

A MODIFICATION OF WIRELESS AND INTERNET TECHNOLOGIES FOR LOGISTICS' ANALYSIS

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Abstract—This research is designed for helping a WAP-based mobile phone's user in order to analyze of logistics in the traffic area by applying and designing the accessible processes from mobile user to server databases. The research's design comprises Mysql 4.1.8-nt database system for being the server which there are three sub-databases, traffic light – times of intersections in periods of the day, distances on the road of area-blocks where are divided from the main sample-area and speeds of sample vehicles (motorcycle, personal car and truck) in periods of the day. For interconnections between the server and user, PHP is used to calculate distances and travelling times from the beginning point to destination, meanwhile XHTML applied for receiving, sending and displaying data from PHP to user's mobile. In this research, the main sample-area is focused at the Huakwang-Ratchada's area, Bangkok, Thailand where usually the congested point and 6.25 km² surrounding area which are split into 25 blocks, 0.25 km² for each. For simulating the results, the designed server-database and all communicating models of this research have been uploaded to www.utccengineering.com/m4tg and used the mobile phone which supports WAP 2.0 XHTML/HTML multimode browser for observing values and displayed pictures. According to simulated results, user can check the route's pictures from the requiring point to destination along with analyzed consuming times when sample vehicles travel in various periods of the day.

Keywords— WAP, logistics, XHTML, internet.

I. INTRODUCTION

Nowadays, countries all over the world are attempting to reduce energy consumption because fuel price are rising dramatically and no signs of turning point. Such crisis also affects the logistics' system which directly makes higher price of goods unavoidable. However, this era of the world is information technologies, including wired and wireless communication via telephone system. In the present we know well that a lot of people use mobile phone for data communications, i.e. Short Message Service (SMS) and

Internet via mobile out of solely converse. As the reason, if we provide such familiar technology for logistics' analysis it might be the effective way to reduce energy consumption on the road as well as transporting time between any points to destination. In accordingly, we can save our money and time from being wasted in traffic constrain from those results

II. REVIEW OF LITERATURE

According to the information technologies, the role of internet is a vitally interval media for completing many functions in communicating patterns. So far, we have used this channel to fulfil modern lives in many means, business, entertainment, knowledge, i.e. The example of above mention are air-ticket bookings [1-3], products' sales [4], services [5], etc. Besides, the internet has also been applied to wireless world via mobile phone's technologies and it is increasingly popular in the mean time. There are many businesses use this weapon for accessing to customers, such as wireless E-commerce via mobile phone in (SMS) manners [6], movie-ticket reservations [7], E-banking [8]. According to the third generation or 3G for wireless communications, in the present we are able to access to Wireless Application Protocol (WAP) via many mobile phones like internet on mobile. As the reasons, this research was undertaken order to combine wireless information technology and logistics' analysis for optionally guiding mobile phone users whoever would like to decrease travelling time on the road in traffic area. So far, Palm OS company has used GPS system for navigating users via its product [9] which is an effective way for estimating the logistics' time. However, it might be more accurate if we can add traffic lights' time as a sub-database into time-calculation module of such system. There was a research, named "An application of wireless and internet technologies for convenient store's E-commerce" [10] which WAP-base and HTTP were modified to create a link between internet and mobile phone. Such research used Mysql for server-site database, a modification of WML (Wireless Mark-up Language) to PHP which is popular for making the internet links in order to combine WAP and HTTP accessibility. According to systems which are mentioned above, this research improved more accuracy in time estimation of Palm

OS navigation by adding traffic lights' database into calculating system and used Mysql 4.1.8-nt along with PHP and XHTML (Extensible HTML) in order to modify the latter research for more efficiency and familiarity in accessible from server and user-site both from internet and wireless system. In this research, it merged both modifications for navigating users who have the XHTML supported mobile phones and want to know estimated time's consumption from the beginning point to destination in traffic area. Moreover, users who use internet via computer system also use this research as well as those mentioned mobile users because XHTML which is developed from HTML by accessing to www.utccengineering.com/m4tg where the research has been uploaded to.

