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Development of a Global Positioning System- Based Location Tracking System for Yaba College of Technology, Lagos, Nigeria

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ABSTRACT

In recent times, there have been some cases of insecurity in Nigerian Higher Education Institutions(HEIs),Yaba College of Technology not an exception. More recently, kidnapping cases were recorded in Yaba College of Technology.This research work therefore present a GPS-based Location Tracking System which uses any internet- enabled device to track the location of a person whenever necessary mainly for interaction and security purposes .System development life cycle and the stages were followed accordingly from the top to the bottom. The design and coding was done using unified modelling language tools such as use case diagrams and the code was implemented using web design tools such as Hypertext Mark-Up Language, Cascading Style Sheet, ColdFusion Mark-up Language, MySQL, JavaScript, JQuery, JSON.There was an improved search rate which almost triples the existing search time used and the system was able to track items on transit. It is therefore recommended that a system be developed to track.

Keyword: Location, Tracking System, Global Positioning System, Insecurity, Higher Education Institutions

Aims Research Journal Reference Format:
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1. INTRODUCTION

The Global Positioning System (GPS) is a satellite-based navigation system which is made up of networked twenty-four (24) satellites positioned into orbit by United State Department of Defense in 1973. GPS was intended originally for applications of military, the GPS was made available by the government to civilians in 1980s.The GPS can work all the hours in day in anywhere and in any weather conditions. GPS is a timing tool which is gaining prominence. Six(6) satellites in each of three orbital planes spaced 120º apart, and their ground stations is made up of eighteen(18) satellites which formed the original GPS. GPS uses satellites otherwise reffered to as “man-made stars" as a point of reference for geographic calculation of positions in meters. Measurements can be taken in centimeters with the advanced form of GPS(Moganastri, 2019).

GPSs is now a standard in most newer automobiles, and newer cell phones. The mapping devices do come under varying of circumstances in handy.The benefits of the GPS include; helps to determine location of a person at a point in time, gives exact latitude and longitude of person’s location and name of the street where a person is travelling. Android mobile platform is now a multi-dimensional which has become popular and attractive to many users(Ionescu, 2010). In recent times, there have been cases of insecurity in Nigerian Higher Education Institutions(HEIs),Yaba College of Technology not an exception. More recently, kidnapping cases were recorded in Yaba College of Technology. In the interest of every community member, every member should have a friend or colleague who can always know where they

are and in what condition.There are a lots of happenings in the institution that cannot be accounted for, furthermore, there are cases when movement in a particular place needs to be regulated or monitored. This paper therefore present a GPS-based Location Tracking System which uses any internet- enabled device to track the location of a person whenever necessary mainly for interaction and security purposes**.** The system is a web-based application that students can use to view the location of a friend of whom they have his or her unique application id that will be generated on registration. In case of a danger, a button can be pressed to send an alert to members on a person's contact list to tell of his location for a rescue; this will be carried by application holder.

2. REVIEW OF RELATED WORKS

The IP location mapping is widely being used ,and its continually drawing attention of researchers.It is a location-aware applications based service for Internet hosts. A web service is another application which is used to transmit information which is related to regional weather , local events, etc This is based on location of user.Web services uses prior information of location of user.It classifies users , and this depends on current users' location. Every application has it needs on where information resolution is located. With the use of Geolocation methods, there are a number of real time security sensitive applications. Due to security reasons,there are a number of restrictions to geographical areas on content sharing ,the online contents - real time applications such as Pandora , Real Media and BBC iPlayer (Hulu, 2010).

Firstly, identification of end user'location based on location information , decision is taken either for viewing of content or not(Wikivividly,2019).Determination of location of client's from its IP .and allowance of access to client during a permitted jurisdiction. Furthermore, there are restrictions to applications to websites for internet application, this depends on the end users risks' on location.In limiting online services to end users , commercial application will depend on geolocation. In last decade, IP geolocation is a dynamic research area (IPInfoDB ,2018). .There is consideration of benign target in all the existing geolocation methods which exists not to misguide the user intentionally .Little work has been observed over geolocating malicious targets.Limitation of geolocation techniques which are passive as presented by Muir and also presented a method of determining machine's IP address with the use of network of Tor anonymization.

