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"A cloud based bus alert system for navigation of blind people"

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Abstract – **Generally, journey in bus is a safe and comfort factor, but due to increase in number of buses and passengers its going be tougher and it will be more difficult for blind people to travel in bus. In this project, we proposed a novel system which can help blind people to find the bus at the bus stop. The main problem is navigation in real time traffic and checking the available buses along with their routes. In this project the blind person will get the information from the bus depository database. The desired output will be announced earphone and the bus is tracked by GPS. The blind people in the bus station are provided with a smart phone which is connected by the cloud. The cloud will store the information about the bus number and timings. Blind people instructions goes to cloud platform then cloud will process the corresponding response then get the desired result. So that blind people can clearly know about bus location and timings of bus arrival to their respective places. For developing this project, we used Voice Activity Detector algorithm, Route Selection algorithm, DTW algorithm for location estimation.**

Keywords— Navigation-Visually impaired persons-cloud storage-bus routes-GPS.

1. INTRODUCTION

The world is loaded with risks and ponders which society accepts the utilization of vision to maintain a strategic distance from or appreciate. However the issues of route for the visually impaired are still exceptionally mind boggling and troublesome particularly when they strolled down in road furthermore explore to inaccessible spots by open transport framework. Visually challenged persons face constraints in independent mobility and navigation. Mobility means the possibility of liberally moving, without support of any supplementary person, at home and unfamiliar scenarios. People with visual impairment tackle enormous limitations in terms of mobility. This project is mainly developed to guide blind people while navigation. There are many techniques used. If blind persons are in bus station, they can't get the correct bus without others help. The blind people can give query regarding the available bus in that route.

Objectives of this project is using cloud storage and GPS in the bus and smartphone consist GPS. Admin will get the data from cloud storage .The blind takes the right bus parked in front of him/her and when the destination is reached it is announced by means of GPS. Audio output is generated by the voice synthesizer. If in case direct bus is not available for particular place, the general instructions must be provided to guide blind people. And also it must guide the people to find particular hotel, mall and other public places. It must guide the blind people while walking in the street by entering destination by giving turn by turn direction. User can swipe around the screen and the device will tell them what item they have selected. For opening an app we have to double tap it. This ensures that the user always knows where his finger is on the screen and so, he can open any app he wants. Voice brief is a feature that can also read emails and text messages out loud and with the use of a voice recognition app, the user can reply.

RELATED WORK

1.Blind Navigation System for Visually Impaired Using Windowing-Based Mean on Microsoft Kinect Camera
Ali Ali, Mohammad Abou Ali Lebanease International University, Department of Biomedical Engineering This paper presents an obstacle avoidance system for blind people using Kinetic depth camera. This assistive technology recognizes the medium in front of the user using Kinetic depth camera. The system receives the depth images from the Kinetic camera .When the system recognizes an obstacle, it sends a voice feedback to the user through earphones.

2.PERCEPT-II: Smartphone based Indoor Navigation System for the Blind
Aura Ganz, Fellow, IEEE, James M. Schafer, Yang Tao, Carole Wilson, and Meg Robertson In this paper we introduce PERCEPT-II, a low cost and user friendly indoor navigation system for blind and visually impaired users. Using an Android Smartphone that runs PERCEPT-II application with accessibility features, the blind user obtains navigation instructions to the chosen destination when touching specific landmarks tagged with

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Near Field Communication tags.

3.The Development of a Pedestrian Navigation Aid for the Blind

Mounir BOUSBIA-SALAH, Mohamed FEZARI Badji Mokhtar University, Annaba Faculty of Engineering, Department of electronics Laboratory of Automatic and Signals-AnnabaBP.12 Annaba, 23000, ALGERIA An Electronic Travel Aid is a form of assistive technology having the purpose of enhancing mobility for blind individuals. This paper examines a pedestrian navigation system for the Blind, which is based on a microcontroller with synthetic speech output. This aid is a portable, self contained system that will allow blind people to travel without the assistance of guides. It is designed for a battery-powered portable model. In addition, it is focused on low power consumption, small size, lightweight, and easy manipulation.

4.Navigation Aid for Blind People Using Acoustic Signal

Zehui Zheng†§, Weifeng Liu†, Rukhsana Ruby†, Yongpan Zou†, Kaishun Wu† †College of Computer Science and Software Engineering, Shenzhen University §College of Information Engineering, Shenzhen University Blind mobility aid is a primary part in the daily life of blind people. Although plenty of systems or devices are invented to make the navigation of blind people easier, those are generally expensive and hardly affordable for them. To solve these issues, we introduce AB Aid, a novel system designed for blind or visually impaired people to navigate, with commercial off-the-shelf (COTS) mobile devices.

