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Protecting Children from New Media Environment: Kids Protector

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Abstract:

In the last few decades, the Internet has been available at home in many places around the world. This has many advantages for people in all ages. For instance, accessing video on demand, online Wikipedia, communication with other people, and elaborating work from a distance. However, Internet availability at home raises new concerns of parents regarding to managing child online safety. By child online safety we mean protecting a child from harmful and non appropriate materials, e.g. adult, violence, or illegal contents. Different techniques used to monitor child online activities. Some of them are procedural techniques, and the others are automated by software tools. One of the open issues regarding to the parental monitoring technique is how to keep child satisfaction while using the parental monitoring. For instance, a child with an age above 10 years old may not prefer the sharp restriction rules by parents.

In this thesis, the goal is to investigate a design for a future parental monitoring tool that supports parent-child web monitoring negotiation. This is by making the monitoring rules more flexible (negotiable). In this case, a child can request a parent to modify the filtering rules when it is needed.

The research methodology is based on a user study that involves a number of families in the design requirements identification, and the tool design and evaluation. As a result, the thesis provides a mid-fidelity system prototype that has been evaluated

by real possible users, which could be used to develop a high-fidelity system implementation in the future.

Key words: Parental web monitoring, remote monitoring, monitoring flexibility, negotiability, fidelity prototypes.

1. INTRODUCTION

Until recently, ensuring your children remained safe online was a reasonably simple affair. Often the only computer they used was the family PC. The influence of media on the children is increased day after day. Media today have many adult and harmful contents, such as pornography, online bullying or harassment websites. [5]. These media have effects on all people but its effects on children are more serious. It can affect the morals and upbringing of children and their behavior in general. Surely, parents have many concerns about how to keep children safe online. Nowadays, children and young people frequently use the Internet to learn by having access to (information, knowledge, opinions, education tools, and even teachers), Communicate (e.g. express ideas, share information and experiences), Interact socially with friends and peers, Innovate , create and share content, and entertainment purpose (e.g. games, movies, music, books) [2]. We can't stop this media or the development of this media, but we can control the device that kid use. Programmers and expert help fixing this problem by designing many programs to control devices (computers, laptops, tablets) of children. The basic of these programs is to provide a mechanism that blocks some words or sites in search engine. Thus, when a child wants to search about a blocked word or site, the search engine will return block message and prevent accessing the page that contains the undesirable thing. Although the availability of blocking programs, it have a lot of disadvantages. We will design an application that will try to avoid these disadvantages.

1.1. Aim and objectives:

The aim of this project is to investigate a design for a future parental monitoring tool that supports parent web monitoring. The project will focus on child online safety and protecting a child from harmful and inappropriate materials online, e.g. adult, violence, or illegal contents. When we talk about program, its main task is to control on children's activities. While children connect their devices to the Internet, we will have a lot of requirement that parents want to ensure their children safety online. The first goal, that we have set, plans for a design that has intelligibility, simplicity, and usability features. As mentioned in [1], we need to focus on crafting a Customer-Centered Web Experience by concentrating on patterns, principles, and processes of the design. Requirements and other targets should be mentioned in our design are ban bad words and sites, and show the history of children activities online.

1.2. Key Results:

This study presents interfaces designed for a future parental monitoring application that supports Parents protect their children from the harmful materials in the Internets. The flexibility of the interfaces can be clarified in different parental monitoring feature. Part of the design is innovative, while the other part reused from the best practices of the current technologies. The innovative part includes improving the usability of the tool. This improvement approved by the parents who participated in our study as they support our usability claim. The other possible contribution by our tool is the support of parent child negotiation. Our design considers making the parental rules flexible and could be customized with simple procedure. This would allow a parent to respond to a child's request easily. However, we believe that our work can contribute to the state of the art in different ways. On One hand, the requirements are gathered by depending on making a

study on some parental monitoring Softwares. On the other, our tool design could be a starting point for the future implementation of an innovative parental monitoring tool.

1.3. Plan of the project:

This phase was an important part of our small project. Most people start their Web Application Project with a general idea, but they do not have a clear direction outlined and do not dedicate much or any effort to the important business marketing and project specification detail and discovery. We'll begin by defining what we need to end up with - the broad, major goals of the app. From there, we can work backwards until we have defined steps that are granular enough to be turned into individual actions we can execute.

