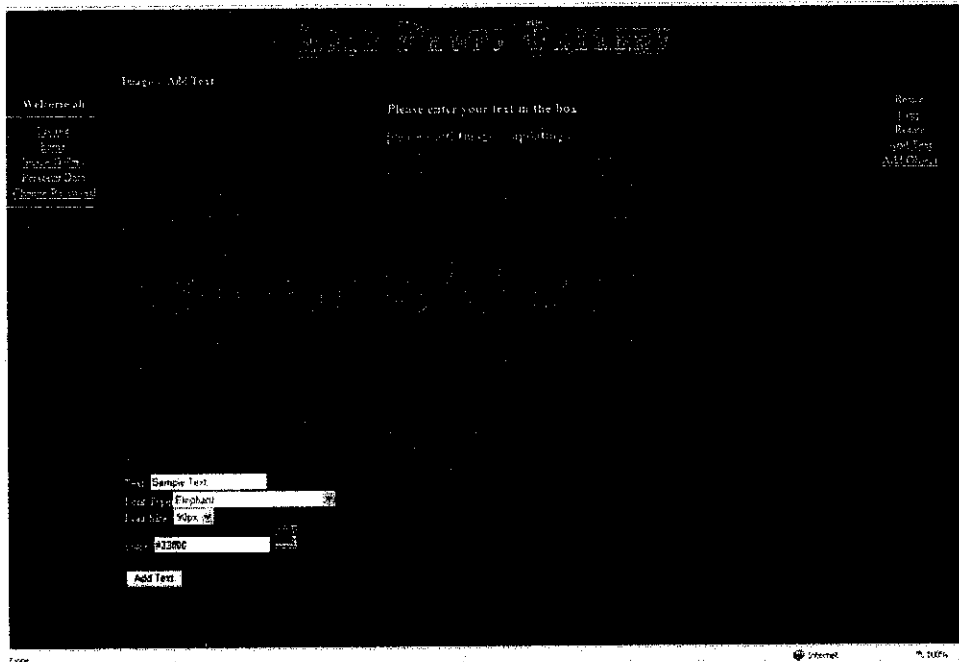


Figure 24: Add Text Page1

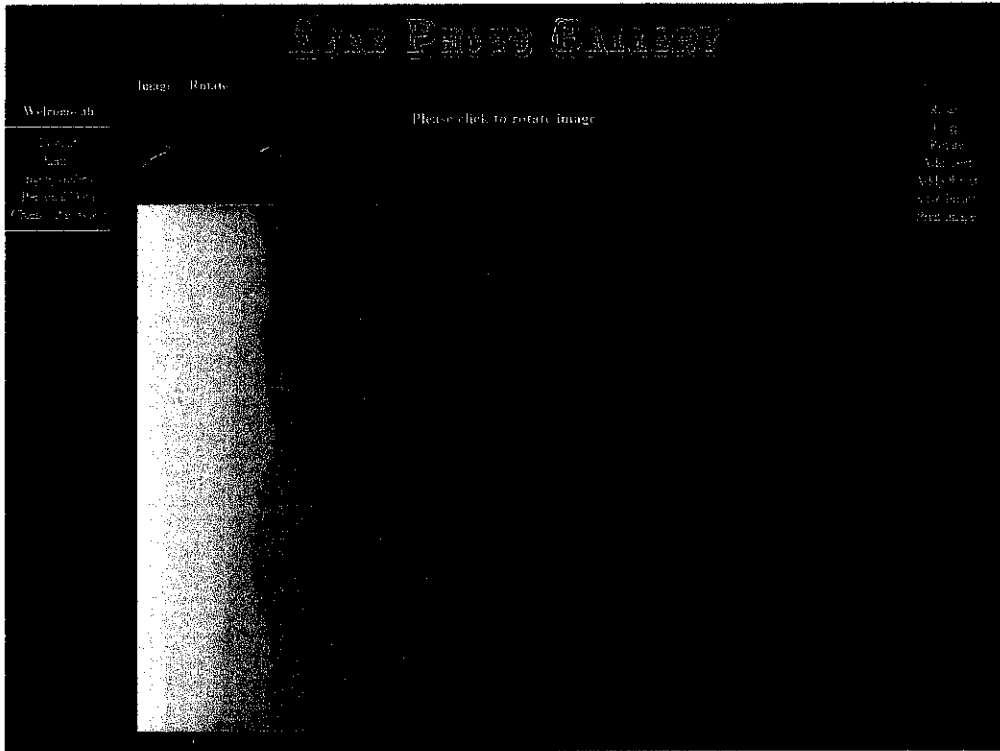
Just like the other functionality pages a red note will appear on the page and inform the user of the changes which is being applied



**Figure 25: Add Text Page2**

### **3.4.11 Rotate Page**

Rotate is one of the other elements this site has to offer as a function. As shown in the figure 26 by clicking on the rotate arrow the picture will be rotated to a 90 degree left or right, depending on which arrow is selected.



