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RYMEC Campus Navigator with Speech Assistance

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Abstract: We suggest a solution for students, their parents and visitors who visit the campus. It is very difficult to reach destination without navigation It will be waste of time in searching destination It may be overhead to the guards to guide continuously to the strangers or visitors. We are designing RYMEC Campus Navigator with Speech Assistance in smart phones and an embedded device for additional information. Campus navigator is a mobile application which is based on Bluetooth/GSM technology. The data from Bluetooth/GSM gets transmitted and it can be monitored in Smartphone. Our project is more suited for campus environment of manufacture industries, software companies, college and universities, government campus etc. We are concentrating on visitor assistance and security for the campus. Both concepts are achieved successfully. Speech output is embedded in the device which provides better assistance for the visitor.

Keywords: Navigator, GSM, RFID Reader, Microcontroller, LDR.

I. INTRODUCTION

Navigation is a technique which basically focuses on process of monitoring and controlling the movement of person or vehicle or craft from one place to another e.g.: Land navigation, Marine Navigation, Aeronautic Navigation etc. The campus navigator is the android mobile application which is basically used for navigating routes inside any campus premises e.g.: Mall, College, Hospital etc... Mobile phones are nowadays far more than merely devices to communicate with. Especially, Smartphone's are products that help to make our work and everyday life easier. Along with the advance in technology and popularity of these devices, the use of mobile applications has increased enormously in the last few years. Based on new techniques like GPS, sensors, compass and accelerometer, that can used to determine the orientation of the device, location-based applications coupled with augmented reality views are also possible.

There are several commercial navigation applications - such as Google Maps, Yahoo Maps and Map quest that provide users with directions from one place to another. However, these applications must search along existing roads
they are not able to provide routes that are as precise as an on-campus path would require. Our project is more suited for campus environment of manufacture industries, software companies, college and universities, government campus etc. In this project we are concentrating on visitor assistance and security for the campus. Both concepts are achieved successfully. A campus is a complex infrastructure. Especially new students and people who are on it for the first time have a hard time to orientate themselves and find places. The campus occupies more than two square kilometers and thus is even larger than that. The campus has many different buildings. Most of the buildings are connected to each other, some of them even by underground walkways. Even if there are maps at some points on the campus, users do not have continuous help to get to their destination. They can try to figure out a way to get to their target on these static maps, but as soon as they start walking in the target direction they have no help any more.The answer to this question is "CAMPUS NAVIGATOR". Our Campus Navigator application enables users to obtain routes that are much more detailed than an existing commercial application can provide. The user has to access this application through an android phone when he enters the premises of the campus and register prior to using the application. The user cannot use the application outside the campus area. The user also has to mandatorily register to proceed.

II. LITERATURE SURVEY

Indoor Navigation With Foot-Mounted Strap down Inertial Navigation and Magnetic Sensors suggested by BIRD Jeff (Defense R & D Canada), ARDEN Dale (Dale Arden Consulting) [1] has described a method of navigation for an individual based on traditional inertial navigation system (INS) technology, but with very small and self-contained sensor systems. A conventional INS contains quite accurate, but large and heavy, gyroscopes and accelerometers, and converts the sensed rotations and accelerations into position displacements through an algorithm known as a strap down navigator. They also, almost without exception, use an error compensation scheme such as a Kalman filter to reduce the

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error growth in the inertially sensed motion through the use of additional position and velocity data from GPS receivers, other velocity sensors (e.g., air, water, and ground speed), and heading aids such as a magnetic compass. This technology has been successfully used for decades, yet the size, weight, and power requirements of sufficiently accurate inertial systems and velocity sensors have prevented their adoption for personal navigation systems. Now, however, as described in this article, miniature inertial measurement units (IMUs) as light as a few grams are available. When placed on the foot to exploit the brief periods of zero velocity when the foot strikes the ground (obviating the need for additional velocity measurement sensors), these IMUs allow the realization of a conventional Kalman-filter-based aided strap down inertial navigation system in a device no larger or heavier than a box of matches. A particular advantage of this approach is that no stride modelling is involved with its inherent reliance on the estimation of a forward distance travelled on every step the technique works equally well for any foot motion, something especially critical for soldiers and first responders. Also described is a technique to exploit magnetic sensor orientation data even in indoor environments where local disturbances in the Earth s magnetic field are significant. By carefully comparing INSderived and magnetically derived heading and orientation, a system can automatically determine when sensed magnetic heading is accurate enough to be useful for additional error compensation.

Design and Implementation of a Campus Navigation Application with Augmented Reality for Smartphone's suggested by Benjamin Lautenschläger [2] have based on new techniques like GPS and sensors, compass and accelerometer, that can determine the orientation of the device, location-based applications coupled with augmented reality views are possible. In the context of this work a mobile navigation application for the University of Calgary is developed. This describes the initial thoughts on this application and the process that lead to the final system environment. The approach on designing a graphical user interface for pedestrian use on mobile devices is described, as well as the actual implementation of it. To provide users with location based information a location tracking algorithm based on wireless network signals is created, which determines the geographical position inside buildings. The resulting application enables the user finding paths to specific locations on campus and offers him the ability to explore the campus environment via augmented reality.