The purpose of assigning IP address to a location geographically is address the problem of solution determination as a result of varying degrees of granularity for most of the applications. Geolocation of two(2) major approaches to the location mapping of IP of database using Measurement-based geolocation algorithms or leveraging on a set of distributed hosts geographically to find target IP. The landmark hosts measure delay as an example of various properties of network, and paths which is taken by traffic between target and themselves. In order to determine target's location by geolocalization inputs to geolocation algorithm can be the results obtained i.e a region constrained where the target is located. Geolocation algorithms rely on trace route and ping measurements mainly. Trace route measures and discovers Round-Trip Time to routers and ping measures the delay of RTT a two(2) number machines on Internet.Based on measurements which is used to determine target's location in terms of measurements such as geolocation algorithms , measurement-based (Phillipa, G., Yashar, G., Bernard, W.,& David, L., 2018).

DNS loc according to NAC (2014) is reffered to open standard in which Domain Name Service server and administrators uses for creation of database which is available publicly with use IP location of information .Because there is no authentication of loc DNS database and IP addresses of its content are often determined by owners, this accounts for their suit for security-sensitive applications, and they have gained widespread usage.The reliability and accuracy of measurement-based geolocation algorithms is due to increased research on the algorithm. Geolocation which is measurement-based is for secure geolocation because target can be reached through a measurement and how effective a proxy is will be diminished whether HTTP or SOCKS proxy.