**Figure 26: Rotate Page**

## **CHAPTER 4**

### **SYSTEM TESTING**

The system was tested by me and some friends of mine on April 07, 2008. In this section of the documentation several testing techniques were used on the system. These testing include functional testing and security testing.

#### **4.1 Functional Testing**

The test conducted primarily on 48 identified system functionality for the two groups of users. The 48 functions of the system are as follow:

1. Admin 26 functions
2. Layers 9 functions
3. Public 2 functions
4. User 5 functions
5. General 6 functions

#### **4.1.1 Admin functions**

Inside the admin 26 functions exist which are as follow:

edit, fload, iaboj, iaobjf, iatext, iatextf, icrop, icropf, idel, iimage, imgdsp, index, iprint, ires, iresf, irot, irotf, isave, iupload, logout, obj, pedit, pipedit, pisave, pipsave and the public function.

Out of 26 functionalities, 22 functions ran smoothly, 4 functions ran smoothly but with partial bugs. These four functions are:

icrop ---- The crop function has these two problems: 1) The page size: If the picture is bigger than the screen a problem occurs. 2) If the user selects an area to crop and by that change their mind to select another are they should first select an area outside the area which they previously selected.

ires ---- The resize function has these two problems: 1) The first problem is that this function does not create a history when it stores the info it copies the picture on the original photo whereby the user can not undo image if they want to. 2) The page size: If the picture is bigger than the screen a problem occurs.

iatext ---- By testing the add text function we found out that it may create some problems for the user. When the text on the screen is clicked by the user it tends to jump to the original position which it was placed at the beginning. But then the user can select the area and place the text all over again, so that's why it is only a slight issue.

iaboj ---- The add object function also has a similar problem like the add text, the object jumps to the original position when clicked upon.



#### ***4.1.2 Layers Functions***

Inside the admin I have 9 functions which are as follow:

css, header, index, loginl, main(JScript), main(PHP) newsl, rgfrom and the top function.

By the test we saw all the 9 functions ran smoothly and without any problem.

#### ***4.1.3 Public Functions***

Inside the admin I have 1 function which is the public function and it runs totally smooth without any problem.

#### ***4.1.4 User Functions***

Inside the user 5 functions exist which are as follow:

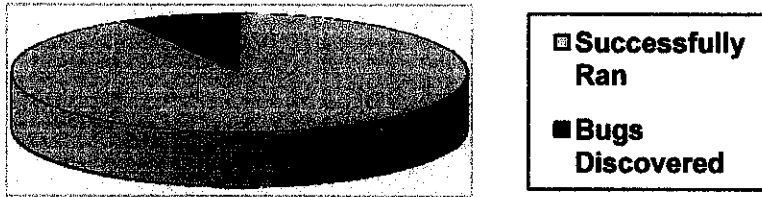
authenticate, connection, index, info and the reg function, which all run properly.

#### ***4.1.5 General Functions***

Inside the general there exists 6 functions which all run totally smooth, they are:

alink, configs, glink, index, index2 and the plink function.

Figure 27 depicts the result of all the functional testing in a pie chart graph:



**Figure 27: Function testing Pie Chart**

## **4.2 Security Testing**

Online photo editing application can be considered as one of the best secure websites created here at UTP based on the following reasons:

1. The logout done in this application is by Ajax when the user logs out of the website, Ajax will move the page to the first public page and other users will not be able to view the admin and logged in pages.
2. The functions which are related to the admin cannot be seen or used if the user is not a member or not logged in the system in any circumstance. For example if a user loges in and uses the functions to edit an image and then logs out other users cannot see the actions unless they log in with the same user name and password.

3. Password is encrypted using the MD5 when sent to the server side, hackers cannot gain the password by just hacking the system.
  
4. It is impossible for the user to access a page from outside the main page the reason to this is that in the main page PHP creates a variable whereby in other pages if the variable is not created the page will not open. For example typing the direct address of a specific page and trying to get the information on that page, is blocked by the system.
  
5. Images uploaded by user can be secured and not seen by other users in this web application by an option provided in Ajax photo editing this web.
  
6. The other important aspect of security in this system is the database. The database uses a “require once” function by which the function enables the database to be used virtually in the pages, and altering it is impossible.

## **CHAPTER 5**

### **DISCUSSION AND RESULT**

Ajax photo editing application has met all the objectives stated in the earlier part of the documentation. This web site enables a user to subscribe by registration, by that the client has a variety of functionalities to edit their uploaded image:

1. cropping image
2. resizing image
3. rotating image
4. applying objects and text open image uploaded
5. printing or saving the edited image

#### **5.1 Advantages of Ajax photo editing application**

The advantages this system has comparing to other online photo editing application are:

##### **5.1.1 *The use of Ajax:***

- a. Fast speed and low usage of bandwidth
- b. Organized system structure (Placement of data, format, style, and function)

The use of Ajax in online photo editing application comparing to the vast usage of flash in similar sites like picture2life, is one of the most significant advantages this site provides.

