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Pliroforia Systima for Visually Impaired

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Abstract: **Visually impaired persons find difficult to lead their life independently. According to the national survey 2016, found that 79% of visually able person and 21% of visually impaired. Out of 21% of visually impaired , 10.56% of literal blinds, 3.44% of illiterate blinds and 7% of blinds with the age above 50. Visually impaired people mainly face problems while walking in a crowd, public places, climbing the stair cases and to read and write messages or e-mails. In the present scenario visually impaired have tactile sensation devices such as finger braille, manual alphabets, print on palm method and several other electronic gadgets. Even though there are some problems arise in these methods such as lack of privacy and lack of compatibility to advanced communicational and computational environment. This paper proposes an intelligent system to support the visually impaired with a low cost hand glove and navigational stick, which helps to write and read text messages and e-mails using different hand gesture as well the navigational stick helps them and assist to navigate in the public places and crowded area , obstrucle detection and gives alert in case of slippery floor and climbing of staircase. Finally this proposal eliminates the lack of privacy and compatible usage of electronic gadgets, making visually impaired to be confident to lead their life independently in the society.**

Index Term **- Finger braille system, Hand glove, Navigational stick.**

I. INTRODUCTION

Blind people find it extremely difficult to acquire basic and vital information necessary for their living. Therefore, they are at a very high risk of being socially excluded as a result of poor access to information. In recent years, several attempts have been made in improving the communication methods for visually impaired people which involve tactile sensation such as finger Braille, manual alphabets and the print on palm method and several other electronic devices. But, there are some problems which arise in such methods such as lack of privacy and lack of compatibility to computer environment. This project describes a low cost hand glove and navigational stick for blind people using accelerometer sensors and flex sensor with the help of which they can read and write emails, text messages and read e-books. This glove allows the person to type characters based on different hand gestures using single accelerometer and flex sensors. Intelligent stick helps for navigational assistance, obstacle detection and gives alert in case of slippery floor.

II. LITERATURE SURVEY

Global System for Mobile communications (GSM: originally from Groupe Special Mobile) is the most popular standard for mobile phones in the world. Its promoter, the GSM Association, estimates that 82% of the global mobile market uses the standard.[10] GSM is used by over 3 billion people across more than 212 countries and territories.[11] Its ubiquity makes international roaming very common between mobile phone operators, enabling subscribers to use their phones in many parts of the world. GSM differs from its predecessors in that both signaling and speech channels are digital, and thus is considered a second generation (2G) mobile phone system. This has also meant that data communication was easy to build into the system. The ubiquity of the GSM standard has been an advantage to both consumers (who benefit from the ability to roam and switch carriers without switching phones) and also to network operators who can choose equipment from any of the many vendors implementing GSM . GSM also pioneered a low-cost, to the network carrier, alternative to voice calls, the Short message service (SMS, also called "text messaging"), which is now supported on other mobile standards as well. Another advantage is that the standard includes one worldwide Emergency telephone number, 112[4]. This makes it easier for international travelers to connect to emergency services without knowing the local emergency number.

In 1982, the European Conference of Postal and Telecommunications Administrations (CEPT) created the Groupe Special Mobile (GSM) to develop a standard for a mobile telephone system that could be used across Europe. [12] [13] In 1987.

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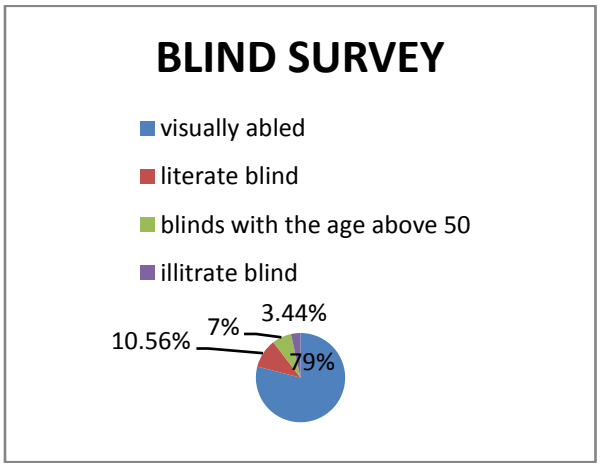


