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MAPTAP: A 3-DIMENSIONAL WAYFINDING KIOSK

Jeric C. Lajada[1,a]

[1]Master in Information Technology, STI Academic Center Cubao, P. Tuazon Blvd. corner 5th Ave., Cubao, Quezon City

[a]<jeric.lajada@dasmarinas.sti.ph>

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Abstract. Students tend to have hard time looking for their designated rooms, especially when they are new students, they spent minutes even hours searching for their classroom thus, making them tired and late. The ability to successfully navigate in school facilities is an important goal for first time visitors and new students. Thus, there remains a need to find more effective wayfinding solutions to the problems that continue to occur in schools. This project is a 3D wayfinding map that will help students find rooms and teachers in just one tap. By doing this, students will never experience hard time locating their classrooms, teachers and tracking their schedules. The 3D directory map will show how to reach classrooms, provide the information and direction. Moreover, this will be essential to find teachers where it also supplies the information and direction needed by the students virtually with voice guide and exhibits the different amenities that the school has.

1. Introduction

There is a great need for simple wayfinding solution to help people navigate. Directory map is becoming essential due to complexity of finding a place or a location. People tend to use paper maps, rely to direction sign post or ask other people for direction - which consumes a lot of time and may cause inaccuracy of information. Kiosk is one of the most common used technology in wayfinding. Kiosk is a thick, column like structure on which notices, advertisements, etc., are posted and kiosk is also an interactive computer terminal available for public use, as one with Internet access or site-specific information [1].

The kiosk will provide information for the students and visitors. The project is designed for school providing the accurate directions, room and teacher schedule for the students, guests, and visitors of the school. The kiosk will also show the different amenities of the school. By the use of the kiosk, students, guests, and visitors will be able to know the route for certain rooms or any destinations inside the school. Schedules for each room is provided for the students. Through the use of the system, new and old students as well as visitors will never waste time in asking people where the teachers and rooms are located.

2. Objectives

This project Maptap: A 3-Dimensional Wayfinding Kiosk is designed to address the following objectives:

1. A kiosk that will provide locations of facilities including room and faculty schedules for students, visitors and guests.
2. A module that will update the room and faculty schedules through the use of administrator login module.
3. A 3D wayfinding with voice guide kiosk.

3. Literature Review

A. Wayfinding

Technology is evolving through time and it takes virtual reality technology gets more and more advanced, one example of this is a wayfinding technology. Wayfinding refers to information systems that guide people through a physical environment and enhance their understanding and experience of the space [2]. The following studies present the use of technology in wayfinding:

"Wayfinding in Hospital", is a study which purpose is to understand how the human displacement in large buildings takes place and suggest solutions to improve its flow [3]. This project helps the people inside the hospital to find their destination, it also stated that the importance of the research lies in the fact that it opened new horizons for the study of accessibility, bringing together areas of management and design.

"Wayfinding in Educational Buildings: A Case Study of the Faculty of Environmental Design, Ahmadu Bello University" is a study designed to help the school navigating large institutional and educational buildings during normal and panic-induced activities such as fire or security alerts [4].

"Affective, Intelligent Driving Agent (AIDA)", is meant to be a highly intuitive navigation technology that using the current location-destination-waypoint model and analyzing driver's behavior will identify goals the driver would like to achieve. That means it tries to help you locate food you like when you're hungry, movies you might like to see, or places you might like to shop. It will be as well connected will social networks so that the driver will be informed not only about places nearby that may be of particular interest but as well about people, friends and family [5].

B. Kiosk

In this world's modern age, many kinds of technology took its place. Gadgets like mobile phones, tablets, laptops and even wristwatch played a role on people's lives. One of the popular things that technology created is the KIOSK. It is a booth providing computer-related services, such as an Automated Teller Machine and Tourist Information. The following studies present the use of technology in Kiosk:

In the study "Kiosk: A New Trend for Digital Library", brief talk about the Kiosk trends and utilization in academic libraries have been described, also discuss how Kiosk technology is useful in various function of academic libraries [6].

"SM Directory Kiosk", is designed for visitors, guests and customers of the mall that provides a vast range of information from retailing stores and provides the direction from your location.

