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DEVELOPMENT OF SOFTWARE SUPERVISION OF CHILD'S INTERNET USAGE WITH SPEECH RECOGNITION BING SPEECH SERVICES ON WINDOWS PHONE PLATFORM

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ABSTRACT

Studies by Kominfo and UNICEF in 2014 about "Digital Citizenship Safety Among Children and Adolescents in Indonesia" claimed as many as 52% of the 43.5 million children and adolescents with 10 to 19 years old, they are using a smartphone to access the internet either to get data and information where the contents is not necessarily appropriate and safe for consumption by children. And the fact that there are problems that occur from the parents side about the difficulty in getting the reports, notifications and provide action against child internet activity that indicated is not appropriate. Then problems from the child side that children is difficult for entering keywords of internet search.

Therefore, the proposed solution is to develop the software supervision of child's internet usage on windows phone platform in order to facilitate parents in supervising child's internet usage and facilitate children in safe internet browsing. The technology used is Speech Recognition Bing Speech Services to facilitate the child for entering a keyword of internet search. The research methodology used is the evaluative and descriptive.

Based on test results that consists of functional testing and beta testing of the software can be concluded that the software supervision of child's internet usage makes parents easy to get reports, notifications and provide action against child internet activity that indicated not appropriate and facilitate the child for entering keywords of internet search. Advice can be given is the applications can be improved its safety performance in accessing the data and can be expanded to other platforms.

***Key words**: Parental Control, Windows Phone, Children, Parent, Internet Safety.*

I. INTRODUCTION

I.1. Background

Studies by the Kominfo and UNICEF in 2014 about "Digital Citizenship Safety Among Children and Adolescents in Indonesia" claimed as many as 52% of the 43.5 million children and adolescents with 10 to 19 years old, they are using smartphones to access the internet to get data and information, particularly for school assignments, communicating with friends via social media, search for music and video content, as well as other sites where the contents are not necessarily appropriate and safe for consumption by children while parents can not monitor entirely on internet activity child on the smartphone so that negative risks of such content to be high [1].

Based on the results of the study found that the major recommendation be used as input that is the part of parents and teachers should supervise and assist their children in digital activities, and engage in it [2]. But in the parental side there are problems occurs that the parent is difficult in getting a report of Internet activity of children, the difficulty of parents in getting the notification and provide action against internet activity children are indicated does not correspond to the needs of children because parents are not always located next to the child's watching them all the time.

Also from the children, the problems that occur in a child is difficult to enter search keywords on the internet due to the knowledge of the spelling of a word or phrase that children do still lacking.

One technology that can be used to facilitate child in entering the keyword search on the net is the Speech Recognition, which is one type of biometric recognition, which processes the computer to recognize each person's spoken by the voice command is converted into a digital print [3]. One provider of Speech Recognition service is Microsoft Corporation, namely the Bing Speech Services [4].

As used smartphone platform is the platform that is growing in ascending to the needs of the world market so that software built have a great opportunity to get more users. The chosen platform is Windows Phone platform in which the selection is based on the observation results of the research conducted by Kantar World Panel Comtech about "Smartphone OS Market Share Sales" in 2015. In these studies indicate that Windows Phone has grown in popularity in the world market Q1 2015 compared with the previous 12 months [5].

Therefore, based on the exposure of the facts and issues which have described the proposed solution is to build a software supervision of child's internet usage with speech recognition bing speech services on windows phone platform to facilitate parents in supervising, get notifications, and provide actions related to children's internet activity and facilitate the child in entering the keyword search on the internet.

I.2. Purpose dan Objective

The intent of this study build build software control internet usage of children with Speech Recognition Speech Services Bing on Windows Phone platform with the following objectives:

1. Facilitate parents in getting children internet activity report.
2. Facilitate parents in getting children internet activity notification that indicated not in accordance with the needs of children.
3. Facilitate parents in providing action against child internet activity which is not indicated in accordance with the needs of children.
4. Facilitate the child in entering the keyword search on the internet.

