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Smart Stick for Blind People

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Abstract: Visually impaired persons in day to day life overcome many challenges like traveling independently. In our day to day life we see many visually impaired or blind person's are always in need of helping hands for example while, walking into an unfamiliar place, while detecting obstacles etc this restricts their mobility. Hence, we are developing a smart walking stick which will help them to know about their surroundings and also guide them during travelling. This stick is an innovative stick designed for visually disabled people for improved navigation and object detection. The blind stick is integrated with ultrasonic, IR sensors in conjunction with motors. On sensing obstacles, If the obstacle is close enough then buzzer and vibrator motor get activated. Here we are using buzzer in case of noise in crowded areas . The system has another advanced feature integrated to assist the blind man to seek out their required location. The main objective of this project is to style a sensible walking stick that alerts visually impaired people over obstacles ahead could help them in walking with less accident and emergency services during emergency. It outlines a way better navigational tool for the visually impaired. The Smart Stick will help the visually impaired person's by providing more convenient means of life.

KEYWORDS: Mobility, Navigation, Obstacles, Sensors, Motors, Smart Walking Stick

I. INTRODUCTION

Dealing with daily activity with sight loss or vision impairment is no less then a challenge for the blind persons. Their disability restricts their life style and interaction with in the surrounding and affecting their quality lifestyle. Limitation on mobility of the specially able persons prevents them from enjoying the nature around and have to completely depends on their family . It becomes difficult for them to detect the obstacles in their path while moving and finding the lost normal stick. Over the past decades many solutions have been proposed in favor of blind persons but still have few limitations in implementing them. Based on new technology and former researches, our proposal has been implemented. The main intention of this project is to design a smart walking stick especially people with complete loss of vision as it alerts visually impaired people over obstacles and water in front that could help them in walking with less accident and making their navigation around easily without seeking the help from others. We here propose a complicated blind stick that permits dim-sighted people to navigate with ease using advanced technology. The blind stick is integrated with ultrasonic sensor along side IR Sensors. Our proposed project first uses ultrasonic sensors to detect obstacles ahead using ultrasonic waves. On sensing obstacles the sensor passes this data to the Arduino Uno. The Arduino uno then processes this data and calculates if the obstacle is close enough. If the obstacle is close the Arduino Uno sends a warning in the form of voice. The stick also includes the vibrator .If the obstacle is close the Arduino uno sends a warning through vibration The system has one more advanced feature of tracking integrated to help the blind find their stick if they forget where they kept it. Emergency services like message and calling is also integrated in the system This Smart stick outlines a much better navigation tool for the visually impaired people. It consists of a simple walking stick equipped with sensors to give information about the environment surrounding them and integrated GPS technology that is recorded with preprogrammed locations to determine the optimal route to be taken to succeed in their destination. The user can choose his destination from the set of locations stored within the memory which will lead the user within the correct direction. This Smart Stick consists of Ultrasonic Sensors which will sense both the distant and nearer objects or obstacles and a RF remote to locate this smart stick and this whole setup is controlled by Arduino UNO .Visually impaired persons will receive all this feedbacks with the assistance of a buzzer which will automatically get activated and can start producing vibration when the sensors will sense the obstacles .Apart from the obstacle detection this smart stick using GPS also can locate the position of the person to their loving ones and communicate with them .The proposed solution is right because it is user friendly ,easy to use and handle, light weight.

II. FLOW SYSTEM

- Ultrasonic Sensors - For the detection of far obstacles .

- Arduino UNO R3- It work as a controller for the GPS & GSM, IR & Ultrasonic Sensors, Vibrators and Speakers in the system.

- Push Button - This button will be pressed by the user when he/she is in the emergency situation.

- Speakers - Speakers helps the user while moving from one source to another by guiding them through the obstacles in between the path via voice .

- Vibrator - Vibrator vibrates when ever sensors senses obstacles .They are placed on the handles so that the user may sense it incase if they are unable to hear the speaker voice.