5.A Cloud-based Outdoor Assistive Navigation System for the Blind and Visually Impaired

Anna N. Lapyko1,Li-Ping Tung2, Bao-Shuh Paul Lin3Intelligent Information and Communications Research Center National Chiao Tung University Hsinchu, Taiwan, R.O.C This work introduces a cloud-based outdoor assistive navigation system (COANS) for BVI people. The main goal of the system is to provide easy street navigation and help to make outdoor walk in non-familiar environment less stressful. Hardware part from the user-side includes an android- based mobile phone and an external low-cost L1 GPS receiver to improve position accuracy. Applying the technique known as Real Time Kinematic (RTK) ameliorates the issue of the user position estimation. Interaction between the application and the user is based on voice commands (user-side) and voice notifications (system-side), together with the user-friendly “shaking” and “swiping” commands.

6.“Smart Bus Alert System for Easy Navigation of Blind”

Adarsh Holikatti M.Tech student, Dr. S. Mohan Kumar Professor,Dept. of Mech., MCE Hassan, Karnataka, India Objective of the project is to provide a solution with the aid of wireless sensor networks (WSNs). ZigBee system is used for indicating the presence of blind person in the bus station. Voice module and APR9600 audio playback systems are used to update and inform the blind person about the bus arriving and reaching destinations and to guide him as to what he has to do next. Microcontroller analysis the information provided and generates the corresponding bus number. ZigBee transceiver sends the bus number and announced in the microphone attached with the system.

7.Voice and GPS Based Navigation System For Visually Impaired

Harsha Gawari*1, Prof. Meeta Bakuli 1(E &TC department, GHRCEM Pune, India.) 2(Prof E&TC Department, GHRCEM Pune, India) The paper represents the architecture and implementation of a system that will help to navigate the visually impaired people. The system designed uses GPS and voice recognition along with obstacle avoidance for the purpose of guiding visually impaired. The visually impaired person issues the command and receives the direction response using audio signals. The latitude and longitude values are received continuously from the GPS receiver. The directions are given to the user with the help of audio signals. An obstacle detector is used to help the user to avoid obstacles by sending an audio message. GPS receivers use NMEA standard. With the advancement in voice recognition it becomes easier to issue commands regarding directions to the visually impaired.

8.Design and Development of Blind Navigation System using GSM and RFID Technology

S. Dhananjeyan1*, Dr. K. Mohana Sundaram2, A. Kalaiyarasi3,and Dr. P. G. Kuppusamy4
The main objective of this work is to provide a cost effective way to allow path planning for blind people. Methods: The Blind Audio guidance system hopes to allow the visually impaired users to simply press a button, speak

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the desired destination to the Blind customer care, and be guided there with the use of audio instructions. The system provides a portable unit that can be easily carried out and operated by a visually impaired user.. To implement a wrong path identification alert system for Blind and to provide blind to communicate with the customer care in a finger Tip. In this work ultrasonic and RFID are combined to navigate the blind.

9.Beacon-guided Structure from Motion for Smartphone-based Navigation

Tatsuya Ishihara Jayakorn Vongkulbhisal†‡ Kris M. Kitani† Chieko Asakawa† IBM Research †Carnegie Mellon University Instituto Superior Tecnico We approach this problem from a systems perspective, where we are required to obtain accurate localization of blind travelers using a smartphones app for localization. In particular, we assume that the environment is already instrumented with Bluetooth low energy (BLE) signals to provide rough proximity information, and we propose to integrate it with visual information to perform efficient structure-from-motion and camera localization.

