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Speech Assistance Campus Navigator of RYMEC

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Abstract: **- Campus navigator is a mobile application which is based on Bluetooth. We are proposing a solution for students, parents and visitors who visit's the college for the first time, they does not know where the destination location present in order to solve that problem we are suggested this method. They can use their own smart phones and an embedded device for additional information. The data from Bluetooth gets transmitted and it can be monitored in Smartphone. Our proposal 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. Speech output is embedded in the project which provides better assistance for the visitor.**

***Key words*— Navigator, Renesas Microcontroller, RFID Reader, 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 microcontroller (or MCU for microcontroller unit)as shown in the fig 3.1 is a small computer on a single integrated circuit. In modern terminology, it is similar to, but less sophisticated than, a system on a chip or SoC; an SoC may include a microcontroller as one of its components. A microcontroller contains one or more CPUs (processor cores) along with memory and programmable input/output peripherals. Program memory in the form of ferroelectric RAM, NOR flash or OTP ROM is also often included on chip, as well as a small amount of RAM. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications consisting of various discrete chips. Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, implantable medical devices, remote controls, office machines, appliances, power tools, toys and other embedded systems. By reducing the size and cost compared to a design that uses a separate microprocessor, memory, and input/output devices, microcontrollers make it economical to digitally control even more devices and processes. Mixed signals microcontrollers are common, integrating analog components needed to control non-digital electronic systems. A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in colour or monochrome.[1]LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words,

digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements. LCDs are used in a wide range of applications including LCD televisions, computer monitors, instrument panels, aircraft cockpit displays, and indoor and outdoor signage. Small LCD screens are common in portable consumer devices such as digital cameras, watches, calculators, and mobile telephones, including smartphones. LCD screens are also used on consumer electronics products such as DVD players, video game devices and clocks. LCD screens have replaced heavy, bulky cathode ray tube (CRT) displays in nearly all applications. LCD screens are available in a wider range of screen sizes than CRT and plasma displays, with LCD screens available in sizes ranging from tiny digital watches to huge, big-screen television sets. 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.

II. LITERATURE SURVEY

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 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. Benjamin Lautenschläger [2], has described a method of Design and Implementation of a Campus Navigation Application with Augmented Reality for Smartphone's based on new techniques like GPS and sensors, compass an-d 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.

III. PROPOSED SYSTEM

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.

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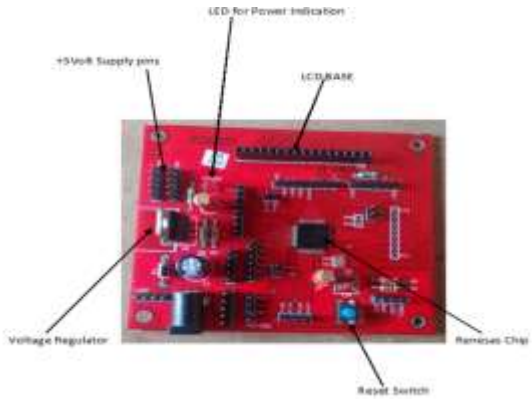

Fig 3.1: Renesas Microcontroller

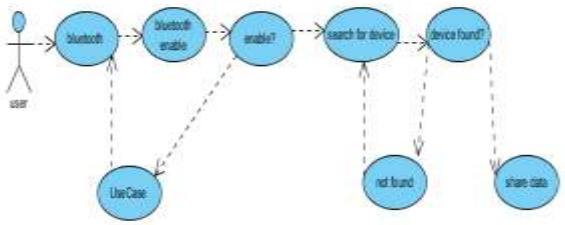

Fig 3.2: Usecase Diagram

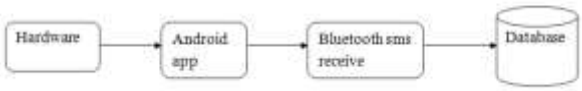

Fig 3.3: Dataflow Diagram

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, Bluetooth and LCD, LDR, LED. The microcontroller located at the centre of the block diagram forms the control unit of the entire project. 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 Bluetooth as shown in the fig 3.3. 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 the android smart phone via Bluetooth 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. 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.

IV. RESULTS 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 as we shown in the figures. 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 after installing the application user need to login as we shown in fig 4.1. 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. If he is a new user then he need to register as we shown in fig 4.2. After login visitor need to select the destination as we shown in the fig 4.3. After selecting the destination if the user is going in the correct path then user will get the green color as shown in fig 4.4. When the visitor reached the destination successfully

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then user need to logout from the application as shown in fig 4.5.

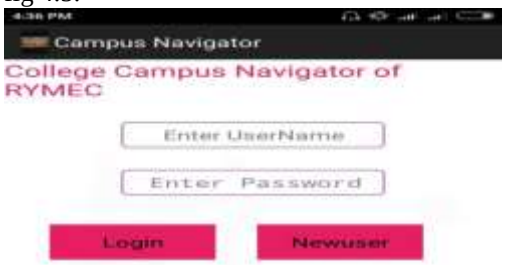

Fig 4.1: Login Page

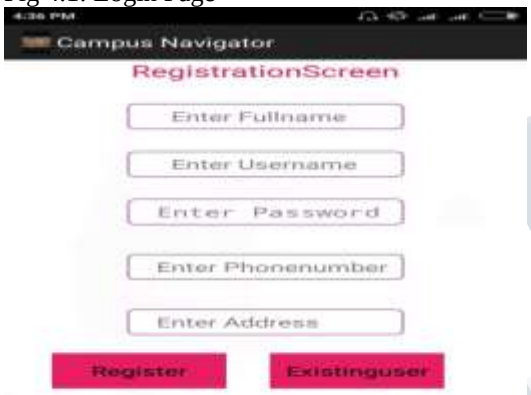

Fig 4.2: Registeration Page

Fig 4.3: Main Page

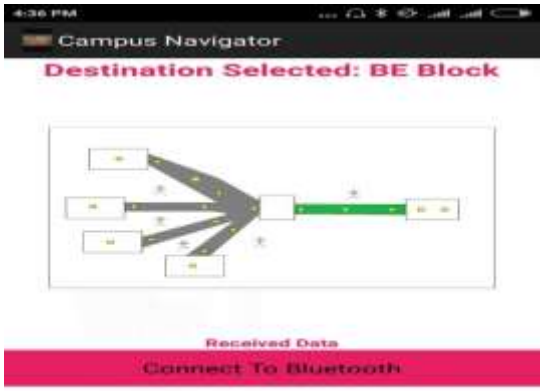

Fig 4.4: Selected Destination Palce

Fig 4.5: Logout Page

V. 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 modeling 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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