C. Synthesis

The reviewed related literature guides the researcher in this study to develop the proposed system "MapTap". The said literature in wayfinding gave the idea of having 3D Model wayfinding and served as an illustrative ideal representation of what will the system look like.

Since it will be much easier if the kiosk is bolstered with voice guide, AIDA (Affective, Intelligent Driving Agent) became the ingenuity behind the idea of this project. The Wayfinding in the hospital and Wayfinding in buildings, give the idea of having easy to use wayfinding kiosk and feature such as 3-Dimensional structure of the buildings.

In consideration of the idea of giving complete information towards identifying and locating rooms and schedules, Kiosk: A New Trend for Digital Library and became the pattern of having the information of faculty and room schedule. The concept of self-service kiosk was

derived from the project Lobby Attendant and SM Directory Kiosk which have the complete map of its building.

4. Methodology

The researcher used the incremental prototyping which refers to building multiple functional prototypes of the various sub-systems and then integrating all the available prototypes to form a complete system.

Below is the context diagram of the project

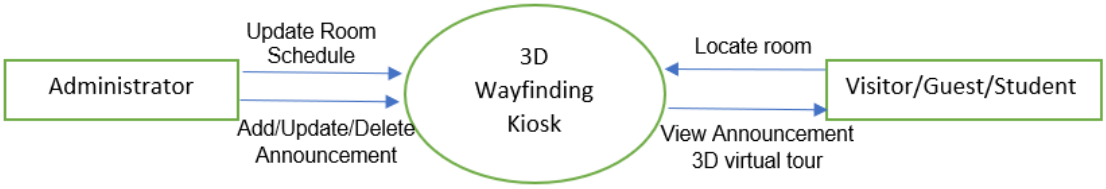

Fig.1 Context Diagram

The visitor and student can access the kiosk to view school announcements, locate specific classroom and teacher. The system provides a 3D map for showing the directory. The administrator can add, update and delete the school announcements and manage the schedule of the teachers.