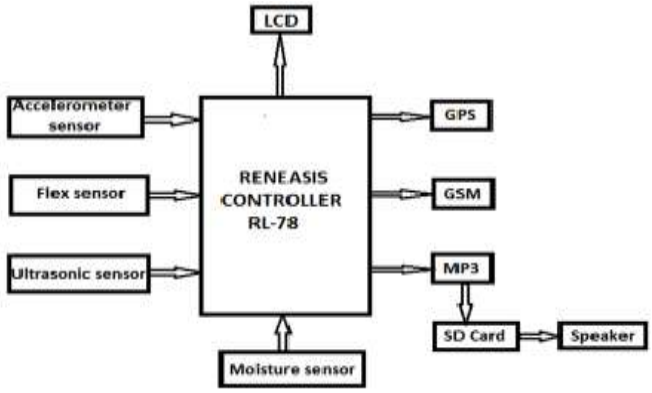
III. PROPOSED METHODOLOGY

1. Our goal is to break down these barriers by introducing a **PLIROFORIA SYSTIMA** which is relatively inexpensive for the blind. We propose a **HAND GLOVE** and **BLIND NAVIGATIONAL STICK** by which the blind are capable of communicating and location–tagging
2. Hand glove allows the person to type characters based on different hand gestures using single accelerometer and flex sensors.
3. Intelligent stick helps for navigational assistance, obstacle detection and gives alert in case of slippery floor.

IV. WORKING

The device is initialized with an input voltage of 12V which is regulated or reduced to 5V that serves as an input to the Reneasis controller (RL-78) it is the heart of the device which controls all the other serially interfaced modules such as GPS, GSM, accelerometer sensor, flex sensor, ultrasonic sensor and moisture sensor. The accelerometer sensor helps in sensing the hand gestures where in the variations of axial moments gives different voltages on the LCD, each gesture will represent an alphabet for typing the text message or E-mail that are stored in the buffer of the code used which is done through the CUBE SUITE+ software and compiled using the Reneasis flash programmer, the typed message is sent to a particular user in the contact list with the help of the GSM module. Here the flex sensor is used for getting more combinations of alphabets. The GPS interfaced to the controller is used for location identification through satellite and to give appropriate voice output. The ultrasonic sensor and moisture sensor – senses an obstrucle and wetness on the floor respectively producing an voice output obtained at the mobile app. The receive voice output is got through the MP3 speaker that is displayed on LCD.

V. BLOCK DIAGRAM



VI . COMPONENTS DETAILS

GPS: The Global Positioning System (GPS) is a satellite-based navigation system made up of at least 24 satellites. GPS satellites circle the Earth twice a day in a precise orbit. Each satellite transmits a unique signal and orbital parameters that allow GPS devices to decode and compute the precise location of the satellite. GPS receivers use this information and trilateration to calculate a user's exact location. Essentially, the GPS receiver measures the distance to each satellite by the amount of time it takes to receive a transmitted signal. With distance measurements from a few more satellites, the receiver can determine a user's position and display it electronically

Ultrasonic sensor: A special sonic transducer is used for the ultrasonic proximity sensors, which allows for alternate

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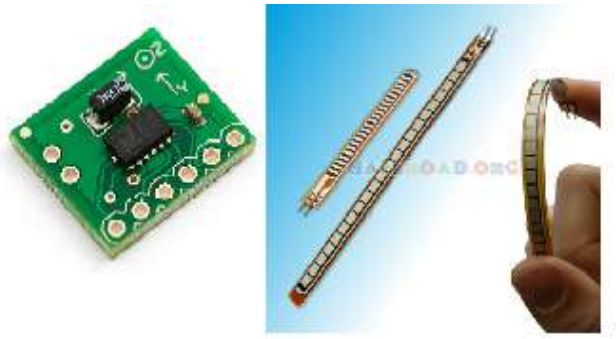
transmission and reception of sound waves. The sonic waves emitted by the transducer are reflected by an object and received back in the transducer. After having emitted the sound waves, the ultrasonic sensor will switch to receive mode. The time elapsed between emitting and receiving is proportional to the distance of the object from the sensor.

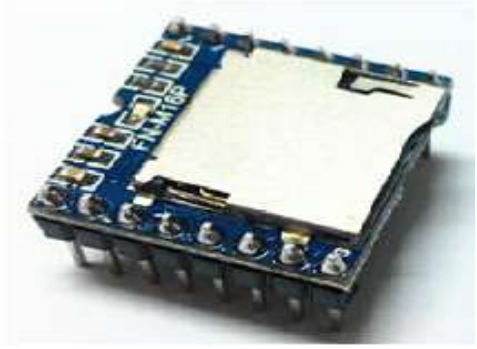
GSM module: GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM). It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.

Moisture sensor: Moisture sensor sense the water content on the floor and gives alarm. This helps the blind while walking in the slippery floor.