I.3. *Speech Recognition*

Speech recognition is one type of biometric recognition, which processes the computer to recognize each person's spoken by the voice command is converted into digital print [3]. Designing a system for voice processing consists of the following phases:

1. The first phase, this phase is the phase known as the learning or training phase. Here is a diagram of the learning phase.
2. The second phase, this phase is the testing phase or operating session.

I.4. *Bing Speech Services*

Bing Speech Services is a technology from Microsoft Corporation that provides services for natural language processing in this case is human language. This service can be integrated into the application made by the developer, in this case a suitable application is an application with Windows and Windows Phone platforms.

The services provided by Bing Speech Services are as follows [4]:

1. Voice Commands is a service that allows users to operate the application with their voice.
2. Speech Recognition is a service that allows applications to receive messages the user utterance as input which will then be converted into text form.
3. Speech Synthesis is a service that allows applications can ring the text into voice form.

I.5. OOAD (Object Oriented Analysis and Design)

Object-Oriented Analysis and Design (OOAD) is a paradigm in software development-oriented object. The analysis process is done by examining the needs based on the viewpoint of the classes and objects that are within the scope of the problem. OOAD is a new way of thinking about a problem by using a model that is based around the concept of the real world.

In OOAD modeling tools are used is UML (Unified Modeling Languages). UML is a standard language in the industry for visualsasi process, design, and documentation software. Here is a diagram commonly used in the analysis and design.

Table I.1 Diagrams On OOAD

No.	Diagram	Description
1	Usecase Diagram	Usecase diagram depicting the functional based system to

No.	Diagram	Description
		be built. Usecase an abstraction interaction of actors and the system which in this case describes how the system is used.
2	Usecase Scenario	Usecase scenario is used to describe information on the interaction of the actor and the system in detail.
3	Activity Diagram	Activity diagrams depicting the flow of the activity of a usecase.
4	Class Diagram	Class diagrams depict the relationship between the classes and relationships that are on the system.
5	Squence Diagram	Sequence diagrams illustrate interactions between objects in a sequence starting from the object was created to end the activity on that object.

I.6. Windows Phone

Windows Phone is a set of operating system developed by Microsoft and is the successor of the Windows Mobile platform. This operating system was launched in October 2010 and launched in Asia in early 2011. The latest version of this operating system is Windows Phone 8.1, which was launched in April 2014. Microsoft created a new user interface in Windows Phone with a modern design language called design language. In the Windows Phone operating system there is architecture as in Figure I.1.

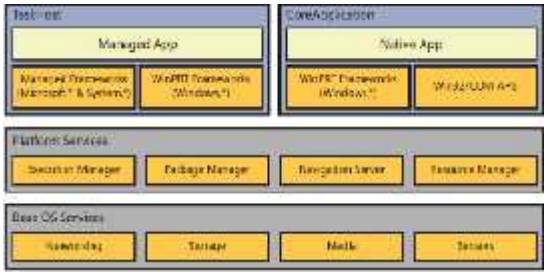


Figure I.1 Arsitektur Sistem Operasi Windows Phone

At the top of the stack there are two models of different applications. The box labeled "TaskHost" represents a XAML application model, which has become the main model since the launch of Windows Phone 7. box labeled "CoreApplication" is a new application model for Windows Phone, which is part of the application model Windows 8. When Windows Phone 8 release, model of this application is just pure supports native applications that use Direct3D [6].

Both models of applications that rely on a shared set of core services platform. Sebgaian of application stores only ever displays this service indirectly.

II. RESEARCH CONTENTS

Fill this study aimed to describe research conducted ranging from process analysis to implementation of the system so as to describe the study as a whole. The contents of this research include problem analysis, analysis of similar applications, system architecture analysis, data analysis, application interfaces, systems implementation, implemenasi environment, system testing, and evaluation testing.

II.1. Analysis Of The Problem

Analysis of the problem is a translation of the problems that existed before the construction of surveillance software is child's internet usage. Analysis of the problem include the following:

1. The difficulty of parents in getting children internet activity reports.
2. The difficulty of parents in getting children internet activity notification that indicated not in accordance with the needs of children.
3. The difficulty of parents in providing action against child internet activity which is not indicated in accordance with the needs of children.
4. The difficulty of the child in entering the keyword search on the internet.