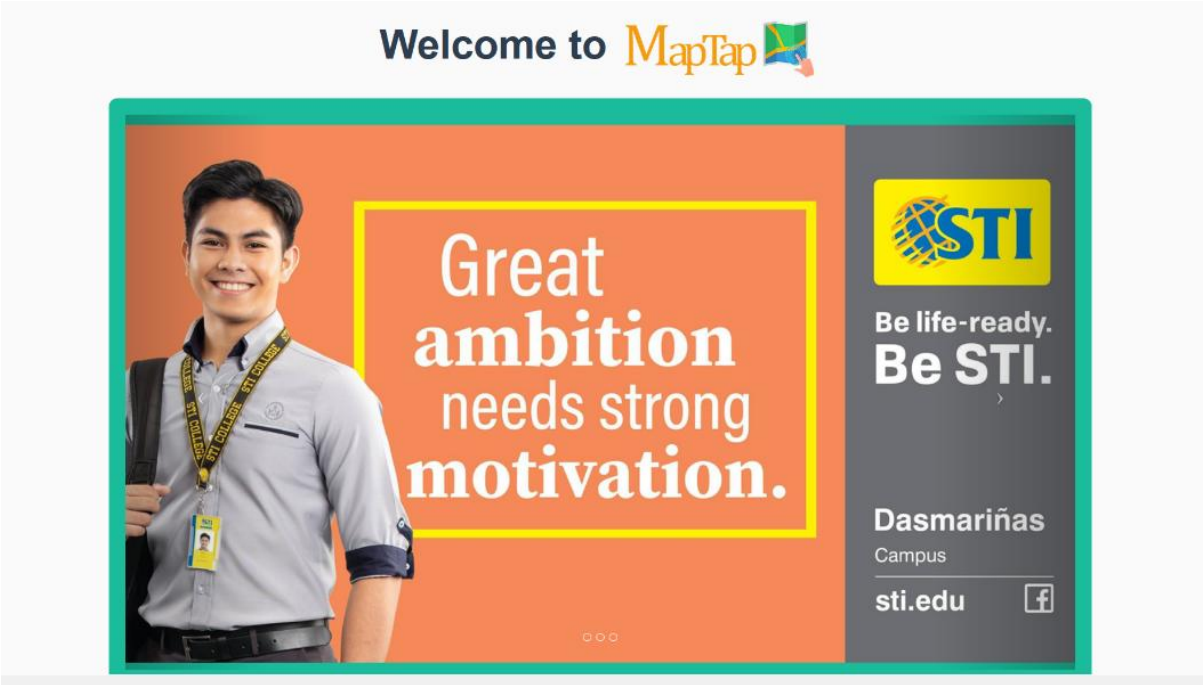

Fig.2 Home Module

Figure 2 shows the module that allows the students and visitors to see the announcements and upcoming events in the school

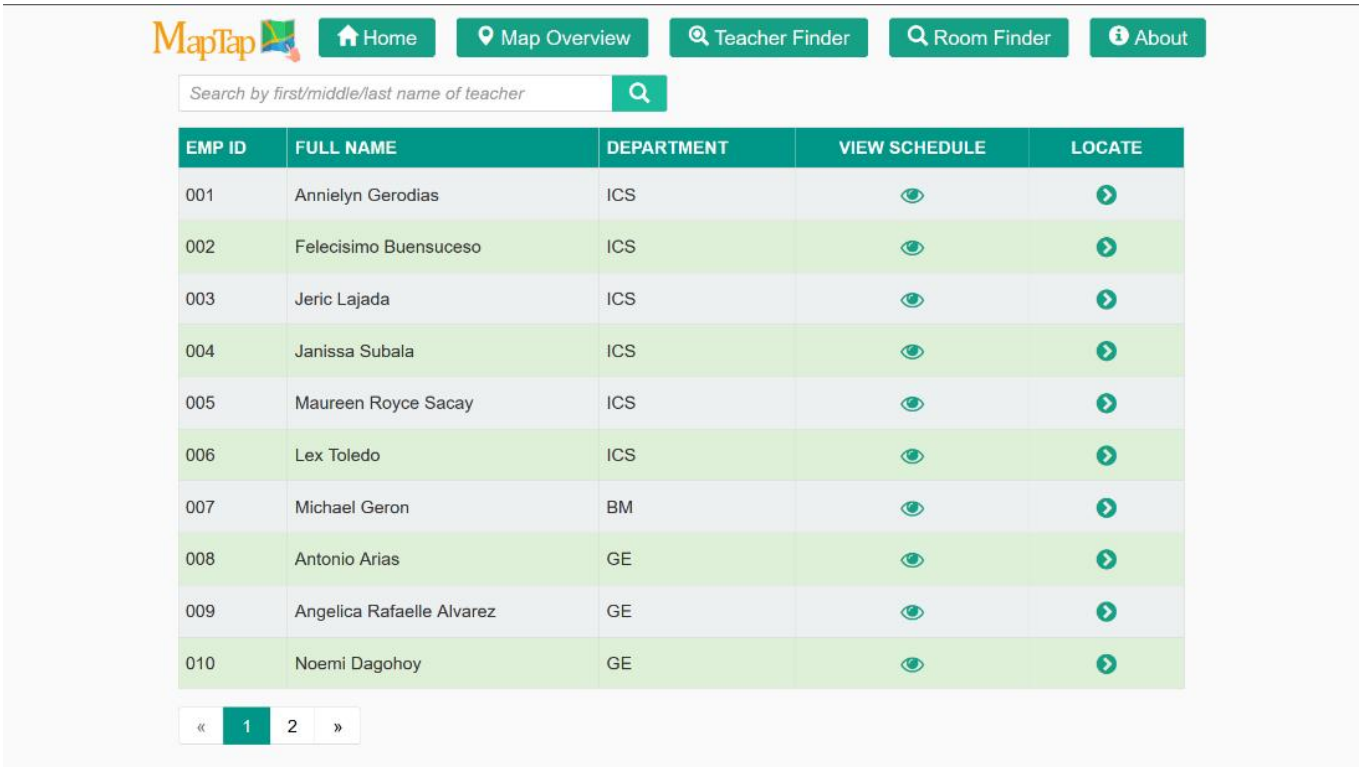

Fig.3 Teacher Finder Module

Figure 3 shows the module that allows the students to search the schedule and current location of specific teacher.