Accelerometer sensor and flex sensor: Accelerometers sensor have multiple applications in industry and science. Highly sensitive accelerometers are components of inertial navigation systems. Accelerometers are used to detect and monitor vibration in hand gestures. A simple flex sensor 4.5" in length. As the sensor is flexed, the resistance across the sensor increases. Patented technology by Spectra Symbol - they claim these sensors were used in the original Nintendo Power Glove. The resistance of the flex sensor changes when the metal pads are on the outside of the bend Connector is 0.1" spaced and bread board friendly. Check datasheet for full specifications.



MP3 module: This embedded MP3 module is an universal and compact circuit (37 mm x 27 mm) for playing MP3 audio files. The MP3 module can be used in embedded systems. The MP3 files (up 65,536) are stored in a micro SDcard. Controlling the module could be done either by buttons and digital inputs or via TTL serial interfaces. The MP3 module is based on MP3 converter VS1011 and a PIC24 and can play up to 65,536 songs or voice messages stored in a microSD.



LCD: LCD (liquid crystal display) is the technology used for displays in notebook and other smaller computers. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow displays to be much thinner than cathode ray tube (CRT) technology. LCDs consume much less power than LED and gas-display displays because they work on the principle of blocking light rather than emitting it. An LCD is made with

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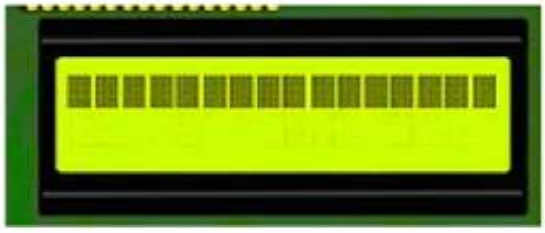
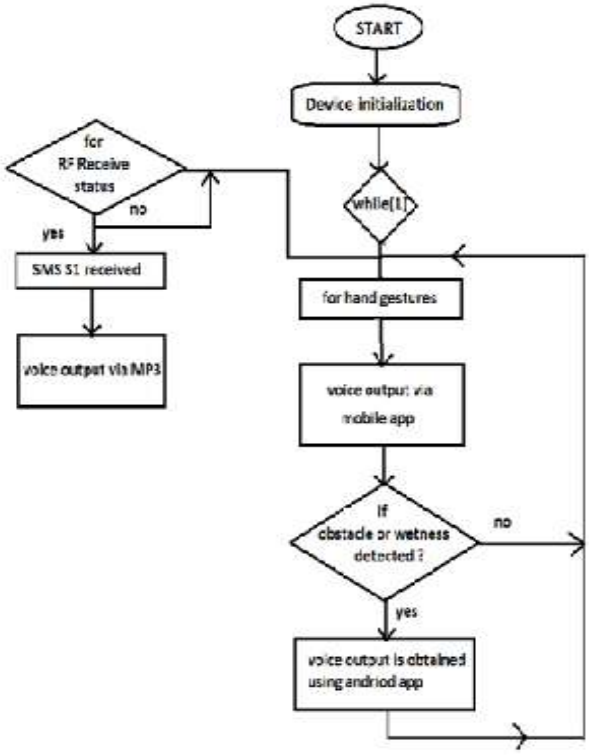
either a passive matrix or an active matrix display grid. The active matrix LCD is also known as a thin film transistor (TFT) display. The passive matrix LCD has a grid of conductors with pixels located at each intersection in the grid. A current is sent across two conductors on the grid to control the light for any pixel. An active matrix has a transistor located at each pixel intersection, requiring less current to control the luminance of a pixel. For this reason, the current in an active matrix display can be switched on and off more frequently, improving the screen refresh time



Flow Diagram:



VII. INNOVATIVENESS & USEFULNESS

1. Hand gloves for communication
2. Intelligent stick for detection of obstacles and navigational assistance.

Blinds find it extremely difficult to acquire basic and vital information necessary for their living. Therefore, they are at a very high risk of being socially excluded as a result of poor access to information. In recent years, several attempts have been made in improving the communication methods for visually impaired people who involve tactile sensation such as finger Braille, manual alphabets and the print on palm method and several other electronic devices. But, there are some problems which arise in such methods such as lack of privacy and lack of compatibility to computer environment. This paper describes a low cost Braille hand glove for blind people using slot sensors and vibration motors with the help of which they can read and write emails, text messages and read e-books. This glove allows the person to type characters based on different Braille combination using six slot sensors. The vibration in six different positions of the glove which matches to the Braille code allows them to read characters. Intelligent stick helps for navigational assistance, obstacle detection and gives alert in case of slippery floor.