- Android Application -The user can login to the application via audio. The user set its destination, then the application fetch the current location and find the path to the destination The path is guided by the voice navigator

III. REQUIREMENT ANALYSIS

- SOFTWARE –
  - Platform : Windows 7 (ultimate, enterprise) or higher, Android

  - Arduino IDE: Version – 1.8 or higher

  - Front End Language : Python

  - Back End Language : Java (JDK Version – 1.0 to 1.9 or higher)

  - Database : SQL
- HARDWARE –
  - Hard Disk : 5 GB or more

  - Processor : i3 or higher

  - Memory : 2 GB RAM or more

  - Android Phone version4.0 or higher

  - Arduino UNO R3

  - Ultra Sonic Sensors

  - Transmitters & Receivers

  - L293D(Driver AC)

  - Speakers(Apr33A3 Voice)

  - LEDs

  - Push button

 - Power Supply

➢ GPS and GSM Board

IV. ALGORITHM USED

▪ The AES algorithm (also known as the Rijndael algorithm) is a symmetrical block cipher algorithm that takes plain text in blocks of 128 bits and converts them to ciphertext using keys of 128, 192, and 256 bits. Since the AES algorithm is considered secure, it is in the worldwide standard.
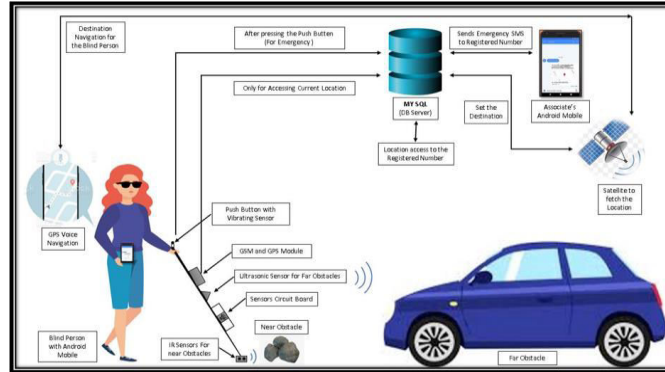
V. USE CASE DIAGRAM

- User: User execute application. Do registration.
     Machine learning : Machine learning learn
     about infected file signature for future use.

- Database: Database stores registration
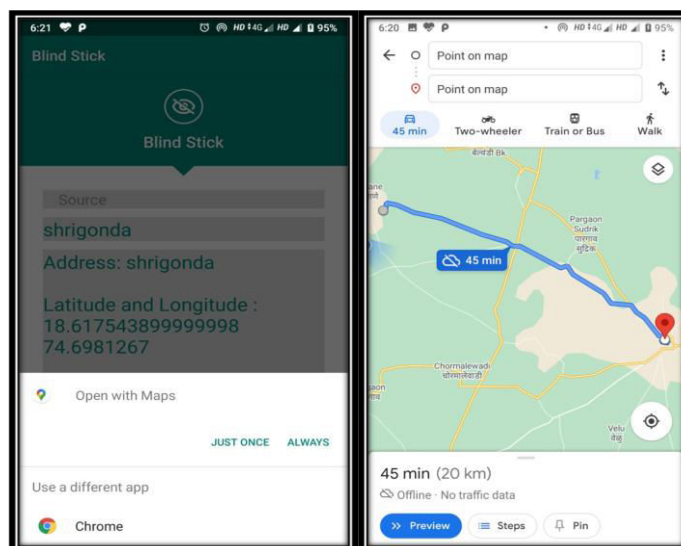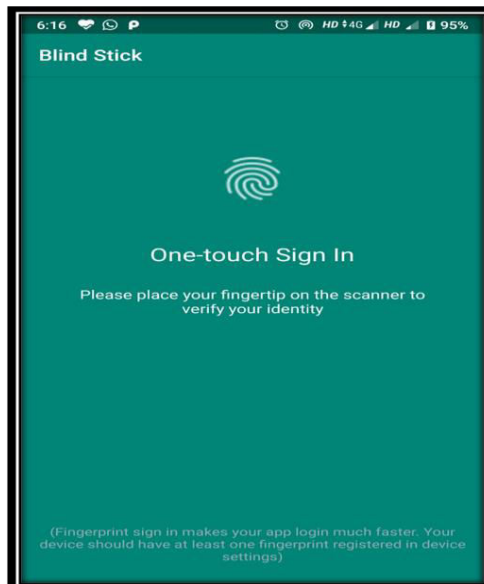   information of user