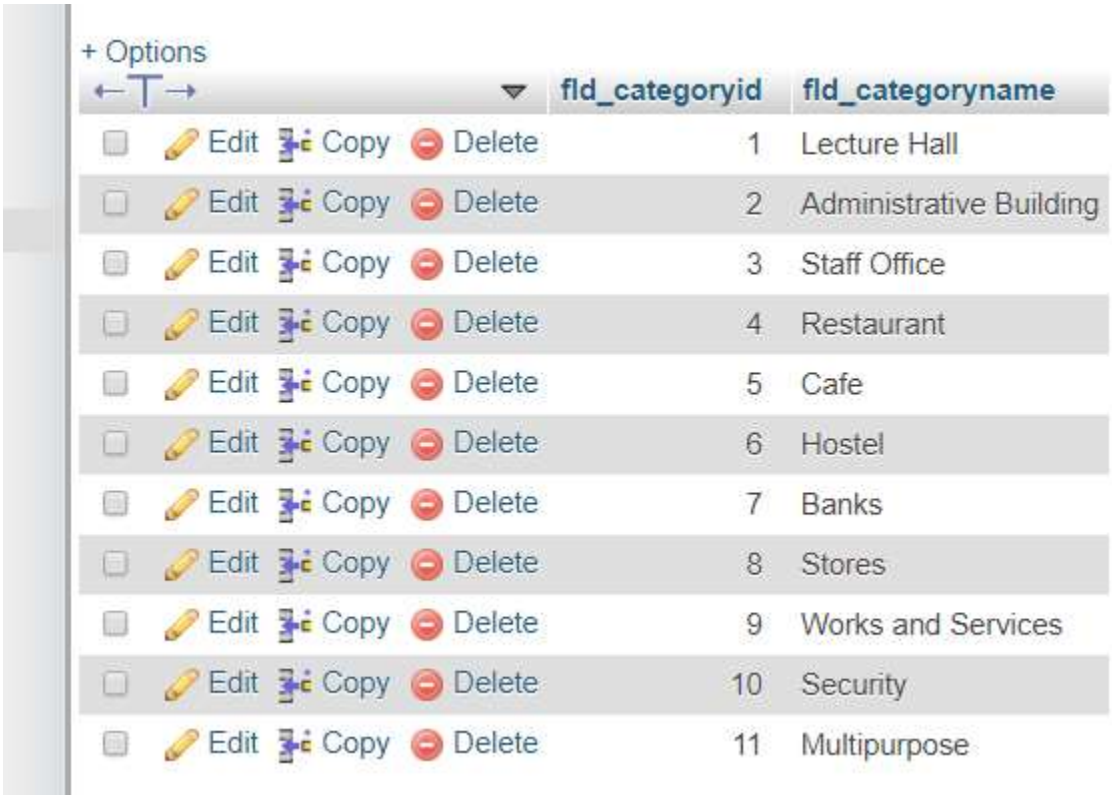
3. DESIGN OF NEW SYSTEM

System design is the most creative part of the programming. In this phase of project design, flowcharts and pseudopodia are of great importance. System design is also the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. The quality and acceptability of any system is determined by the quality or appearances of its output. The output of a computerized system varies depending on the input design and processing algorithm. The output is usually a function of the input data and the processing logic. The output design will have the following features expressed in various columns of the website.The input is designed in such a way that would validate data entry. Input design starts after the completion of design phase is finished. The purpose of input design is for the development of the internal logic for each of the modules of the system design.Explanation in natural language of what a module is supposed to do is given in a more detailed specification.In order for input design to contain a detailed description of logic and structures for the design to be different from coding completely, system design can be expands.

3.1.1 Database Design

The database design describes how the records will be saved in tables, the relation each table has to one another, each table consist of Name of fields, Type of fields and Width of data to be stored. The following figures; Figure 1: Database Entity Structure, Figure 2 :Database Table Structure – tbl_activity, Figure 3: Table structure – Activity Table, Figure 4: Table Structure – Users Table, Figure 5:Table Structure – Reviews Table.