With supervision we receive the first step towards building appropriate design or program for the control of parents. First, we will look for programs that already manufactured by skilled programmers like Net Nanny, WebWatcher, McAfee Safe Eyes, Witigo Parental Filter and Qustdio. We will specify the objectives and the need for these programs. Moreover, we will search for their common defects and limitations and will write them. We will choose the best features of these available parental monitoring applications to implement them our design. After we will define a detailed list of objectives for our application, it becomes infinitely easier to proceed with building it. After selecting the best features of each program, we will use the language of HTML and CSS in the manufacture of the main base for our program. After equipped with all interfaces and pages, we will think about how you can use the interfaces for the purpose of the basic program, a ban on the words and sites. We will use the language Php to built own database and tables. Then, we will implement the additions and deletions of undesired words and sites manually.

In software development, creating a Minimum Viable Product allows for building an initial version of an application

very quickly. Then, It can be adding additional features down the road after real users are actually interacting with the app [4].

2. LITERATURE REVIEW ON CHILD SAFETY

Kids may come across websites containing adult images or demeaning, racist, sexist, violent, or false information. Many of the risks faced by children on the internet are the same as those they face in their everyday life. According to the U.S. Department of Education, % 81 of children as young between 3 - 6 years old are using the Internet. That percentage continues to increase with age with the highest percentage of usage at % 88 for children different age .So it's safe to say that many of the simple safety rules you must teach your children to follow when they leave the house each day also apply when they use the internet. It's best to talk to your children about what they are doing online and help them understand how to have a safe, fun and secure experience of the internet. You can help them to know what risks to look out for, and help them to feel comfortable telling you about anything that offends or upsets them online [6].

2.1. Adults and harmful contents:

Parents can protect their children when they are online from many harmful contents, such as the following examples:

- **Pornographic materials [3]:** A US survey reported %42 young people aged 3 - 7 being exposed to online pornography in a one-year period; % 66 of this exposure was unwanted. %24 of these children and young people were not bothered or upset by the experience.[10]
- **Illegal content:** such as Gambling online. Moreover, some web sites and newsgroups that promote the use of drugs, tobacco or alcohol.

- **Legal and Financial Problems:** such as giving out a parent's credit card number or committing a cyber crime [7].
- **Violence content:** such as exposed to violence in movies and television, video games and music. Today, children and teens can download violent music lyrics (including lyrics removed from retail versions of songs) and access violent images, video clips and online games, with the click of a mouse [16].

All of these contents can have negative effects on morals and behaviors of children [3].

2.2. Related work:

Varied of adult and harmful contents are available over the Internet and can be easily reach by any user. In addition, most children have their own devices. These factors lead parents to have concerns about their children safety online. We explore the various free software and system settings that can help parents to protect their little children while they use the web on any devices at home. We discussed the hidden misdeeds suffered by users. We will give three examples of programs and compare them with "Kids Protector" software:

2.2.1 Net Nanny Parental Controls - Main Features:

Net Nanny is an Internet filter software available today. It combines together effective pornography filters with anti-cyber bullying capabilities that can help you keep your children safe from harm. It may seem that it a good application but it have some limitations. First, it can be considered the time cost of this program is one of its limitation, as mentioned by the disadvantages of the program: "We can find that our system reacts really slowly to user operations related to firewall. Users always hate long waiting time in modern high-speed daily life.

However, to realize advanced features with fewer obstructions for user operation, we have lots of functions and command executed during background processing. The booting time and enabling time of wireless access take extremely long time."[11]

"It always takes more time for router to boot when using third party firmware. The booting time comparison is shown in table "[11]

	Linksystem	OpenWrt	Home Internet cafe
booting time	8 s	40 s	83 s

FIGURE 2.1: Net Nanny

The second problem in this application it's very complicated even with different versions on computers and mobiles. This leads to aversion and boredom from the use of this application by users. As mentioned in Net Nanny2, it shows the problem with the design and how difficult it is for the user to deal with the design "With our design and improvement, our user interface is more friendly and convenient comparing with normal third party firmware developed for advanced users with more Internet skills. But there still may be some features missing and detailed guidelines needed for our users since we will never know what our users will do to the system and how they can understand the options with the right meanings. It is really necessary to continue the interface improvement works with more user testing and feedback." [11]