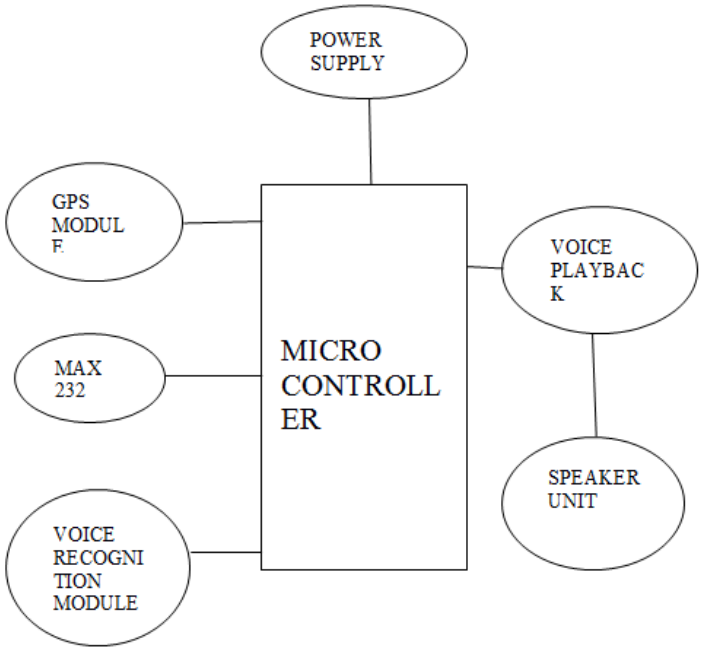
10.BlindDroid: An Information Tracking System for Real-time Guiding of Blind People

José Cecílio*, Karen Duarte, Pedro Furtado University of Coimbra, Coimbra, Portugal Among the activities affected by visual impairment, navigation plays a fundamental role, since it enables the person to independently move in safety. The heterogeneous environment, easily perceived by visually enabled people, is hardly known by partially sighted people. A challenging task for these people is independent navigation spaces/buildings/environments. The environment is usually signaled and labeled with visual marks and signs which are not appropriate for blind persons. With the purpose of balancing the access to services and spaces among all persons, this work proposes an innovative navigation and information system to help the navigation of blind people within new environments (e.g. shopping center, public office building)..

PROPOSED SYSTEM:

Most mobile operating systems offer some accessibility tools within the operating system itself for users with disabilities. These are carefully created to provide the necessary features for those who can't see the device's screen. Both Android and IOS offer these features, and they consist of a voice overlay and special gestures for users to access the different apps and features that are on the phone. The term blindness refers to the people who have no vision at all or people who have less vision. We are explaining about the GPS and voice navigation system for blind people. In this blind people issues the commands and then receive the response using audio signal. GPS receiver is used to receive the values of the latitude and longitude continuously. With the advancement in technology usage of voice recognition is easier to send commands regarding directions to the blind people. This blind navigation system is build with the major components like Microcontroller, GPS receiver, voice recognition module, voice playback unit, speaker unit, power supply unit.

DIAGRAM



MICROCONTROLLER:

This controller of ARM LPC2148 processor which combines microcontroller with high speed flash memory ranging from 32 to 512 KB. It has on-chip flash program memory and on-chip static RAM memory. It had 10 bit A to D convertors and supporters for USB 2.0 full speed transfer. Due to low cost, low power consumption and ease of handling, this microcontroller is reliable for this project.

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VOICE RECOGNITION MODULE:

This module detects the user spoken word through a microphone. Speech analysis will take place by this unit after input audio signal is taken. This system consist of two phases as training phase and other is recognition phase. Android's TalkBack feature is a service that gives a voice overlay of what is in the screen at any point, as well as a different way of browsing the device. Users can swipe around the screen and the device will tell them what item they have selected. For opening an app, they have to double tap it. This ensures that the user always knows where his finger is on the screen and so, he can open any app he wants. The system can also read emails and text messages out loud and with the use of a voice recognition app, the user can reply.

WORKING PROCEDURE

GPS is used to find the location of the bus. Mobile GPS technology has enabled today's smartphones with convenient and highly efficient means for end users to receive navigating instructions via a global positioning system process called "trilateration."

A phone's built-in GPS receiver also communicates with an array of satellites which provides navigation provides navigation instructions for those either in an automobile or on foot. More technologically advanced phones can identify individual streets and attractions on maps, as well as provide narrated tracking capability. Admin is authorized to change and modify the data which is available in cloud .admin has rights to modify everything in cloud. A Cloud Account Administrator monitors and manages services of one or more Cloud Accounts. The Cloud Account Administrator can also create new users, provide access, upgrade or terminate subscriptions. An account administrator signs in to the My Account application in Oracle Cloud using their Oracle Account and manages services belonging to a traditional Cloud Account or an identity domain. A smartphone is a cellular telephone with an integrated computer and other features not originally associated with telephones, such as an operating system, Web browsing and the ability to run software applications. Cloud is an online storage .it consists of bus information and it will store the new information transferred from GPS .Cloud storage is a cloud computing model in which data is stored on remote servers accessed from the internet, or "cloud." It is maintained, operated and managed by a cloud storage service provider on a storage servers that are built on virtualization techniques.