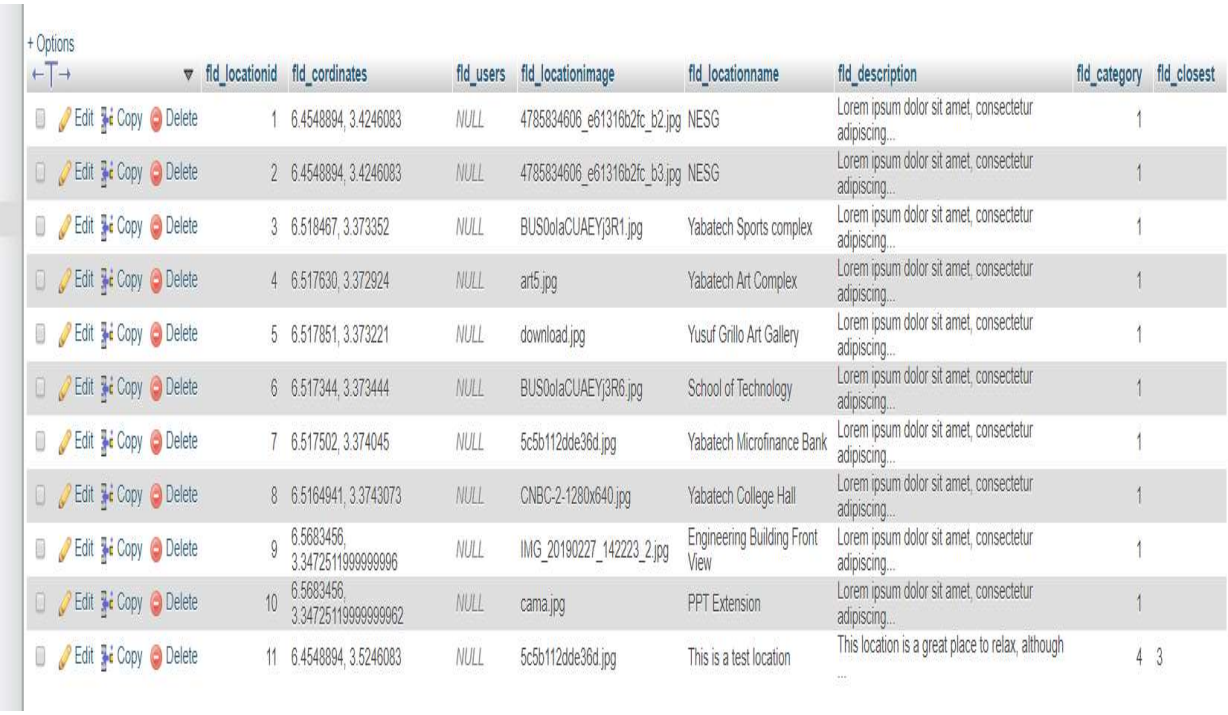
Figure 1: Database Entity Structure



+ Options

	fld_categoryid	fld_categoryname
Edit Copy Delete	1	Lecture Hall
Edit Copy Delete	2	Administrative Building
Edit Copy Delete	3	Staff Office
Edit Copy Delete	4	Restaurant
Edit Copy Delete	5	Cafe
Edit Copy Delete	6	Hostel
Edit Copy Delete	7	Banks
Edit Copy Delete	8	Stores
Edit Copy Delete	9	Works and Services
Edit Copy Delete	10	Security
Edit Copy Delete	11	Multipurpose

Figure 2 :Database Table Structure – tbl_activity



+ Options

	fld_locationid	fld_cordinates	fld_users	fld_locationimage	fld_locationname	fld_description	fld_category	fld_closest
Edit Copy Delete	1	6.4548894, 3.4246083	NULL	4785834606_e61316b2fc_b2.jpg	NESG	Lorem ipsum dolor sit amet, consectetur adipiscing...	1	
Edit Copy Delete	2	6.4548894, 3.4246083	NULL	4785834606_e61316b2fc_b3.jpg	NESG	Lorem ipsum dolor sit amet, consectetur adipiscing...	1	
Edit Copy Delete	3	6.518467, 3.373352	NULL	BUS0olaCUAEYj3R1.jpg	Yabatech Sports complex	Lorem ipsum dolor sit amet, consectetur adipiscing...	1	
Edit Copy Delete	4	6.517630, 3.372924	NULL	art5.jpg	Yabatech Art Complex	Lorem ipsum dolor sit amet, consectetur adipiscing...	1	
Edit Copy Delete	5	6.517851, 3.373221	NULL	download.jpg	Yusuf Grillo Art Gallery	Lorem ipsum dolor sit amet, consectetur adipiscing...	1	
Edit Copy Delete	6	6.517344, 3.373444	NULL	BUS0olaCUAEYj3R6.jpg	School of Technology	Lorem ipsum dolor sit amet, consectetur adipiscing...	1	
Edit Copy Delete	7	6.517502, 3.374045	NULL	5c5b112dde36d.jpg	Yabatech Microfinance Bank	Lorem ipsum dolor sit amet, consectetur adipiscing...	1	
Edit Copy Delete	8	6.5164941, 3.3743073	NULL	CNBC-2-1280x640.jpg	Yabatech College Hall	Lorem ipsum dolor sit amet, consectetur adipiscing...	1	
Edit Copy Delete	9	6.5683456, 3.3472511999999996	NULL	IMG_20190227_142223_2.jpg	Engineering Building Front View	Lorem ipsum dolor sit amet, consectetur adipiscing...	1	
Edit Copy Delete	10	6.5683456, 3.3472511999999962	NULL	cama.jpg	PPT Extension	Lorem ipsum dolor sit amet, consectetur adipiscing...	1	
Edit Copy Delete	11	6.4548894, 3.5246083	NULL	5c5b112dde36d.jpg	This is a test location	This location is a great place to relax, although ...	4	3

Figure 3: Table Structure – Activity Table

Table structure | Relation view

#	Name	Type	Collation	Attributes	Null	Default	Comments
1	fld_userid	int(11)			No	None	
2	fld_useremail	varchar(45)	latin1_swedish_ci		No	None	
3	fld_userpassword	varchar(45)	latin1_swedish_ci		No	None	
4	fld_friends	text	latin1_swedish_ci		No	None	
5	fld_username	varchar(45)	latin1_swedish_ci		No	None	
6	fld_userprofile	varchar(45)	latin1_swedish_ci		No	None	