The third problem in this program is the usability, It is one of the programs that is hard to use as the program at the beginning teaches the user to use the software, As mentioned in Net Nanny2 shows the problem with the usability "More users test may find more problems in a single test, but in a second test with problems found in the first time test fixed, users may find other new problems ignored the first time round. It makes the more times of testing with less test users more effective." [3]. The user may need to follow the steps more than once even

get used to the program. An important thing we have to motion that we find in ones of the websites, A mother complains from Net Nanny program where she could no longer access to the school website of her daughter site, so the program is considered to be the school of the sites that should be banned from searching As with Janelle Leatherwood when he says his biggest problem with net nanny" When I used net nanny it was a software program that you had to install on a computer. It captured links to websites that were visited that day and emailed them to you. I didn't use it very long because it blocked the very stuff we needed our computers for in the first place - work, school and research. ". [2]

2.2.2 Qustodio Application:

This program based on blocking unwanted words in search engines. It has design and according to the usability this application consider easy to use.

FIGURE 2.2: Qustdio Interface

The main disadvantage in this application is in the app-management. The program can lose the importance of his work in the case as mentioned in disadvantages in Qustodio for Families Premium "As strong as Qustodio's app-management features are, I noticed some problems. New apps don't appear in the admin panel until they've been used on the phone. A

blocked app can be opened, though not used. I tested this on a Game of Thrones app, which resulted in the app's painfully annoying music playing without end. To stop it, I had to restart the phone. You can restrict broad categories of Web content rather easily using this app, but I noticed little real effect. Net Nanny's own browser makesWeb filters much more workab.

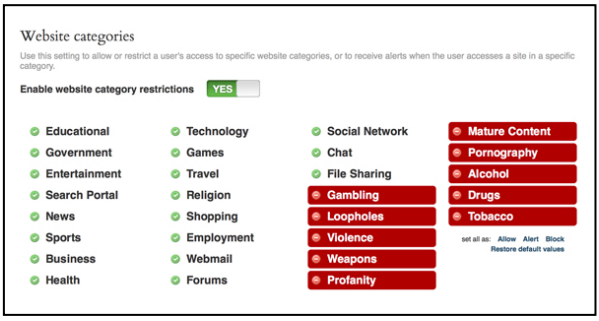

FIGURE 2.3: Website categories

In our program we tried a lot to avoid this problem, only the word and the site that mother will enter to the database will be blocked from the browser and when the kid try to search to this word or site he/she will be disable to access to it. this will add more advantage to Kids Protector program and make it more stronger to protect the words and sites from tampering by children and block them entirely from the browser.

2.2.3 Salfeld child control:

Is another parental control program, You can block bad sites, porn and prevent improper words and has a pretty distinctive is the possibility of blocking access to important files from the futility of children.

Program Salfeld Child Control Just like any other Softwares gives you the reports of everything in your absence at any time and how long, tedious detail, but prominent defect in this program is the difficulty in using the program. High-level program seeks to prevent children from manipulating files, blocking sites and the prohibition of certain words are controlled by parents more features is available in this program

but all this features add a lot of complexity to the program. In addition to the complex is worth noting that the timing of the ban or to control where this program controls the computer a certain period of time, an extension is in effect basically only for the user to whom it was granted. No other users are affected. An extension is valid for a maximum of one day. This is what can be considered a good thing in terms of security, But add more than a lot of complexity for users, As mentioned in the Child Control's book "Important: The most restrictive limit is always in effect. Please be aware that if several limits, whether daily, weekly, or monthly, are defined, the most restrictive limit is always in effect. If, for example, you have set a daily limit of 5 hours and a weekly limit of 3 hours, the weekly limit takes precedence, and the computer will not be available for more than 3 hours on one day. You can enter the period of availability either in hh:mm format or as minutes alone."[8] "Child Control has offered the ability to set extensions for some time. We have completely re-engineered this functionality in response to suggestions from some of our customers. Starting with Version 7.150, the following applies: Granting an extension: You can open the status window by clicking the icon in the System Tray. Next, click the Extensions button, and the Extensions window will be displayed. Then enter an extension time in minutes, along with your password (the same password that you use for settings). You can grant extensions more than once. Each time, the time is added to the time currently available. Extensions will always be shown in the Status window. As an alternative to the password, you can also enter a previously defined TAN to extend the time. When entering a TAN, the number of minutes entered is not important—this will be determined by the TAN. For more information, consult the topic on TAN Management.".[8] While it should be noted that our program is a very simple program to use and navigate between pages design. This is the prominent thing in the program. We add a lot of features that will attract the users to

Kids Protector, This is what distinguishes our program is already eligibility for any software programmed technology and a high-level.