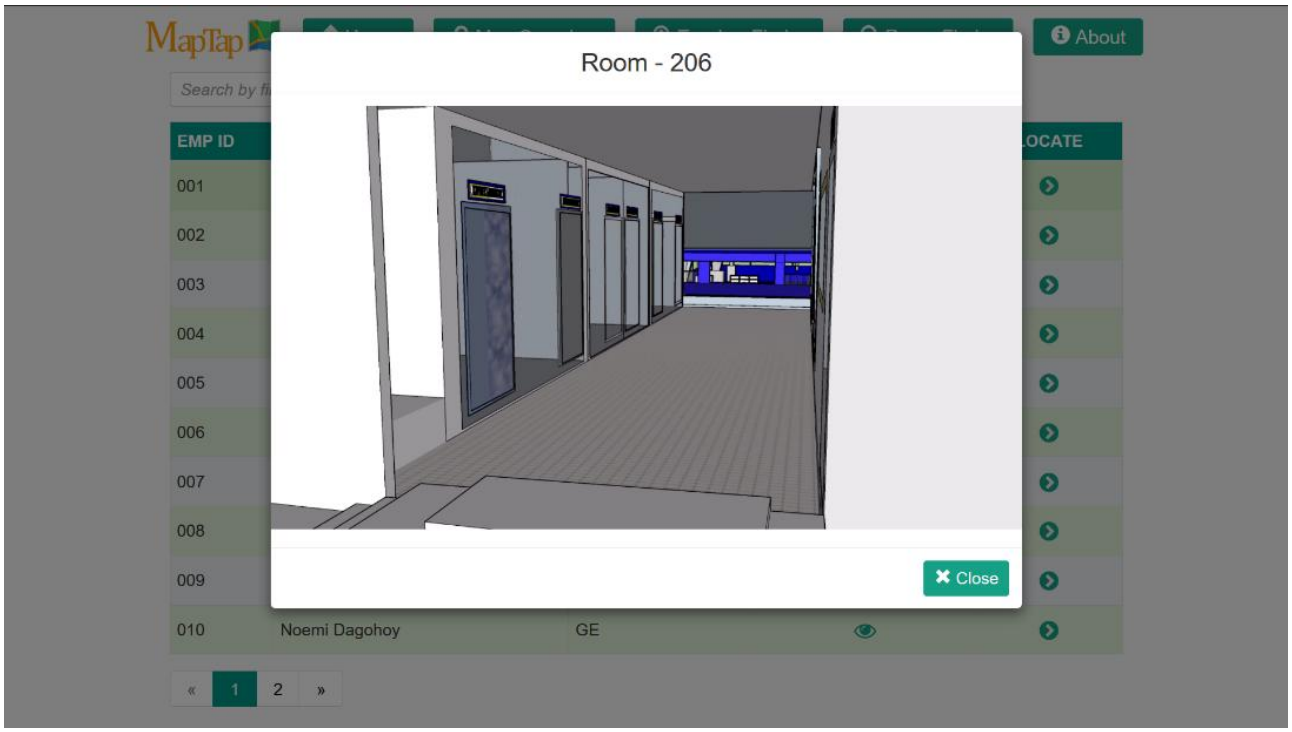

Fig.3 3D Virtual Tour

Figure 3 shows the 3D- wayfinding animation with voice guide

5. Results and Discussion

The beta testing has been conducted by the researcher to the new students of STI Dasmariñas. The researcher used stratified sampling for selecting respondents who will evaluate the project.