II.2. Similar Applications Analysis

Analysis of similar applications intended to analyze the functionality and workflow of applications that already exist in the same scope with the software in this study. Types of applications that will be analyzed is prental control applications.

As for the kind of applications that are analyzed include Phone Sheriff and Qustodio with the consideration that this application has a number of users and rank higher than other similar applications contained in the applications market.

Based on the analysis of the application shows that there is a common functionality that can be used as a basis for development of software in this study coupled with the needs of functionality based on the background of the study.

II.3. Analysis Of System Architecture

Analysis of system architecture is used to analyze the software that is built in the form of a general overview of the system. The system architecture can be seen in Figure II.1.

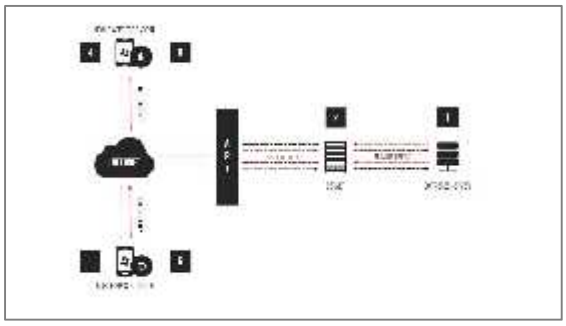


Figure II.1 System Architecture

Here is an explanation of the architecture of software systems monitoring children's Internet usage:

1. Users in this case is the child will perform a search based on a particular keyword on mobile devices.
2. The server receives a request to display search results that will be a screening process prior to the search keywords. Then the next action is to determine whether the search either for the child or not. If the search is categorized worse then the system will send notifications to mobile devices parents. If no search results are displayed on a mobile device the child.
3. Each child's internet activity will be recorded on the database system.
4. Parents receive notifications related to the use of the internet that is not suitable for children. Parents can provide related actions such activities. Actions that may be provided include four types include advice, warning, angry, and allow. Where each action represents a specific intent that advice is given action when parents only give advice directives relating to Internet activity. Warning is given action when parents give close attention to signs angry child internet activity. Birds are the action given when parents angry child internet activity. And allow the action is given when parents assume that the child is considered a good activity.
5. The action given by parents to be executed on mobile devices child.
6. Parents receive a report related to the activities of children based on activity data that has been recorded in a database system.

II.4. Data Analysis

Analysis of the data used in this study is the Object Relational Mapping (ORM). Object relational mapping mapping to tables in a relational database with an existing entity classes in object-oriented programming language. Mapping is done by ORM will require bridges that form JSON format that can connect ORM with the existing database on the server. The structure of the JSON data format used in this study is divided into three object data, the data array and null data. The following JSON data analysis are needed to build this software can be found at Table II.1.

Table II.1 The Struktur of JSON Format Data

Name	Data Exchange Format	Description	Information
Data Object	{ “key” : “Value” }	JSON format is used when restoring data only in the form of an object	1. The key : a database field 2. Value : The value of the field 3. The result : report processing of data from the server 4. Items : signaling data to be returned in the form of an array 5. Message : Error messages
Data *Array*	{ “result” : “value” “item” : [{ “key” : “value” },{ “key” : “value” }] }	JSON format is used when restoring data only in the form of a data array	
Data *Null*	{ “result” : “value”	JSON format is used when restoring	

Name	Data Exchange Format	Description	Information
	“message” : “value” }	data is just a null data	from the server

II.5 System Implementation

Implementation of the system is done by describing the environment that will be used by the system, followed by a description of the implementation of any interface that has been implemented into the system of design that has been created previously.

II.6 Impementation Environment

Implementation environment is a hardware and software specifications in which these systems will be installed and accessed. Here is the implementation environment.

1. Hardware Environment

Here are the hardware specifications in the development of software that can be seen in Table II.2.