In conclusion, considering to the design of these programs, we can say that, most of these programs has limited into make simple and integrated design and into convenience some users in using their programs.

3. DESCRIPTION OF WORK

We will start from the design concept that says, "designing interactive products to support people in their everyday and working lives"[10]. Choosing the right colors is a very important aspect of user interface design. In our design for user interface, we limit the number of colors to four .The color uses in design [turquoise blue, purple, white, black]. We chose the contrasting colors carefully as there is a distinct difference between the color of the text and the color of associated background. Making good design required that unnecessary icons, buttons, boxes, lines, graphics, shading, and text can be stripped, leaving a cleaner, crisper, and easier-to-navigate website. However, a certain amount of graphics, shading, coloring, and formatting can make a site aesthetically pleasing and enjoyable to use. Plain vanilla sites with just lists of text and a few hyperlinks may not be as appealing and may put certain visitors off returning. The key is getting the right balance between aesthetic appeal and the right amount and kind of information per page.[10] We will start with manual design, that is called low-fidelity prototype, then we will develop and programming it with HTML and CSS languages to make mid-fidelity prototype. Additionally, we'll try to make interaction design to support our work and to make it easiest for future use. In the beginning, design hand painted dozens of times, and in the middle of the design work has changed a lot.

3.1 Design fidelity prototypes:

There are three levels of fidelity: low, mid and high. Designing three types of fidelity prototypes refers to the level of details and functionality built into a prototype.

3.1.1 Phase 1: designing low-fidelity prototype:

Low-fidelity prototyping tools and methods are used for early design just after requirements analysis, to help conceptualize and envision the interface at a high level. These tools often support rough sketching of interface screens by freehand drawing with a mouse or tablet pen [9]. The tools that have been used are sketches, paper prototyping and pen to draw prototyping. We will illustrate our low fidelity prototypes in the following paragraphs.

At first, we thought that the first screen of our design will be the sign in screen as illustrates in Figure (1). It contains two parts. First part is for logging to our parental control tool if the user has account. The second is to register a new user account if the user downloads our parental control tool for the first time. We decided that our design have easy to use icons for the usability of users. In addition, we decided to use Photoshop software to build the logo of our design in the design background.

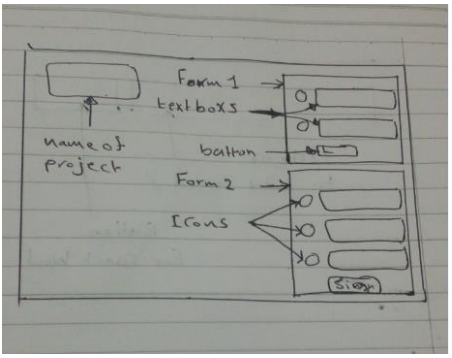

FIGURE 3.1: Log in and Register Interface

Here we decided to draw the main interface of our design in such a format that illustrates in (figure 3.2). It contains five

buttons. These buttons are block words, block sites, history, about as and exist.

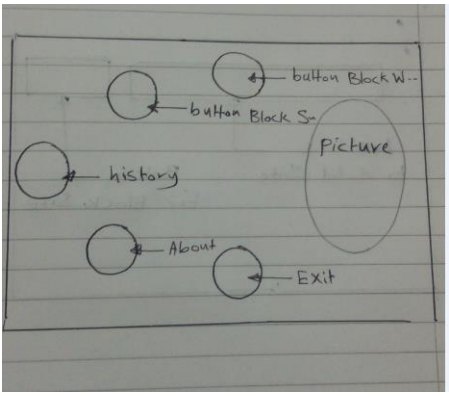

FIGURE 3.2: Home Interface

When a parent clicks on the first button (block words), It will lead to the block word screen (see figure). In this form, we decided to use textbox and buttons to insert and delete undesirable words.

