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PIAK: A PERSONALIZED INTERNET ACCESS FOR KIDS

Abrar Noor Akramin Kamarudin[1], Bali Ranaivo-Malançon[2] and Nadianatra Musa[3]

[1]*Universiti Malaysia Sarawak, Malaysia, min268@gmail.com*
[2]*Universiti Malaysia Sarawak, Malaysia, mbranaivo@unimas.my*
[3]*Universiti Malaysia Sarawak, Malaysia, nadia@unimas.my*

ABSTRACT. Children are Internet users and as such they need to be protected from all inappropriate information available on the Internet. This paper is describing the components of a Personalized Internet Access system for Kids called PIAK. This kind of systems will allow children to browse the Web in a secure environment. The personalized features are individual welcoming message, recommended webpages, a Web search guided by preferred categories, and targeted educative mediums. A preliminary usability assessment of the system is reported in this paper indicating that all implemented personalized features are working properly.

Keywords: personalization, Internet access, children

INTRODUCTION

Diverse definitions can be found in the literature for the term "personalisation". Mulvenna, Anand, and Büchner (2000) stated that the goal of personalisation is to provide users with what they need without requiring them to ask for it explicitly. However, when the users are children, the "what they need" require some controls, mainly in the context of Internet browsing when parental guidance and supervision are missing. In general, children like playing, and thus they will search for online games. It is known that not everything on the Internet is good. For example, free online games are available for download at Google Play Store. These free applications are often equipped with adware, which actively provides unlimited advertisements. Children may also end up playing unfit games or even worse their online behaviour can be tracked and learned for recommendation purpose, which might suggest unsuitable webpages and advertisements. These situations are exaggerated as with the advancement of advertisement delivery, Web providers are able to recommend similar games effectively personalized to the user interests (Qaffas & Cristea, 2016). Nevertheless, these exaggerated situations are possible and need to be considered. As highlighted by Ybarra and colleagues (Ybarra et al., 2014), violent computer games often bring adverse effects to the child psychology.

This paper describes a Personalized Internet Access system for Kids (PIAK), which will allow them to browse the Web in one secure environment with personalized features.

RELATED WORKS IN INTERNET ACCESS CONTROL

Many commercial parental software exist like Net Nanny, the leading brand in 2016 as it has real time categorization while one surfs the Web. The most common approach taken by these software is to control the access of Internet by blocking unsuitable content for children. However, on one side, blacklisting only some websites is not sufficient and perfect, and on the other side, whitelisting may be too restrictive. In addition, none of the existing parental software has a feature for teaching children on Internet safety, which is provided by PIAK. There are some dedicated websites for children like PBS Kids, Great Websites for Kids, and Kidsites.com, which offer online games and good information suitable for children's cognitive level. Unfortunately, these committed websites are not interconnected and accessing them requires extra efforts from the kids and the adults. Besides, there is no specific category for each webpage and the contents offered are limited to the Web providers.

OVERVIEW OF PIAK

PIAK has been developed in Sarawak, a Malaysian state on the island of Borneo. Sarawak is the home of many indigenous ethnic groups with Iban as the dominant group. It happens that the word PIAK sounds like 'Biak', which means "young people or kids" in Iban language. According to the 2012 Status Report on Children's Rights in Malaysia, children most at risk are children from indigenous and minority communities, and that is one of reasons for the development of PIAK. Figure 1 depicts the overall personalisation component framework of PIAK as the main contribution of this paper. The framework is divided into two main components. Component A is the entrance to Internet. It includes a cross-platform user interface, a multilingual access, and a set of mediums to assist the children in the use of Internet. Component B is the Web content filtering.

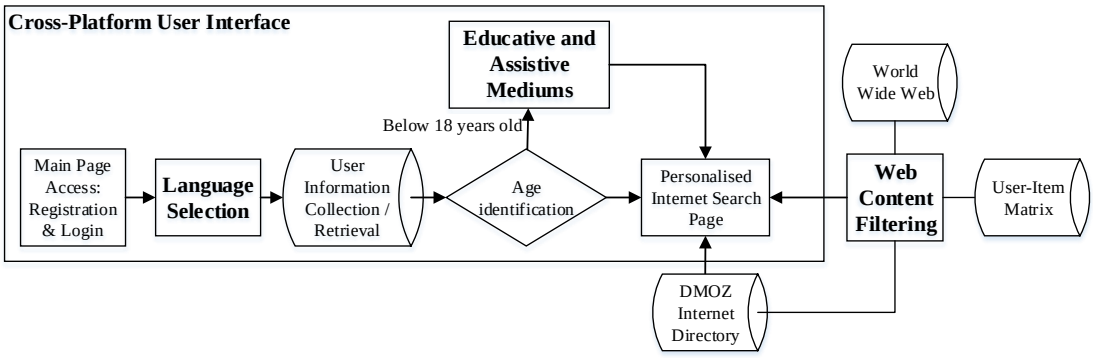

Figure 1. The Personalisation Component Framework.