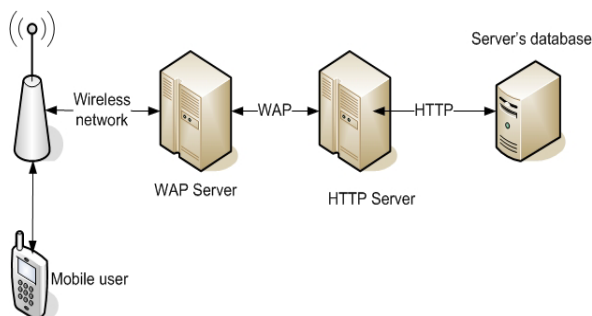


Fig. 1 The environment of wireless and internet interfaces

III. CONCEPTUAL DESIGNS OF THE RESEARCH

For the conceptual designs of this research, it is shown as in Fig 1, interconnections between all parts of the system is bi-directional data communications from mobile phone user to server-site. The beginning process is occurred when user requests data of logistics' analysis from server-site, this requirement is in XHTML manner which passed through wireless network to WAP-server for encoding data into HTML which is generally used as internet's connecting language. The encoded data is sent through HTTP-server for connecting in internet pattern to server-site and then the data calculations and analysis will be undertaken in this stage. The encoded data which comprises beginning point of traveling, destination, period in a day of traveling and vehicle's type will be compared to tables in Mysql database where all details of time consumptions for each mentioned items are stored. When matched data from those tables have selected, the next stage is route and time of logistics' analysis. All data will be calculated together by PHP in order to know the traveling direction and time to destination.

Hereafter the route and time consumption to destination have been analyzed, these data will be sent back from server-site though HTTP server to WAP server in HTML manner. The data from server-site will be decoded into XHTML for connecting wirelessly to mobile user. The decoded data which consists of picture of traveling route and time will be shown on user's screen in the final stage of research's process.

IV. PROPOSED MODELS OF THE RESEARCH

This section covers whole proposed models of the research there are one server database's organization and three models which designed to interface each other for transferring data from server to user-site as well as inverse direction. According to the research's sample area as in Fig 2, it is Huakwang-Ratchada area in Bangkok, Thailand where usually the congested point and various traffic-lights' time in different period of a day. The total area of 6.25 km² are split into 25 blocks, 0.25 km² for each. For the server's database organization which is mentioned previously, showing in Fig 3, the server-site has three main tables which are area-pictures, time of traffic's lights and speed of vehicles in order to be interfaced from the two of three modules of research, sever-database interfaces module and travelling time-calculating module which their operations will be declared later. According to the area-pictures'table, it contains picture of 25 mentioned blocks, including distances' detail between each other. About time of traffic's lights table, there are details of waiting time and tolerance from intersections in each designed period of a day. For the speed of vehicles' table, it is where averaged speeds in designed period of a day from motorcycle, car and truck are stored.



Fig. 2 The sample area of research

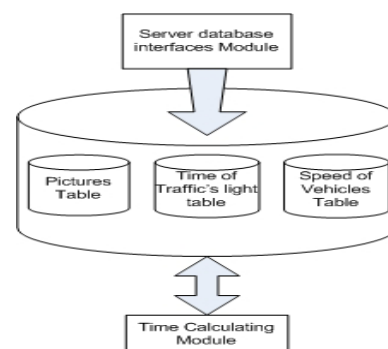


Fig. 3 Server database's organization

For the first module that will be described in this research is user to server-site interfaces, its operation as shown in Fig 4. This module is designed to request data from server by user-site, regarding route and time consumption in traveling to the destination. The operation starts when mobile user access to server's homepage and inputs requiring data that are beginning point, destination, traveling period of a day and vehicle's type on user's screen. For this stage there are two options for deciding, the first is access to server-database interface and time calculating modules and the second is back to start all over again unless needed inputs were filled. Hereafter the results, comprising route's picture and traveling time to destination have evaluated from those mentioned modules the next stage is displaying them on user's screen. The final operation of this module is decision from user whether need for backing to homepage or not. It is designed for new inputs from user in the case of another route's requirement.