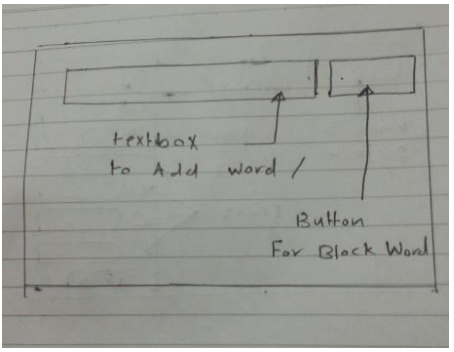

FIGURE 3.3: Block word Interface

Moreover, when a parent clicks on the second button (block sites), it will appear screen for blocking undesirable sites as illustrates in figure. This form also contains textbox and buttons to insert and deletes undesired sites.

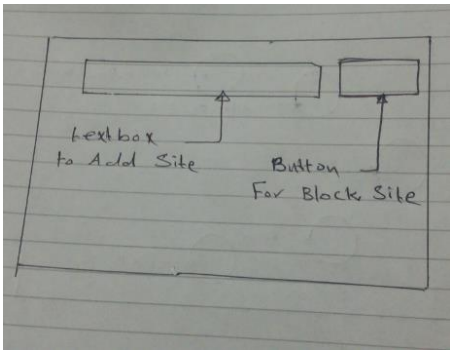

FIGURE 3.4: Block site Interface

In addition, we designed the screens for history button that show the history of the activities. Finally, we draw the screen for and about as button. Then, we moved to the second phase of our project. In the second phase, we achieved the mid- fidelity prototype. And finally, we built the structure of Low-Fidelity Prototype design.

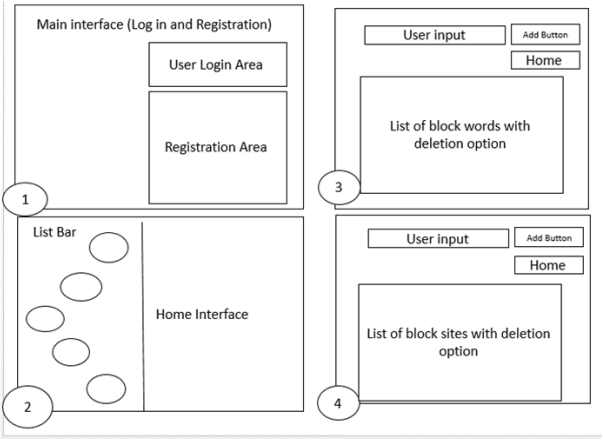

FIGURE 3.5: Main Interfaces Architecture of the Low-Fidelity Prototype.

3.1.2 Phase 2: Design mid- Fidelity Prototype (Kids Protector)

Mid-fidelity prototyping tools are used after early design, for the purposes of detailed design and usability validation. They present detailed information about navigation, functionality,

content and layout, but in schematic ("wireframe") or approximate form.[10].We transferred the sketching on paper to an actual prototype by using programming languages, such as HTML, CSS and JavaScript .We assign name for our parental control software which is " Kids Protector".

In the following, we will illustrate each interface of "Kids Protector" interfaces. The first interface will display is login screen. Here is the first point that we started the design of our tool. Generally, the first screen has two parts: Login and Signup parts. If a user utilizes our tool for the first time, the screen will include registration part to create a new account. Otherwise, the first screen appears only the Login part for a parent to sign in to our design. If you want to register a new account, you need to enter your username, Email and password. Figure (5) shows the first screen of "Kids Protector" tool. In case that you have registered account, you need to enter your email and password, and then click on login. We used two textbox, two icons and a button. The icons images that represent images for Email and password.

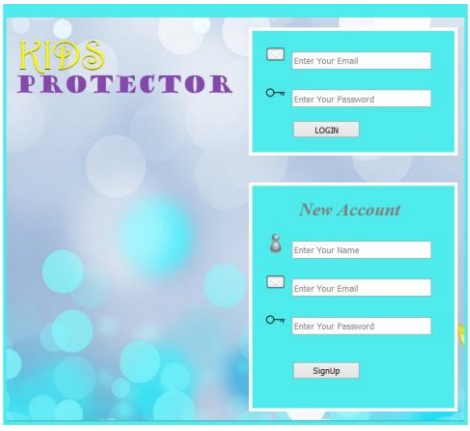

FIGURE 3.6: interface to log into the program

Home page screen:

In this screen, we used five buttons as we clarified in low-fidelity level. Figure (6) show the detail of the page.