Society functions primarily through the smooth exchange of goods, services and companionship. However information and resources are made more readily available to the eye. The societal infrastructure and exchange network are designed to optimize the freedom, functioning, and enjoyment of sighted people - facing the visually impaired with exclusion from this network. The internet has become an effective, essential and a fast access tool for obtaining vital educational information. In this fast developing modern world internet has become the most important and reliable educational information hub. They have to rely on conventional and orthodox methods of obtaining information which includes tactile sensation such as finger Braille, manual alphabets and the print on palm method, but these methods are tedious, slow and inefficient and are not suitable for the computer environment. As a result, they are unable to access the information hub i.e. the internet. Emails, text messages, internet blogs, e-books etc. have become an integral part of our life and the visually impaired unfortunately are deprived of such facilities. They do a reading using Braille language which has a wide variety of characters. This is a small attempt by us to try to solve their problems by opening up the digital world to them. To obtain Information necessary to carry out normal day-to-day activities, this low cost real-

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time communication braille hand glove is one device which can immensely benefit the visually impaired people, who work in the computer environment. This concept will go a long way in helping them learn on an equal footing with their sighted counterparts. Nowadays, many systems have been developed which can be interfaced to a computer to read text online which have taken over the old systems which involved cumbersome systems like keyboards and printers.

In our work we present a low cost, efficient and portable hardware design of a Braille hand-glove and a software application which can be used by the visually impaired people to read and write e-mails, read blogs as well as e-books. We have developed this system on the Braille platform since the visually impaired people are well versed with the Braille language. Many systems have been designed previously in this area like the Braille embosser which is a special type of impact printer which prints text in the form of Braille cells. But these printers are more expensive and bulky compared to normal printers and also a special type of Braille paper has to be used for printing which is thicker and expensive compared to normal paper.

Specially designed hand glove helps the blinds to write text with the use of gesture based slot sensors interface with the microcontroller which helps in producing voice over messages through mobile application and Bluetooth. And can read messages as soon as the messages are received in form voice using Bluetooth. Intelligent blind stick is mainly used for navigational purpose with the help of GPS and GSM module, obstacle detection using ultrasonic sensor and slippery or wet floor detection using moisture sensor. To access this device we use a special type of microcontroller – RENESAS microcontroller (R5F100LE) from the family RL78/G13 as it is more compact in size when compared to other microcontrollers, consumes less power and it is comparatively low cost.

VIII. ANDROID SOFTWARE DEVELOPMENT KIT

The Android software development kit (SDK) includes everything you need to start developing, testing, and debugging Android applications. Included in the SDK download are:

- **The Android APIs:** The core of the SDK is the Android API libraries that provide developer access to the Android stack. These are the same libraries used at Google to create native Android applications.
- **Development Tools:** To turn Android source code into executable Android applications, the SDK includes several development tools that let you compile and debug your applications.
- **The Android Emulator:** The Android Emulator is a fully interactive Android device emulator featuring several alternative skins. Using the emulator, you can see how your applications will look and behave on a real Android device. All Android applications run within the Dalvik VM so that the software emulator is an excellent environment — in fact, as it is hardware-neutral, it provides a better independent test environment than any single hardware implementation.
- **Full Documentation:** The SDK includes extensive code-level reference information detailing exactly what's included in each package and class and how to use them. In addition to the code documentation, Android's reference documentation explains how to get started and gives detailed explanations of the fundamentals behind Android development.
- **Sample Code:** The Android SDK includes a selection of sample applications that demonstrate some of the possibilities available using Android, as well as simple programs that highlight how to use individual API features.
- **Online Support:** Despite its relative youth, Android has generated a vibrant developer community. The Google Groups at http://code.google.com/android/groups are active forums of Android developers with regular input from the Android development team at Google.

IX.CONCLUTION

This project is built to aid the blind person so that they may communicate and navigate easily in urban areas and avoid obstacles using special detection sensors and the message that assists them from android app. We seek to develop a portable hand glove and blind stick for visually impaired users, along with the accompanying GPS localization infrastructure for position information. The project is suitable for blind, low-vision and sighted individuals. These applications run on both I-Phone and Android mobile devices that have a touch screen and vibration capability. Hand glove allows people to write messages and emails using hand gestures. The letters are presented one at a time in random order, and the android app tries gives the voice output of the typed message and received message.

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