The next declared module is sever-database interfaces as shown in Fig 5, this module is designed for accessing to server's database in order to collect all data which are necessarily required in the operation of traveling time-calculating module. It is started by receiving all inputs from user to server-site interfaces module which be mentioned previously then they will be divided into three operating paths. The first path is beginning point and destination matching between user's inputs and blocks' pictures in the database-table. According to research's design, the distance between beginning point and destination will be known in this stage. For the second path, traveling period from user will be matched to the traffic lights' table in order to evaluate durational time which has to be wasted because of traffic's constrain. The last path is vehicle's type of user-input to speed of vehicles-table matching operation, this stage will launch average speed of user's vehicle from the selected period in order to be used by next operation. Hereafter all outputs from matching process have finished, they will be sent to traveling time-calculating module where its declaring operation is the next topic of this research. According to results of time-calculating module, there will be two outputs for sending back to user and server-site interfaces module, the calculated time of route- traveling and route's picture from server-database.

The last designate module of this research is traveling time calculating, which shown in Fig. 6, its operation will be started when receiving data from server-database interfaces module. All of those data comprise beginning point, destination, vehicle's speed in the selected period, time of traffic-lights and tolerance then they will be calculated and evaluated the traveling time and route by using these steps. The first step is to find distance between block of beginning point and destination then this value will be divided by speed of the vehicle for knowing traveling time without traffic lights' constrains. For the next step, mentioned time will be added with traffic lights and tolerance in order to evaluate the net consuming time in each period of a day. When the results of route and traveling time has been analyzed, they will be sent back to server-database interfaces module for continuing the designed process and this operation is eventually ended.