Figure 3.7: Home page Screen.

When a parent clicks on a button to block words, it will appear this interface. We used the textbox and two buttons to add and delete words. When you enter a word and press "add word" button words added to the database and display on the block word screen.

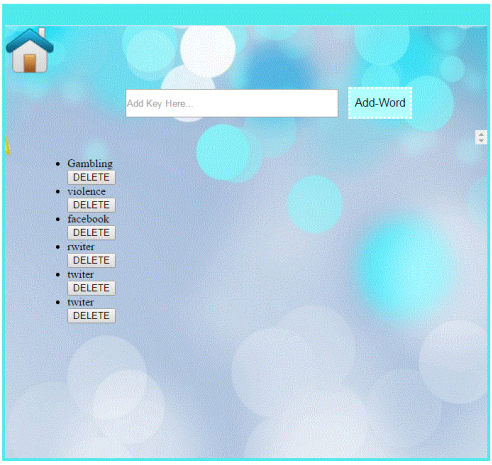

FIGURE 3.8: Block Words screen

When you press the button for blocking websites, this interface appears (see figure 3.9). We used textbox and add site button to insert links. When you type undesired link and press the button, the site will be stored in the database.

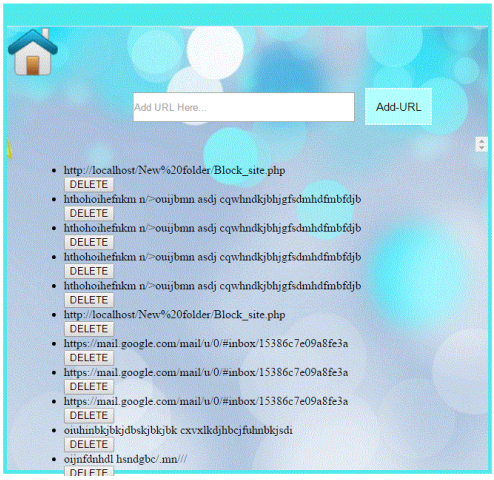

FIGURE 3.9: Block Websites Screen

3.1.3 Phase 3: Design High fidelity prototype:

Most of the necessary design assets and components have been developed and integrated by the time we're building a prototype, which usually consists of HTML/CSS and JavaScript. Compare excellent for conveying the look and feel of a product, but they can't interact with the user, which is why prototyping is so important, also called functional prototype. [12]

Our idea that we need to download the "Kids Protector" application to a parent PC, then the parent can add words, sites and check their child achieves online. The added words and sites will be stored on the database. The data will store its contents in two XML files for block words and sites in order to be reach by other computer. In addition, the child activities will copy to XMLfile to display on the History screen of the "Kids Protector" Application. On the other hand, parent need to create three plugins on the Google Chrome browser in order to connect the XML file that contains undesired word and sites, and their child activities. This idea will be achieved by High-Fidelity prototype. The standard technologies for implementation are HTML, Css, JavaScript, and Php. Moreover, We will build our database using MYSQL. The

database will contain three tables, one for users; i.e. parents, second for storing block words, and the third for scoring the block sites. The user's table may have lot of users, each user control a list of block words and sites. The words and sites tables both have a foreign key refers to the primary key in the users table. So we can say that the relationship between the users table and words table is one to many relationship. Similarly, users and site tables related in one to many relationship.

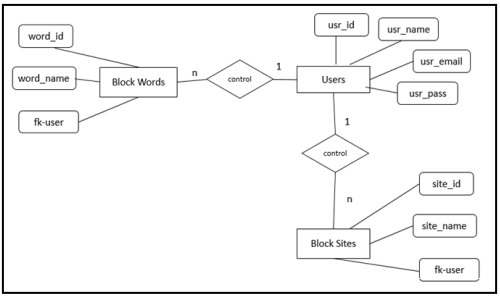

FIGURE 3.10: Entity Relationship Diagram

The next step is to install plugins on the browser (browser of computer that kid use).We will take three plugins block word plugin , block site plugin and history plugin. The block word and site plugin must take the configuration from the tables that we created. Then the kid will be disabled to search about these words and sites.