- Extractor: Collects features
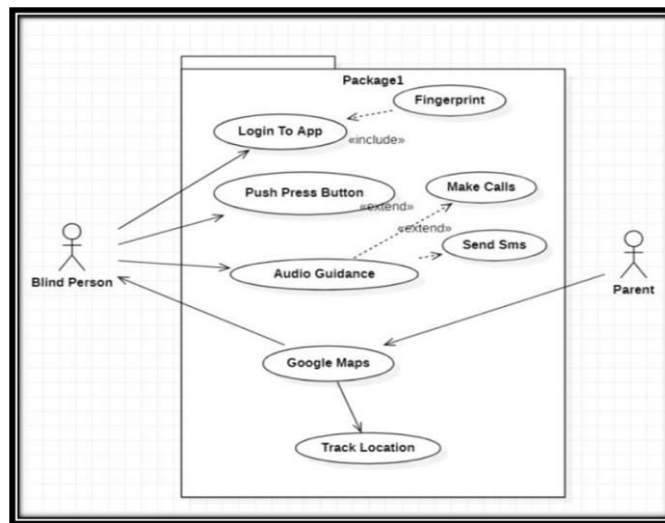
VI. CLASS DIAGRAM
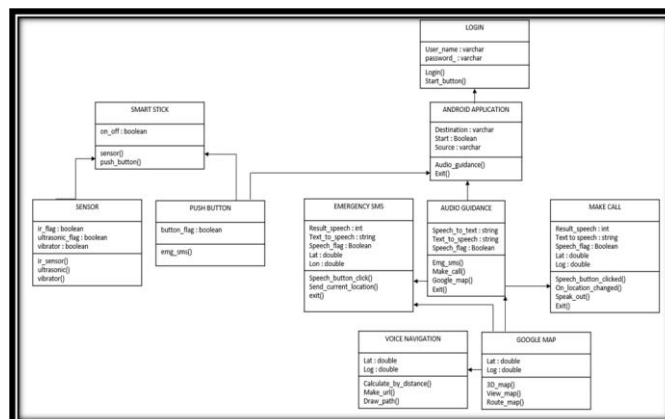
VII. SYSTEM ARCHITECTURE

VIII. GUI DESIGN SCREENSHOTS

IX. ADVANTAGES

- Visually Impaired do not need to depend on others, it also helps them to move with ease and confidence as sighted people.

- Feature to give you indicate right path.

- Facilitates easier communication in case of emergency.

- Auto detection and auto alarming.

- Reduce accidents.

- Simple to use.

- Associate / Parent feel safe as they know the location.

X. APPLICATIONS

- Helps blind people to easily reach their destination.
- Helps blind people for obstacle detection.
- Alerts blind people about obstacles and voice   navigation.
- Personal - Any individual can use Smart Blind Stick as per their convenience and need.
- Old Age Homes - Smart Stick is very useful in old age homes for senior citizens.

XI. FUTURE SCOPE

- The future scope of the existing smart sticks, guides the visually impaired person in their navigation independently and in an efficient manner along with ensuring the person's safety.
- The programmable wheels could steer the stick away from the hindrance and also would lead the blind person towards the destination.
- Internet of Things is a very trending concept that can increase the benefits of such smart stick by allowing a stick to communicate with another smart stick (or mobile ,tabs , laptops) nearby to utilize the functionality of the other stick when one stick's functionality breaks down.
- In order to operate this integrated set of hardware we can also make use of solar panels as an alternative to the battery. The use of solar array occurs to be more advantageous because it uses sunlight , the easily available natural resource of energy, to urge recharged.
- Features like Object detection, Text Detection and Face Detection can be applied on the stick itself byusing Raspberry pi.

XII. FINAL RESULT

We have successful implemented a sincere attempt to upgrade the lifestyle of blind peoples through smart blind stick which is used for navigation , emergency services (calling and messages) , live tracking, object and text detection .

XIII. CONCLUSION

This proposed idea of smart stick for blind people may be a sincere attempt to upgrade the lifestyle of visually impaired by providing independent mobility to the blind person with the help of smart stick and navigation system that helps in locating the exact location and in constant contact of their loved ones setting them free into their surroundings.

XIV. ACKNOWLEDGEMENT

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