EXPERIMENTAL ANALYSIS
ROUTESELECTIONALGORITHM

Finding ones way to an unknown destination is challenging for visually impaired persons. In order to reach the same destination, blind pedestrians may choose one of the four different paths represented by different colors. Some of them are shorter or have less turns but may be less suitable for blind pedestrians(e.g. Gabsence of pedestrian crossing). Our aim is the selection of the most appropriate eroute, based on user needs, and relying on the proposed classification of geographical data. We propose that an optimal route may be computed by solving the minimization problem using the Dijkstra algorithm, taking into consideration the defined classes of objects in a connected graph. For each section linking two nodes, a score is calculated. Figure 3 shows a theoretical example of a selected route according to the presence of different types of proposed points. Details on the algorithm are presented in the subsequent sections.

P =j X i [(X ∗Up),(Y ∗Sp)]
Up =j X i [(2∗POI),LM]
Sp =j X i (VP*0.5)
Proposed Voice Activity Detection Algorithm
1- Set Frame _ Size 10ms = and compute number of frames (Num_)(no frame overlap is required) Of _ Frames
2- Set one primary threshold for each feature {These thresholds are the only parameters that are set externally}
• Primary Threshold for Energy (Energy_PrimThresh)
• Primary Threshold for F (F _ Pr imThresh)
• Primary Threshold for SFM (SF _ Pr imThresh)
3- for i from 1 to Num_Of _ Frames
3-1- Compute frame energy)) (E(i .
3-2- Apply FFT on each speech frame.
3-2-1- Find k
F(i) arg max(S(k)) = as the most domi-
nant frequency component.
3-2-2- Compute the abstract value of Spectral Flatness Measure (SFM (i)) .
3-3- Supposing that some of the first 30 frames are silence,
find the minimum value for E (Min _ E) , F (Min _ F) and SFM (Min _ SF) .
3-4- Set Decision threshold for E , F and SFM .
• Thresh _ E Energy _ Pr imThresh *log(Min_ E) =
• Thresh _ F F _ Pr imThresh =
• Thresh _ SF SF _ Pr imThresh =

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3-5- Set Counter = 0 .
• If((E(i) Min _ E) Thresh _ E) − >= then Counter + + .
• If((F(i) Min _ F) Thresh _ F) − >= then Counter + + .
• If((SFM(i) Min _ SF) Thresh _ SF) − >= thenCounter + + .
3-6- If Counter > 1 mark the current frame as speech else mark it as silence.
3-7- If current frame is marked as silence, update the energy minimum value:
_ 1
(_ * _) ( ) _ +
+ = Silence Count
Silence Count Min E E i Min E
3-8- Thresh _ E Energy _ Pr imThresh *log(Min _ E) =
4- Ignore silence run less than 10 successive frames.
5- Ignore speech run less than 5 successive frames.

Improved DTW algorithm for location estimation

The map-following method consists of a magnetic map, data collection and localization algorithm; the first two are closely related and inputs to the location algorithm analogous to a leader-follower approach. The leader prepares a 1D magnetic map along a route of interest to help the follower determine the location in real time by matching measured data with the prerecorded magnetic map. Since both the magnetic map and real-time sampled-data (that vary in time or speed under certain restrictions) are time-series with M and N elements respectively, the algorithm estimates the spatial location by evaluating similarities between the two temporal sequences to find an optimal alignment between them using a DTW method. The largest similarity implies that the magnetic samples most likely correspond to the location on the magnetic map. DTW is time-independent making it suitable for this application since travelers walk with different speeds and on varying paths.

RESULT ANALYSIS

CONCLUSION

In the previous system, the blind person used to carry a bus stop unit but according to the system proposed, the bus stop unit is made stationary at the bus stop. The combination of a voice synthesizer and the speaker system will help the blind at the bus stop, to find his/her bus that passes through a required/desired route. The aim of the proposed system is to provide a helping hand tothe visually impaired for convenient navigation is fulfilled. With the help of GPS tracker connected with audio output the destination chosen by the blind is intimated when the bus reaches the correct location. PDA's can be used for GPS tracking but it is not cost effective.

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