In-Car Positioning and Navigation Technologies suggested by Isaac Skog and Peter Handel [3]
In-car positioning and navigation has been a killer application for Global Positioning System (GPS) receivers, and a variety of electronics for consumers and professionals have been launched on a large scale. Positioning technologies based on stand-alone GPS receivers are vulnerable and, thus, have to be supported by additional information sources to obtain the desired accuracy, integrity, availability, and continuity of service. A survey of the information sources and information fusion technologies used in current in-car navigation systems is presented. The pros and cons of the four commonly used information sources, namely, 1) receivers for radio-based positioning using satellites, 2) vehicle motion sensors, 3) vehicle models, and 4) digital map information, are described. Common filters to combine the information from the various sources are discussed. The expansion of the number of satellites and the number of satellite systems, with their usage of available radio spectrum, is an enabler for further development, in combination with the rapid development of microelectromechanical inertial sensors and refined digital maps.

Navigation Domain Representation For Interactive Multiview Imaging suggested by Thomas Maugey, Ismael Daribo, Gene Cheung, and Pascal Frossard [4] Enabling users to interactively navigate through different viewpoints of a static scene is a new interesting functionality in 3D streaming systems. While it opens exciting perspectives toward rich multimedia applications, it requires the design of novel representations and coding techniques to solve the new challenges imposed by the interactive navigation. In particular, the encoder must prepare a priori a compressed media stream that is flexible enough to enable the free selection of multiview navigation paths by different streaming media clients. Interactivity clearly brings new design constraints: the encoder is unaware of the exact decoding process, while the decoder has to reconstruct information from incomplete subsets of data since the server generally cannot transmit images for all possible viewpoints due to resource constrains. In this paper, we propose a novel multiview data representation that permits us to satisfy bandwidth and storage constraints in an interactive multiview streaming system. In particular, we partition the multiview navigation domain into segments, each of which is described by a reference image (color and depth data) and some auxiliary information. The auxiliary information enables the client to recreate any viewpoint in the navigation segment via view synthesis. The decoder is then able to navigate freely in the segment without further data request to the server; it requests additional data only when it moves to a different segment. We discuss the benefits of this novel representation in interactive navigation systems and further propose a method to optimize the partitioning of the navigation domain into independent segments, under bandwidth and storage constraints. Experimental results confirm the potential of the proposed representation; namely, our system leads to similar compression performance as classical inter-view coding, while it provides the high level of flexibility that is required for interactive streaming. Because of these unique properties, our new framework represents a promising solution for 3D data representation in novel interactive multimedia services.

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II. PROPOSED SYSTEM

The Advance of rising technologies has broadened the means in addition because the applications of the web. In different words, virtually each "object" may be a part of a network. With sensible property, physical objects area unit networked and can gain the flexibility to speak with one another. The technology offers location based services with the assistance of small GSM transmitter. If we move within the range, a signal will be transmitted to our phone which gauges a response from app installed on our device. However, retailers, platforms and brands are allowed to know where a customer is at any time. This gives them chance to send advertising that is designed to trigger actions instantly.

Problem statement

- It is very difficult to reach destination without navigation
- It will be waste of time in searching destination
- It may be overhead to the guards to guide continuously to the strangers or visitors

Tags will be placed on the floor in certain directions resembling that of a path to various offices or different buildings in a campus. The visitor will be given a RFID reader. The direction to the particular office or buildings in a campus will be shown on a map in his/her android smart phone. LDR is implemented in this project which is helpful at the night time. Whenever there is a light on LDR then LED's will be in off state, if there is no light on LDR i.e. at night time LED's will turn on.