PIAK MAIN FEATURES

PIAK is developed on the Microsoft Windows 7 Ultimate platforms using PHP 5, Python and JavaScript programming language. The Integrated Development Environment to develop the website is using Adobe Dreamweaver CS4 and Notepad++. MySQL is deployed to provide a database solution for the prototype system. The system execution is done using Apache HTTP Server.

Cross-Platform User Interface

Nowadays, a cross-platform user interface is essential for any online system. Users can access the system through different platforms such as smartphone and desktop computer. By providing such platforms, the usage of the online system will be increased compared to the

usage of one single platform. Therefore, PIAK has been implemented to be cross-platform as shown in Figure 2.

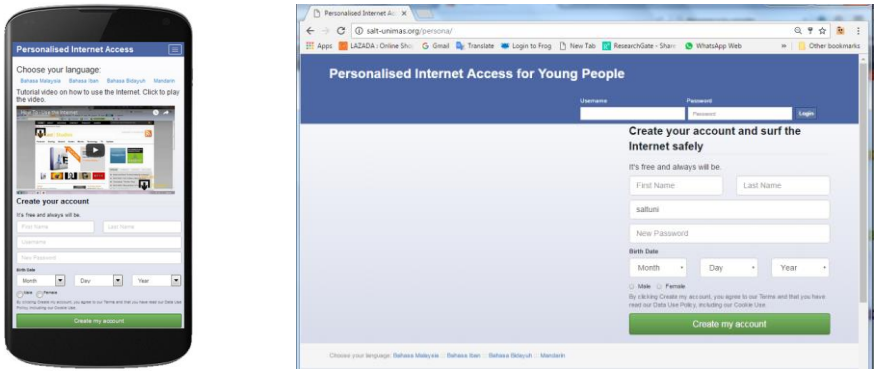

Figure 2. PIAK Access via Smartphone (left-side) & Desktop Computer (right-side).

Personalised Main Page Access

PIAK considers two types of users: new users and registered users. New users need to fill in the empty boxes related to their first and last names, username, password, birthdate, and gender. Language selection is available using provided link. The purpose of each of this information is shown in Table 1. Registered users need to provide their username and password to log in. To personalise the Welcome feature, the first name is used to greet the user and the greeting text is written in the preferred user's language. In addition, the greeting text will be taking into account the local time. It means that if a user X logs in in the morning, the greeting text will be "Welcome X, good morning!". However, if X logs in in the afternoon, the greeting text will be changed into "Welcome X, good afternoon!".

Table 1. Purpose of User Information.

Information	Purpose
Name (first and last names)	Welcome text
Username	Login, User-item matrix
Password	Login
Birthdate	Educative medium
Gender	-
Language (English, Bahasa Malaysia, Iban, etc.)	Welcome text, Educative medium

Multilingual Features

To personalise the language access to Internet, PIAK offers the possibility for the children to select their preferred language interface during the registration step. Besides the welcome text and the interface text menu, the subtitles of the educative and assistive video are also switched to the user's selected language. The current implementation of PIAK proposes three languages: English, Malay, and Iban. To support the personalisation in language capability, webpages are duplicated and saved in folders with an abbreviated code for each language. For

example /en/index.php for English, /my/index.php for Malay, and /ib/index.php for Iban. The system is able to redirect the visitors to their preferred language site after logged into the system. For instance, when an Iban user logs into the system through English language interface, the system will redirect the user to their preferred language site. Users are allowed to change their preferred system language in the Profile Update page. After all, multilingual features has been found benefit to all system users in the same way (Ghorab et al., 2014).

Educative and Assistive Mediums

Education is a good strategy to impart knowledge. Therefore, it is normal that PIAK provides an initiation to the use of Internet. After logging on and authenticated, an orientation is first conducted for basic Internet education, which is explained through a video. The lesson is provided in English but personalized with the subtitle in the user's preferred language. This initiation has been made compulsory for new users below 18-years-old. To ensure that these users have a sufficient understanding on the use of Internet, they must finish the lesson before being able to enter the search page. For the other users, the lesson is facultative but at any time the lesson is accessible by clicking on the Tutorial Page link provided.