### ***5.1.2 Installation***

To use the functionalities online photo editing provides there is no need for installation. Users need to register and by that use the fast and easy accessible functions to edit their image, which makes their process cheap and accessible anywhere which has a computer and internet connection.

### ***5.1.3 Easy to work with:***

This web application has been designed based upon principles of HCI (Human Computer Interaction) to develop an interface, good looking and easy to work with for both novice and advanced users. Unlike similar web applications with crowded interface like picture2life

### ***5.1.4 Security:***

Tests have shown that this web application was designed with security being one of the most important elements in the development. Clients can be ensured that their information's are accessible to themselves only and that the system blocks attempts by outsiders to expose secure info.

## **5.2 Disadvantages of Ajax photo editing application**

### **5.2.1 JavaScript**

By using Ajax there is always this possibility that JavaScript might not work. If so the web functions provided by this web application automatically stop working.

### **5.2.2 Only IE**

Currently this website is only workable on the internet explorer; this does not mean that it will completely be useless on other internet browsers (for example firefox) but some of the functionalities may not work.

### **5.2.3 Back button will not work as undo**

The dynamically created web page will not record itself in the browser history engine; this causes the problem for the "Back" function. Meaning if the user attends to a page and uses the "Back" button it will not function properly.

### **5.2.4 Bugs in the functionality**

As discussed in the testing section four functionalities exist which have slight problems:

- a. The crop function
- b. The resize function
- c. The add text function
- d. The add object function

### **5.2.5 Lower functionalities**

Ajax photo editing application has lower functionalities comparing to similar applications like picture2life. This website was created in less than 8months and only by one person unlike picture2life which has been going for 4 years now.

## **5.3 Future Improvement**

Creating this web application I had so many plans figured out in my head, lack of time and experience did not allow me to create a photo editing application with full and sufficient functionalities. The long term objective is to create an application like Adobe Photoshop but online and without installation.

Mainly what is going to be done in the near future is to enhance and improve all the disadvantages stated in this project. Here are some solutions to the disadvantages:

### **5.3.1 JavaScript**

There always exists the possibility of JavaScript not working on a browser, in order to overcome this issue the use of plain HTML and PHP to support Ajax is going to be taken. The user will not be able to preview the image in the updating process which they get by Ajax, but by clicking on the submit button they will be able to see the finalized image.

### **5.3.2 *Only IE***

Users around the world may use any web browser they wish, so the weakness of the system in which all the functionalities of the web application will only work on the internet explorer must be resolved.

### **5.3.3 *Back button will not work as undo***

There are various solutions to this problem which have been developed by the expertise. One of the well known solution is using of the invisible IFRAMEs to invoke changes that populate the history used by a browser's back button.

### **5.3.4 *Bugs in the functionality***

Users expect a system which will not give them a hard time, work and which are available whenever they wish. The four functionalities which had slight problems will be worked upon and updated to a better working condition.

### **5.3.5 *Lower functionalities***

Ajax photo editing application was developed in nearly 7months by one person. With more time and knowledge functionalities of this web application can be enhanced, and enable this website to become a big competitor towards websites like picture2life.



## **CHAPTER 6**

### **CONCLUSION**

The use of web based applications is growing day by day and web applications are improving to be as efficient as possible. In today's world web applications that can function on a variety of platforms or in a variety of contexts, which do not need installation and that are easy accessible insure a business' competitive edge.

The objective for creating an e-commerce (Electronic commerce) web application was to satisfy clients by providing easy accessible service, which is fast, cheap and the most important factor which is saving users precious time.

Ajax helped in so many ways to achieve this goal, Ajax's fast speed and low usage of bandwidth with organized system structure made creating such a system possible. A system in which data, format style, and functions were all organized in the system structure. Comparison played a major role in the development of Ajax online photo editing, similar applications like picture2life were analyzed, their weaknesses and strengths pointed out and by that a system was developed which tried to capitalize on the weaknesses and learn from the strengths.

This is an ongoing process which will be improved in the future, hopefully the day would come in which it could compete with the major online photo editing applications.

## CHAPTER 7

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## APPENDIX I

### 1) Schedule FYP I

**Table 1: Schedule and milestone FYP I**

No.	Detail/week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1	Selection of project Topic															
2	Preliminary Research Work															
3	Submission of Preliminary Report															
4	Seminar 1 (optional)								Mid Semester Break							
5	Project Work															
6	Submission of Progress Report															
7	Seminar 2 (compulsory)															
8	Project work continues															
9	Submission of Interim Report Final Draft															
10	Oral Presentation															

2) Schedule FYP II

Table 2: Schedule and milestone FYP II

No.	Detail/week															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1	Project work continue	█	█	█					Mid Semester Break							
2	Submission of progress report 1															
3	Project work continue				█	█	█									
4	Submission of progress report 2															
5	Seminar										█	█	█			
6	Project work continue									█	█	█	█			
7	Pre EDX															
8	Dissertation															
9	Oral Presentation															
10	Hard Bound Project submission															