Table II.2 Hardware Specifications Software Development

No.	Item	Spesification
1	Processor	Intel Pentium® Dual-Core CPU T4400 @2.20GHz 2.20GHz
2	Harddisk	320 GB
3	Memory	3 GB
4	VGA	1564 GB
5	Monitor	14 inch
6	Mouse	Optical Logitech
7	Keyboard	QWERTY Creative
8	USB Port	2
9	Internet Connection	Yes
10	Windows Phone	Device 5 inch

Here are the hardware specifications to access systems that can be seen in Table II.3.

Table II.3 Spesifikasi Hardware Mobile

No.	Item	Spesification
1	Processor	Qualcomm® Snapdragon™ S4 @1 GHz
2	Memory	512 MB
3	Internal Storage	8 GB
4	Internet	Yes

2. Software Environment

The software used in this development are as follows:

a. OS Windows 8.1 Pro 64 bit.
b. PHP dan JavaScript, C#.
c. DBMS MySQL 5.6.20
d. Web Browser Google Chrome 39.0.2171.95.
e. Code Editor use WeBuilder 2014 dan Notepad++
f. Web Server XAMPP.
g. Use IDE Visual Studio 2013
h. JSON

The specifications of mobile software that is used to access the system is a mobile device with the operating system Windows Phone 8.

II.7 Application Interface

Interfaces describe the look on each form of application. Here are some interface software built.



Figure II.2 Main Manu Interface



Figure II.3 Search Functional Interface



Figure II.4 Report Interface

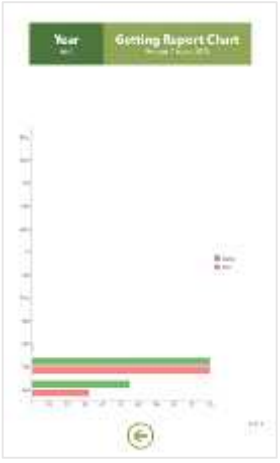


Figure II.5 Graphic Report Interface



Figure II.6 About Application Interface



Figure II.7 Notification Interface



Figure II.8 Action Chooser Interface



Figure II.9 Register Interface

II.8 System Testing

Plan testing to be performed is divided into two types of plans are functional testing and beta testing plan.

1. Functional testing plans

Functional testing plan will be carried out using a type of black box testing on mobile software that has been built.

2. Beta testing plans

Plan beta testing is done by distributing questionnaires to 30 people who will use the software that is built. This questionnaire consists of several questions that support the ultimate goal of the application being built using a Likert scale of 1 to 5 scale.

II.9 Testing Evaluation

Based on the results of testing functionality and beta testing is done it can be concluded that:

1. In testing the software functionality that is built, stating that the application is built has been running with the expected both in terms of process validation and error handling.
2. In the beta testing of software that is built has reached the goal of this software development sendriri. The goal has been achieved, namely Enables parents to get a report of Internet activity of children, easier for parents to get notification of internet activity children who indicated not in accordance with the needs of the child, allows the parents to provide action against internet activity children who indicated not in accordance with the needs of children, and facilitate the child in entering the keyword search on the Internet.

III. CLOSING

III.1. Conclusion

Based on the results of testing against software that is built, it can be concluded as follows:

1. Internet usage monitoring software facilitates children of parents in getting children internet activity reports.
2. Internet usage monitoring software facilitates children of parents in getting children internet activity notification that indicated not in accordance with the needs of children.
3. Internet usage monitoring software facilitates children of parents in providing action against child internet activity which is not indicated in accordance with the needs of children.
4. Internet use monitoring software to facilitate the child in the child entering the keyword search on the internet.

III.2. Suggestion

Internet usage monitoring software on windows phone children built a browser application for children and help for parents to monitor children's Internet browsing activities. Therefore, it is necessary developments for this application to be used better. The suggestions for the development of this application is as follows:

1. Improve application performance regarding safety so that children can not access or obtain information that is not good on the internet.
2. Develop applications to be used on other platforms such as Android, iOS, and Blackberry.

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