Personalized Internet Search Page

PIAK search page is featured after being logged in and finishing the educative orientation page. This page is similar to the YouTube main page with the difference that instead of videos, PIAK represents webpages in a box with an image and annotation of it. The webpages are obtained from DMOZ kids and Teens directory. PIAK organizes and recommends all of the information to the user needs. Figure 3 shows the main page of PIAK Search page and the personalized search engine. The Search page has three main layouts: the header, main column, and left sidebar. On the header, a greeting message to the user is placed to show that the webpage is personalized to the user. Three links are provided for the user: getting back to the tutorial video page, updating profile, and logging out from PIAK. A search engine is placed below the links to perform search. In the left sidebar, there are categories listing for users to browse based on category. A carousel slide is located on the top of the main column. This attractive feature shows all category banners which will link to the related issues. Below that, a list of recommended webpages is presented.

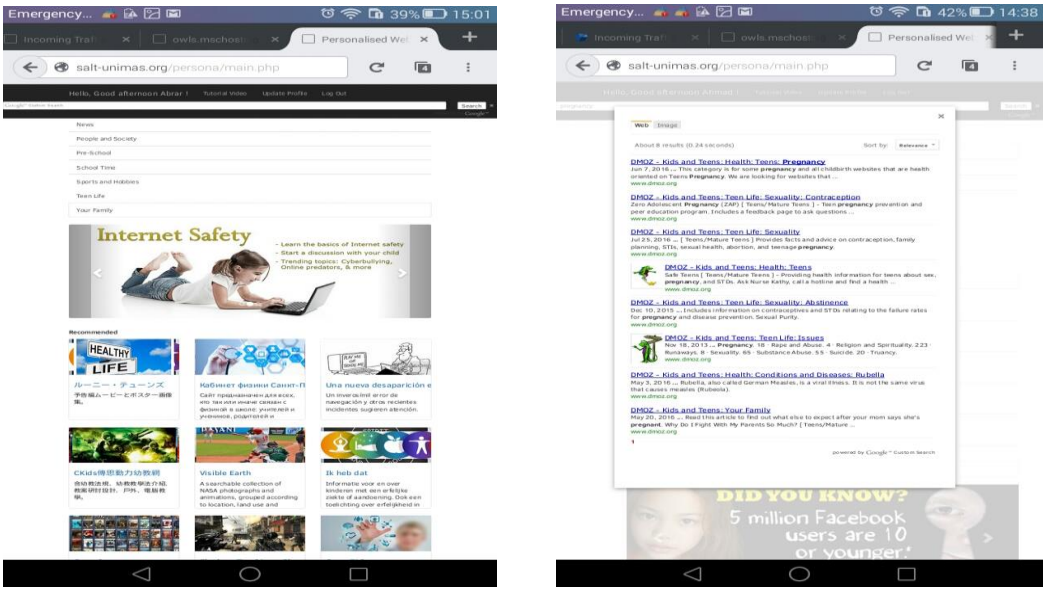

Figure 3. PIAK Search Page (left-side) & Search Engine (right-side).

Personalized searching is the most useful feature for a user to find specific information which is not directly presented to them. Keywords searching will be done through DMOZ directory first before checking at other Internet directories. The search result filtering is done based on the most relevant items corresponding to the user's inclination before showing other items in general. The layout of the search engine is located on top of the website. The search result is designed not to left current page. Users are able to sort the result based on the relevance or date. Google Custom Search Engine (CSE) is utilised to create a basic search engine to do searches in the DMOZ Kids and Teens directory. Users are able to perform searches for everything but the return results are still in a controlled environment. Google CSE provides custom ranking which can be used to personalize the search based on keywords, weighted labels and scores. In addition, an autocomplete feature is also available to help user to spell word correctly. This will help them to obtain results instantly by displaying useful queries as soon as they start typing in the search box. Additionally, a hybrid webpage content filtering is utilised when performing a search outside the DMOZ directory (Kamarudin & Ranaivo-Malançon, 2015).

New users have never done any searching. It means that their needs are not known by PIAK yet. However, the current implementation of PIAK will display to them the listing of random websites for each category. This is used to solve the cold-start problem. Users are expected to click on any webpage or performing a search on something before their preferences will be used for recommendation. For registered users, the list of recommended webpages is generated by the hybrid technique of collaborative filtering and content-based filtering.