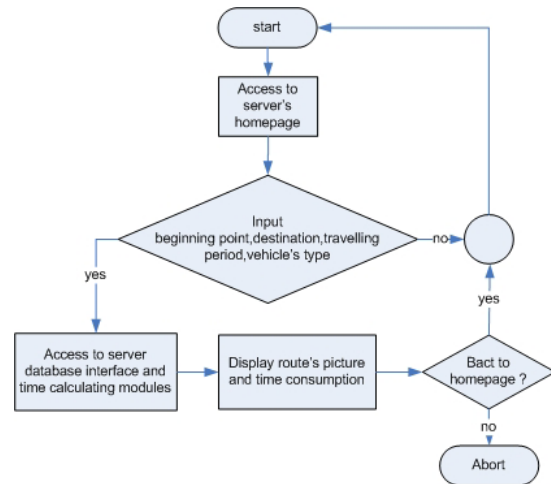


Fig. 4 User to server-site interfaces module

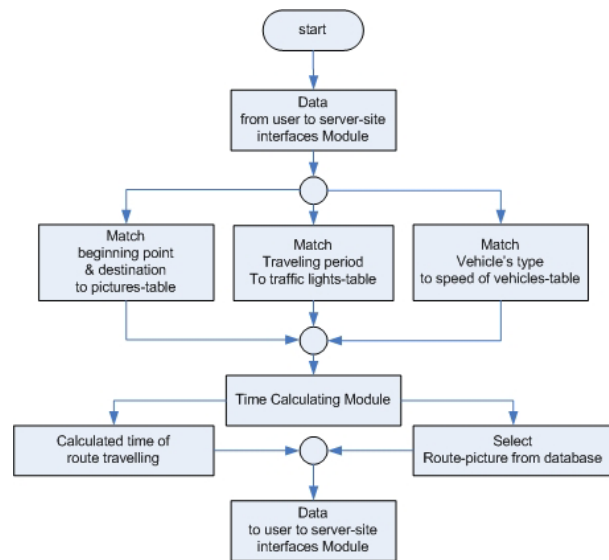


Fig. 5 Server-database interfaces module

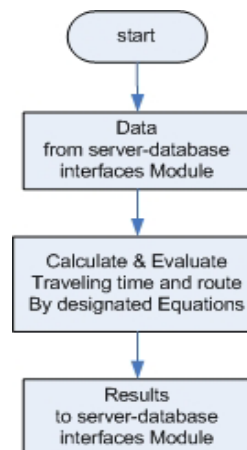


Fig. 6 Travelling time calculating module

TABLE I. TRAFFIC-LIGHTS' TIME OF INTERSECTIONS IN A DAY

Period of traveling time of day	Traffic-lights' time of Intersection (minutes)		
	Thailand cultural center (Block A4 -B5)	Huaykwang-Ratchada (Block A4 -B3)	Sutisarn-Ratchada (Block A4 -B1)
8-10.00	5	3	2
10-12.00.	3	1.5	2
12-14.00	3	1.5	2
14-16.00	4	2	2
16-20.00	5	3	2

TABLE II. TOLERANCE OF TRAFFIC-LIGHTS' TIME OF INTERSECTIONS IN A DAY

Period of traveling time of day	Tolerance of Traffic-lights' time of Intersection (minutes)		
	Thailand cultural center (Block A4 -B5)	Huaykwang-Ratchada (Block A4 -B3)	Sutisarn-Ratchada (Block A4 -B1)
8-10.00	6	4	4
10-12.00.	3	1.5	2.8
12-14.00	2.33	1	1.67
14-16.00	4	3	3
16-20.00	6	5	4

TABLE III. AVERAGED SPEED OF VEHICLES IN A DAY

Period of traveling time of day	Averaged speed of vehicle (km/hr)		
	Motorcycle	Car	Truck
8-10.00	50	40	30
10-12.00.	70	60	50
12-14.00	60	50	40
14-16.00	70	60	50
16-20.00	50	40	30

V. EXPERIMENTS AND RESULTS

Hereafter all mentioned databases' organization and conceptual modules has designed, we made the assumptions of appeared traffic-lights', tolerance and speed of vehicle's type values in table I, II, III respectively. The research's sample area and assumptions, including server-database and all operating modules have been uploaded to www.utccengineering.com/m4tg for simulating the results. Meanwhile, Nokia 6680 mobile phone which has second edition of Symbian series 60 operating system and supports WAP 2.0 XHTML/HTML multimode browser has been used as user-site simulator in order to display and check corrections of the research.

According to first simulated result which is shown in Figure

7, when user access to the homepage of research at www.utccengineering.com/m4tg the map of sample area will be appeared on the user screen. Whenever the option named "SEARCH" on screen is selected, it will go to next stage of operation that be shown in Figure 8 which needs inputs, consisting of beginning point, destination, traveling period of a day and vehicle's type from user. Appearing information in the figure is user would like to travel from the university of the Thai chamber of commerce to Thailand cultural center by using a car during 8.00 to 10.00 a.m. and when clicking at "Search" button, the following results will be appear in Figure 9. It is showing the route picture from the beginning point to destination, including traveling information that are routes' distance, passing places, waiting times from traffic lights and total traveling time. Finally, when all information has been shown to user, the "Home" button will be available for new route's search if needed.



Fig. 7 The homepage of research

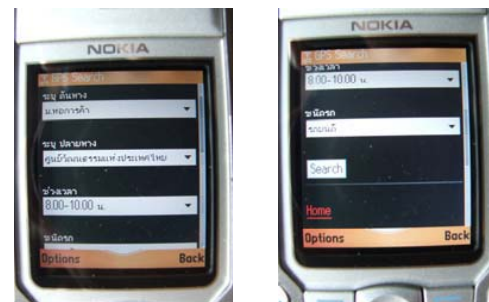


Fig. 8 Sample inputs from user



Fig. 9 Travelling route and information's result

VI. CONCLUSION AND COMMENTS

According to simulated results of this research, achievements have been received, mobile phone users can access to server-site system regularly, the required route and traveling time is appeared on the screen for evaluating from user, traffic-lights' constrains in congested area present a more time accuracy in logistics' analysis and the modification of wireless to internet system has worked properly. However because of mobile screen's size, the clarity in observing from different users has been a problem for future improvement. Moreover, the WAP's communicating language by XHTML cannot be used to many mobile phones which solely understand WML.

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