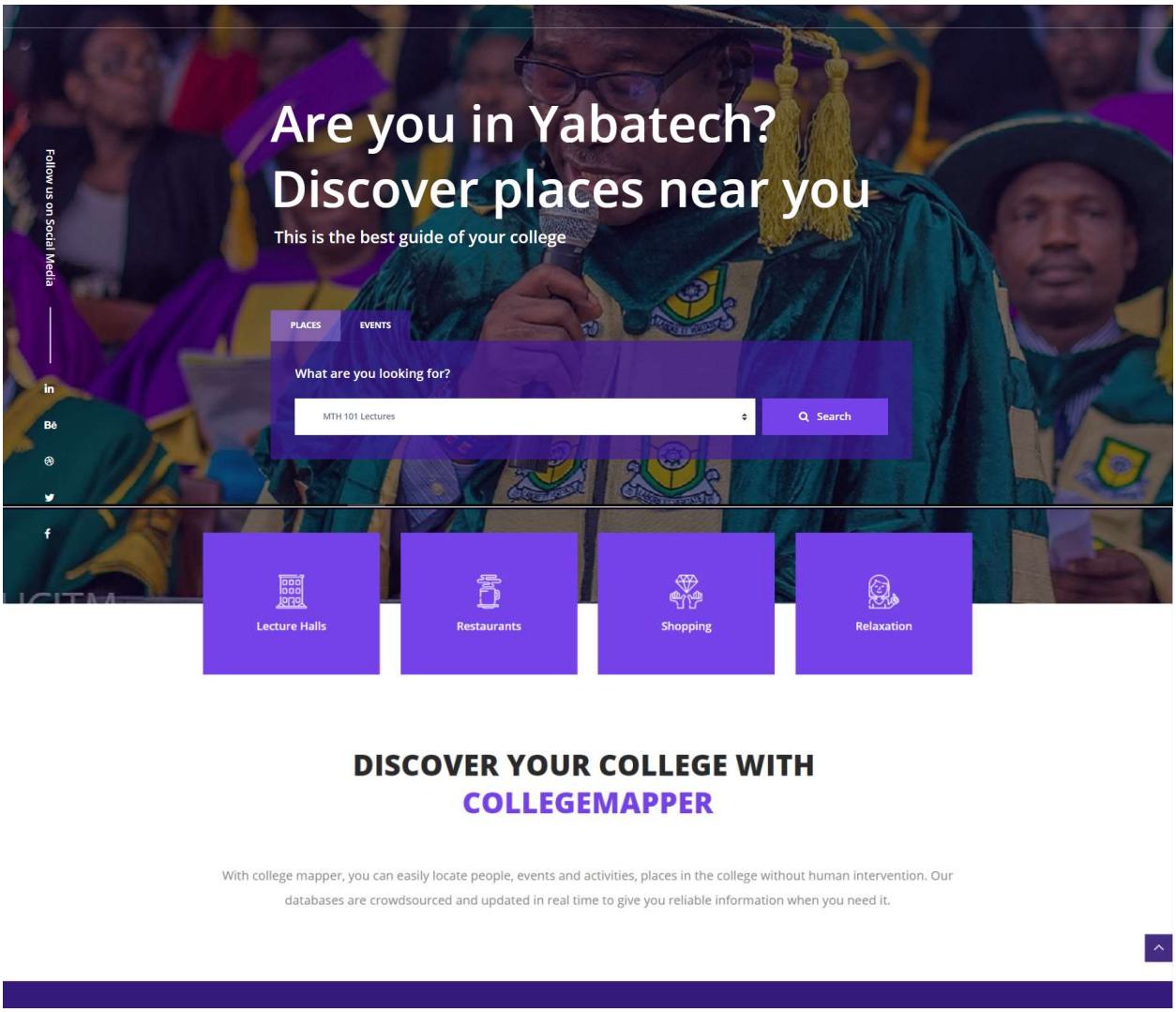
Figure 4: Table Structure – Users Table

#	Name	Type	Collation	Attributes	Null	Default
1	fld_reviewid	int(11)			No	None
2	fld_locationid	varchar(45)	latin1_swedish_ci		No	None
3	fld_review	varchar(345)	latin1_swedish_ci		No	None