SYSTEM EVALUATION AND FINDINGS

As it was stated, the "evaluation of personalisation system remains a challenge due to the lack of understanding of what factors affect user satisfaction with a personalization system" (Anand & Mobasher, 2005). The same authors suggested few key dimensions including user sastisfaction. PIAK was tested at a secondary school computer lab of "Sekolah Menengah Kebangsaan Serian*"*. Thirty respondents aged 13 years old volunteered to assess PIAK. The usability testing was done on 15th November 2016. Briefings were given to the respondents before performing the evaluation tasks, which the can perform as many times as they want. Then, an online questionnaire was administered to get their feedback. Table 2 shows the results of the usability testing. The numbers (1 to 5) are for user ratings. The numbers under each rating indicates the number of respondents.

Table 2. PIAK Usability Test Results.

	Usability of the Website			1	2	3	4	5		Mean
1	Overall reaction to the system		Difficult to operate		1	8	12	9	Easy to operate	4.67
2	Registration interface		Confusing			8	10	12	Straightforward	4.87
3	Educative video on basic Internet		Confusing		2	10	12	6	Clear	4.5
4	Recommended webpages displayed		Terrible		3	8	13	7	Useful	4.57
5	Reading characters on the screen		Hard to read		3	4	15	9	Easy to read	4.1

6	Organization of information		Confusing		3	12	12	4	Clear	3.67
7	Search engine result		Unhelpful		1	8	14	7	Helpful	3.9
	Average Mean									4.33

The overall mean result shows that the usability of PIAK website is a success. This includes all features such as the educative video and recommendation technique. Further adjustment is needed in the organization of the information which might not very clear for some users. As for the search engine, further modification is needed to include a wide source of information retrieval and increase user's satisfaction.

CONCLUSIONS AND FUTURE WORKS

This paper presented two things: the different components of PIAK, a tool to assist the children in accessing the Internet and the results of the first usability testing. As a personalized Internet access for kids, PIAK provides a multilingual user interface, Internet education, Web content filtering support and accessibility thru a personal computer and a mobile device. In the report issued by UNICEF Malaysia in 2014, the results of the CyberSAFE in Schools National Survey 2013 are presented. The survey collected data from 9,651 primary and secondary school Malaysian students. More than half (around 58%) of the participants learnt the use of Internet from family members. It means that the other 42% learnt by themselves, which can expose them easily to online risks. Hence, one of the utilities of PIAK is to replace the missing mentor.

PIAK is in active step of development. In near future, two improvements will be done to PIAK. First, the number of languages will be increased to cover most of the indigenous languages of Sarawak. Second, other mediums such as audio, text and infographic will be added to provide additional information regarding the Internet access.

REFERENCES

Anand, S. S., & Mobasher, B. (2005). Intelligent Techniques for Web Personalization. In B. Mobasher, & S. S. Anand (Eds.), *ITWP 2003, LNAI 3169* (pp. 1-36). Springer-Verlag Berlin Heidelberg.

Ghorab, M. R., Lawless, S., O'Connor, A., & Wade, V. (2014). Does personalization benefit everyone in the same way? Multilingual search personalization for English vs. Non-English users. *CEUR Workshop Proceedings*, *1181*, 40–47.

Kamarudin, A. N. A., & Ranaivo-Malançon, B. (2015). Simple Internet Filtering Access For Kids using Naive Bayes and Blacklisted URLs. In *International Knowledge Conference*. Kuching: Pustaka Sarawak. http://doi.org/10.13140/RG.2.2.25148.64646

Mulvenna, M. D., Anand, S. S., & Büchner, A. G. (2000). Personalization on the Net using Web mining: introduction. *Communications of the ACM*, *43*(8), 122–125. http://doi.org/10.1145/345124.345165

Qaffas, A. A., & Cristea, A. I. (2016). An Adaptive e-Advertising Delivery Model: The AEADS Approach. *Proceedings of the 13th International Joint Conference on E-Business and Telecommunications*, *2*(Icete), 124–131. http://doi.org/10.5220/0005996301240131

Ybarra, M. L., Huesmann, L. R., Korchmaros, J. D., & Reisner, S. L. (2014). Cross - Sectional Associations Between Violent Video and Computer Game Playing and Weapon Carrying in a National Cohort of Children, *40*(April 2013), 345–358. http://doi.org/10.1002/ab.21526