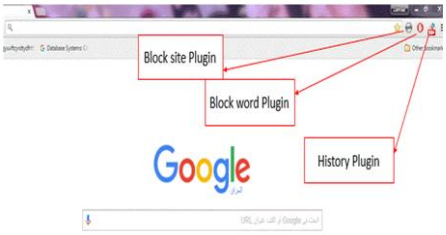

FIGURE 3.11: Plugins

History plugin will give us the history of all activities in child browser, then the history will be downloaded from plugin into html file. This html file will appear in parent app (history

page). In home page of our application "Kids Protector ", the history of kids' activities will appear when user clicks a history button. The history plugin, that must be installed in child browser, will save the history in HTML file. Then, this file will be send to the application interface. Thus, parents can check the searching history of their child device.

4. DISCUSSION

In our simple project we tried a lot to achieve. Set of goals that will serve the client and provide the facilities for parents. This project could be easy to use. In addition, we tried to apply the limitations that we discovered in our case study to three popular parental control software. The most important goals that we achieved in "Kids Protector" tool are the simplicity; Usability and elegantly that will facilitate the navigation and wandering between the pages in the program. We used HTML, CSS and JavaScript languages that is so known in web programming and provide a various and different choices for any web design. After searching for the requirements that are desired and needed by parents who used parental control tools, we concluded that most parent need the following requirements in any parental monitoring tool, For example:

1- The first requirement, monitor the activity of their young children under the age of 10 years, especially in times when parents have permission for their children to be online. Thus, Parents protect and prevent their children from accessing certain pages by their controlling.
2- The second requirement, making designed to be very easy to use by parents, i.e. the design does not have complexity, which leads to alienate parents from the program.
3- Third requirement is the remote control of the computer that the child is usually used to access the Internet,

navigate in the social networking and gaming sites, where computer of parents is in control on the browser of their child's computer. The design that contains simplicity and usability can serve parents. Thus, we tried to achieve these features in "Kids Protector" for parents, as we talked earlier in detail about each screens of it. In addition, selecting appropriate colors that attract users, easy navigation between pages, elegantly of the design, and selection of buttons and inputs in the appropriate places. All of these features, that we have, have been achieved in "Kids Protector". We have programmed our design, which will lead to high fidelity prototype. In addition to design, we will be able to achieve the possibility of adding and deleting undesirable words and sites. These data will be added to two different tables one for words and one for sites, and then we raised the database to be accessible by other computer.

4.1 Limitation:

One of the shortcomings in the program is to prevent the computer that is usually used by a child using the blocking words and links that is added in the database tables. In addition, our method that we suggest is only work on Google Chrome browser. And this can be limitation in our work. On the other hand, "Kids Protector " is designed and built for children with age under 10 years old.

5. CONCLUSION

One of the many reasons that parents should set parental controls, is because they can protect their children when their devices online. This means that if you don't want your child to use social networking websites, you can easily block them .In this research, we focused on software programs, that its core

objective is protecting children in the new media environment. Actually, we have focused on the limitations in available parental control Softwares. The goal of our program "Kids Protector" was to make magnificence and simple design that easily to deal with it. "Kids Protector" tried to monitor children's activities, such as block bad words, undesirable sites and show the history of user activities. We have achieved part of it. Moreover, we put the main base that will enable the future programmer to develop and complete the program. At the end of our work, we conclude that designing interactive products is important to support people in their everyday and working lives. Parental control programs are often easy to find, but it is so difficult to find a program with good design features. We made a simple, easy and very attractive design for users, which will lead to High fidelity prototype. In addition, we were able to achieve the possibility of adding and deleting undesirable words and sites. These data will be added to two different tables, one for words and one for sites. Parents can set limits on the words and sites that your children can visit, the games they can play, and the programs they can run. Moreover, we raised the database to be accessible by other computer. Thus, Parents can access it by entering their account information to block or allow access to undesirable words or sites and check their child access history.

The design of "Kids Protector" could be the base stone of similar programs in the future. Simplicity and usability of "Kids place" may solve the limitations of other investigated applications in our project.

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