On the other hand, Slovin's formula was used to compute the sample population needed. The 343 selected sample is composed of the following:

Table 1. Total of Respondents per Course

Tertiary (1st year)	
24	Bachelor of Science in Business Administration (BSBA)
9	Bachelor of Science in Accountancy (BSA)
24	Bachelor of Science in Tourism Management (BSTM)
55	Bachelor of Science in Information Technology (BSIT)
41	Bachelor of Science in Hospitality Management (BSHM)

Table 2. Total of respondents per Strand

SENIOR HIGH SCHOOL (Grade 11)	
35	Accountancy, Business and Management (ABM)
60	Information and Computer Technology: Mobile Application and Web Development (ICTMAWD)
32	Home Economics in Culinary Arts (HECA)
21	Humanities and Social Science (HUMMS)
14	Information and Computer Technology Communication and Computer Technology (ICTCCT)
28	Home Economics in Tourism Operation (HETO)

The following are the results of the evaluation process conducted with the respondents

Table 3. Provides location of facilities

CHARACTERISTICS	**MEAN**	**INTERPRETATION**
1. Furnished current room schedule	4.65	Very Effective
2. Furnished current faculty schedule	4.64	Very Effective
TOTAL	**4.65**	**Very Effective**

Legend: 1.0-1.80 Not Effective 1.81- 2.60 Less Effective 2.61 – 3.40 Moderately effective 3.41-4.20 Effective 4.21-5.0 Very Effective

The table above shows the effectiveness of providing facility location using the MapTap application. A mean score of 4.65 to display the room schedule and a mean of 4.65 to display the faculty schedule as interpreted using a 5 pt. likert scale.

Table 4. Updating of Schedule

CHARACTERISTICS	MEAN	INTERPRETATION
1. Room information is up-to-date	4.68	Very Effective
2. Faculty information is up-to-date	4.68	Very Effective
TOTAL	**4.68**	**Very Effective**

Legend: 1.0-1.80 Not Effective 1.81- 2.60 Less Effective 2.61 – 3.40 Moderately effective 3.41-4.20 Effective 4.21-5.0 Very Effective

The table above shows the effectiveness of updating schedule using the MapTap application. A mean score of 4.68 to demonstrate the room schedule and a mean of 4.68 to demonstrate the faculty schedule as interpreted using a 5 pt. likert scale.

Table 5. Voice guide functionality

CHARACTERISTICS	MEAN	INTERPRETATION
1. Voice guide instruction is easy to follow	4.64	Very Effective
2. Audible voice guide	4.58	Very Effective
TOTAL	**4.61**	**Very Effective**

Legend: 1.0-1.80 Not Effective 1.81- 2.60 Less Effective 2.61 – 3.40 Moderately effective 3.41-4.20 Effective 4.21-5.0 Very Effective

The table above shows the effectiveness of voice guide functionality using the MapTap application. A mean score of 4.64 which denotes the voice guide instruction is easy to follow and a mean of 4.58 which denotes the audible voice guide as interpreted using a 5 pt. likert scale.

Table 6. Summary of Results

CHARACTERISTICS	MEAN	INTERPRETATION
1. Provides location of facilities	4.65	Very Effective
2. Updating of Schedule	4.68	Very Effective
3. Voice guide functionality	4.61	Very Effective
TOTAL	**4.65**	**Very Effective**

Legend: 1.0-1.80 Not Effective 1.81- 2.60 Less Effective 2.61 – 3.40 Moderately effective 3.41-4.20 Effective 4.21-5.0 Very Effective

The table shows the summarized results of testing and evaluation of the students. It scored 4.65 average mean which indicate that the MapTap is very effective in terms of providing location of facilities, updating of class schedule and giving voice guide instruction.

6. Conclusion

Based on the evaluation result from the students and visitors

1. It is apparent and possible to develop a kiosk that provides location of facilities including room and faculty schedules for students, visitors and guests through this system.

2. It can update the room and faculty schedules through the use of administrator login module is essential which was achieved through developing and using the project's system.
3. Adding a voice guide to the 3D wayfinding kiosk was achieved by supplementing voice narration that was created using the kiosk easier to the students, visitors, and guests.

7. Recommendation

The researcher recommend that students and visitors use this kiosk as reference and guide for locating specific rooms, schedules and amenities. For further enhancement of MapTap, additional studies could be:

1. Interactive 3D model.
2. Updating of 3D models.
3. Batch upload of teacher's schedule.

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