Figure 5: Table Structure – Reviews Table

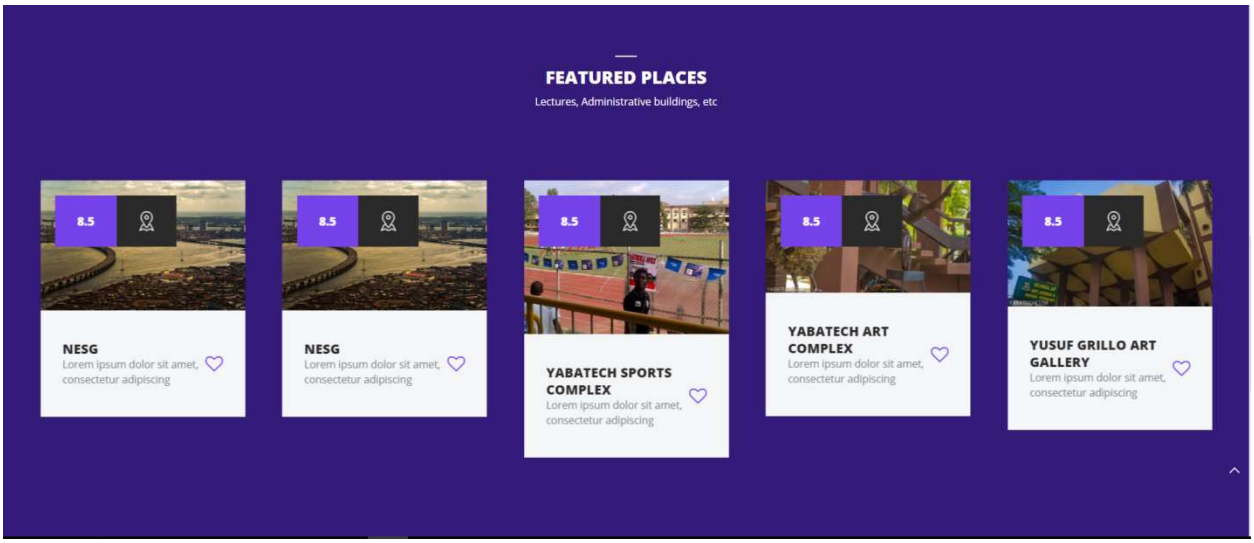
4. RESULTS

The home page or landing page is the first point of interaction between the users and the system. this is where the users get to understand what the system is about. from this page the users can view recent projects and access them.The following two figures i.e Figure 6 shows : (a) Locations Page (b) Activities Page



(a) **Locations Page**

From this page, users can track the location of any other student whose data they have in their contacts list. These locations are automatically generated using google maps APIs.



(b) Activities Page

Figure 6: (a) Locations Page (b) Activities Page

4.1 Discussion on Results

There has been an improved search rate which almost triples the existing search time used after addressing proper record keeping and data referencing issues.The second major issue that the system addressed is the tracking of items on transit. This can be applied to determine the precise location of product at every point in time for delivery, this will enhance customer trust.

5. CONCLUSION

The research work was conducted using the system development life cycle and the stages were followed accordingly from the top to the bottom. The design and coding was done using unified modelling language tools such as use case diagrams and the code was implemented using web design tools such as Hypertext Mark-Up Language, Cascading Style Sheet, ColdFusion Mark-up Language, Lucee server, MySQL, JavaScript, JQuery, JSON.The database for the program was created using MySQL, ColdFusion Mark-up was used for linking the database and the web application. The developed system basically meant to ensure efficiency and effectiveness in the security architecture in HEIs.

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