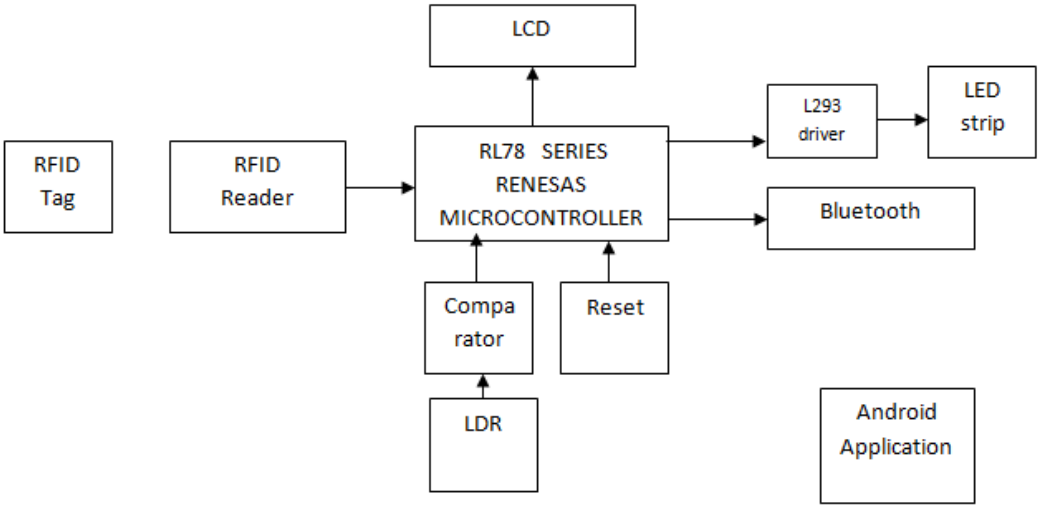

Fig 1: Overview of our proposed system

Many embedded systems have substantially different designs according to their functions and utilities. In this project design, structured modular design concept is adopted and the system is mainly composed of microcontroller, RFID reader, GSM and LCD, LDR, LED as show in fig 1. The microcontroller located at the centre of the block diagram forms the control unit of the entire project. The dataflow diagram is shown in figure 2.

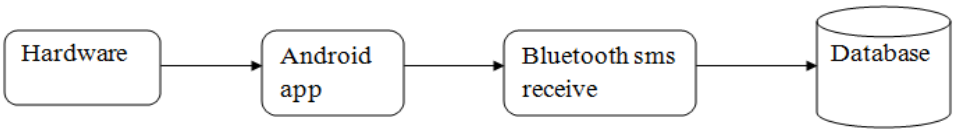

Fig 2.Data flow diagram

Embedded within the microcontroller is a program that helps the microcontroller to take action based on the inputs provided. Here in this project demo, tags will be placed on the floor in certain directions resembling that of a path to various offices or different buildings in a campus. The visitor will be given a RFID reader. The direction to the particular office or buildings in a campus will be shown on a map in his/her android smart phone. If the visitor deviates once or twice from the path shown in the android smart phone, the microcontroller will pass message to the android smart phone via GSM. On receiving this message the android smart phone will activate a predefined voice output, thereby suggesting the visitor to take the correct path.LDR is implemented in this project which is helpful at the night time. Whenever there is a light on LDR then LED's will be in off state, if there is no light on LDR i.e. at night time LED's will turn on. Hence it is useful at night time also. In any situation if you want to restart your system then reset button is provided. If the visitor deviates from the path, for the third time, the microcontroller will pass this message to

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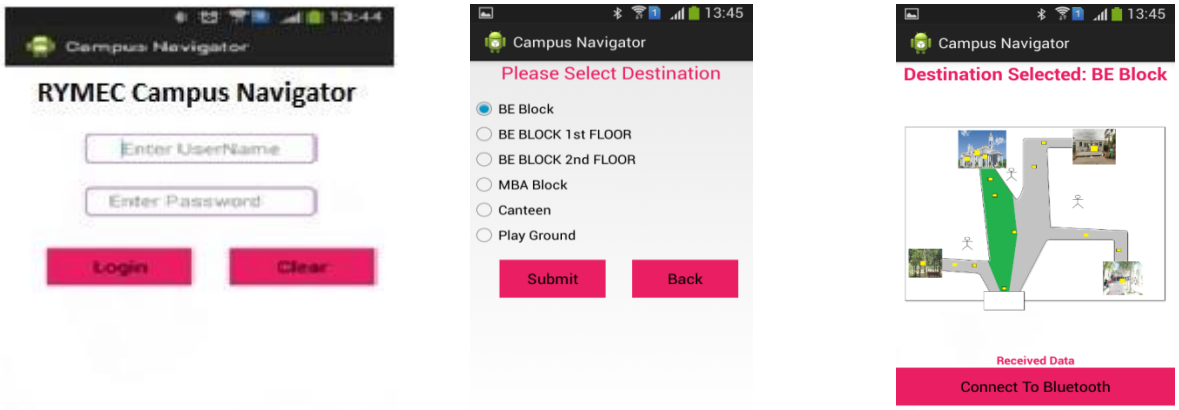
the android smart phone via GSM and as usual a voice output will also be created. Immediately, after the voice output is given, a message will be passed to the security centre on that campus from visitor's android smart phone.

IV. RESULT AND DISCUSSION



An android application is created for this project, to display the route map of the campus on any visitor's android smart phone. At the entrance of the campus the security guard will be in charge of installing this android application on any visitor's android mobile phone. Automatic transmitting of message to security centre is part of the android application feature. If visitor takes correct path or wrong path, an acknowledgement in the form of voice output will be given through the visitor's android phone. As seen in the block diagram an LCD is added. The LCD is used to display any event taking place between microcontroller and peripherals connected to it. Below are snapshots of how the android application looks.

VI. CONCLUSION

Depending on the profile and time of the day information for students, visitors can be delivered**.** They can do a guided tour, without an actual guide. This design is very flexible and can be easily adopted for other systems with similar tasks for Example Smart City, Smart People. The project is designed using structured modelling and is able to provide the desired results. It can be successfully implemented as a Real Time system with certain modifications. Science is discovering or creating major breakthrough in various fields, and hence technology keeps changing from time to time. Going further, most of the units can be fabricated on a single along with microcontroller thus making the system compact thereby making the existing system more effective. To make the system applicable for real time purposes components with greater range needs to be implemented.

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