

# EBANS‘VIP’ - ENHANCED BUS ALERT NAVIGATION SYSTEM FOR VISUALLY IMPAIRED PEOPLE

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**Abstract**—By and large, venture in transport is a safe and solace factor, yet because of increment in number of transports and travelers its going be harder and it will be more troublesome for visually impaired individuals to go in transport. In this task, we proposed a novel framework which can assist daze individuals with finding the transport at the transport stop. The fundamental issue is route progressively movement and checking the accessible transports alongside their courses. In this venture the visually impaired individual will get the data from the transport storehouse database. The coveted yield will be reported headphone and the transport is followed by GPS. The visually impaired individuals in the transport station are given a PDA which is associated by the cloud. The cloud will store the data about the transport number and timings. Daze individuals directions goes to cloud stage at that point cloud will process the comparing reaction at that point get the coveted outcome. With the goal that visually impaired individuals can plainly think about transport area and timings of transport entry to their particular spots. For building up this undertaking, we utilized Voice Activity Detector calculation, Route Selection calculation, and DTW calculation for area estimation.

**Index Terms**— Navigation-Visually impaired persons-cloud storage-bus routes-GPS.

## I. INTRODUCTION

The world is hampered with dangers and thinks about which society acknowledges the work of vision to keep up an arranged separation from or appreciate. Anyway the issues of course for the outwardly disabled are still greatly awesome and wearying especially when they walked around in street moreover investigate to inaccessible spots by open transport system. The outwardly tested people confront checks in autonomous portability with route. Versatility implies the chance of generously moving, without arrangement of any extra individual, at home and uninformed situations. Individuals with outwardly tested have gigantic constraints regarding versatility. The proposed work is for the most part created to screen daze individuals while route. There are many existing systems are utilized for visually impaired people, yet there are numerous disadvantages. When they are in transport station, they can't get the right transport without others help. These visually impaired people groups can give inquiry about the accessible transport in that course.

In critical urban networks, transports play a basic employment for the transportation. For a bigger piece of outwardly impeded what's more, ostensibly prevented individuals, open transport is the principle sensible adaptability decision to search for guidance, work and informal community. Those people live in a limited circumstance and experience difficulty to distinguish what happen around them, which lessens their activities in a couple of fields, for instance, guidance and transportation since they depend in a manner of speaking in solitude impulse. In like manner, as the massages, the amount of VIPs has extended. At present, estimation shown that 285 million people are ostensibly debilitated far and wide: 39 million are outwardly weakened and 246 have low vision. As of India, around 8 million people in India are outwardly impeded. India is by and by home to the world's greatest number of outwardly disabled people with 20% of the whole world. Henceforth, we need to make their lives more pleasant by exhibiting a structure that causes them acknowledge transportation organizations self-governing and wholeheartedly like typical people, without relying upon others.

The fundamental targets of this proposed work is utilized with distributed computing condition and GPS in the transport and cell phone comprise GPS. Administrator will get the information from distributed storage .The visually impaired takes the correct transport stopped before him/her and when the goal is achieved it is declared by methods for GPS. Sound yield is produced by the voice synthesizer. In the event that on the off chance that immediate transport isn't accessible for specific place, the general guidelines must be given to control daze individuals. And furthermore it must guide the general population to discover specific inn, shopping center and other open spots. It must guide the visually impaired individuals while strolling in the road by entering goal by giving turn by turn course.

Client can swipe around the screen and the gadget will reveal to them what thing they have chosen. For opening an application we need to twofold tap it which guarantees that the client finger is on the screen thus, he can open any application he needs. Voice brief is a component that can likewise peruse messages and instant messages so anyone can hear and with the utilization of a voice acknowledgment application, the client can answer.

## II. LITERATURE SURVEY

Ali et al., (2017) presents an Assistive Technology (AT) to help visually impaired people avoiding obstacle using proposed Kinect depth camera and windowing-based mean method. The proposed system has the ability to change the walking dog, which is an expensive choice by evaluation and also it is clear that its lighter, cheaper and also no need of electricity. Aura et al. (2014) introduced the PERCEPT-II which is low cost and user friendly indoor navigation system for blind people and visually impaired users. In an android smartphone that runs PERCEPT-II application with convenience features, the blind user attains navigation commands to the chosen destination when moving specific landmarks labelled with near field Communication tags.

Mounir et al. (2006) examines a pedestrian navigation system for the blind people, which is based on a microcontroller with synthetic speech output. This assistance is a movable, self-contained system that will permit blind people to travel without the help of controllers. It is intended for a battery-powered portable model and also focused on low power consumption with small size, lightweight, and easy for manipulation.

Zehui et al. (2017) introduced AB Aid, a novel system designed for blind or visually diminished people to navigate, with profitable off-the-shelf (COTS) mobile devices. Blind mobility aid is a key part in the daily life of blind people. Even though sufficient of systems or devices are designed to make the navigation of blind people easier, those are normally exclusive and hardly reasonable for them.

Anna et al. (2014) introduced a cloud-based outdoor assistive navigation system (COANS) for BVI people. The proposed work is to provide easy street navigation and support to make outdoor walk in non-familiar situation with less stressful. In user-side the hardware includes an android-based mobile phone and also in external the low-cost L1 GPS receiver is used to improve position accuracy. The proposed technique which is known as Real Time Kinematic (RTK) upgrades the issues of the user position approximation. Interaction is done 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.

Adarsh et al. (2016) provided a solution with the aid of wireless sensor networks (WSNs). The proposed Zig Bee system is used for indicating the presence of blind person in the bus station. In this proposed work voice module and APR9600 audio playback systems are used for updating bus arriving and reaching destinations. This will inform and to guide him as to what he has to do next. The informations provided are analyzed by microcontroller and it will generate the matching bus numbers. Then the bus number will send to blind person using Zig Bee transceiver and announced in the microphone attached with the system.

Harsha et al. (2014) represented the architecture and implementation of a system that will help to navigate the visually impaired people. GPS and voice recognition along with obstacle avoidance is designed by the system for the purpose of guiding visually impaired. These people’s concerns the command and receives the direction response using audio signals. Through GPS receiver the latitude and longitude values are received continuously. For user the directions are given which helps for audio signals. To avoid obstacles for sending an audio message the obstacle detector is used. The GPS receivers use NMEA standard. Advanced voice recognition also become easier to issue these commands regarding directions to the visually impaired persons.

Dhananjeyan et al. (2016) proposed path planning for blind people which is cost effective. In this method the Blind Audio guidance system is used to allow the visually impaired persons to press a button for finding the desired destination. The system also provides a portable unit which is useful for visually impaired user. The proposed work is implemented find wrong path and provide blind person to communicate with the customer care. In this proposed work ultrasonic and RFID are integrated to navigate the blind.

Tatsuya et al. (2017) proposed to integrate it with visual information to perform efficient structure from motion and camera localization. In particular, they assumed that the environment is already instrumented with Bluetooth low energy (BLE) signals to provide rough proximity information.

Jose et al. (2015) among the actions affected by visual impairment, navigation plays a vital role, since it allows the person move safe independently. The heterogeneous environment, easily perceived by visually enabled people, is hardly known by partially sighted peoples. The most challenging task for these people is independent navigation in environments. The environment is regularly signaled and labeled with visual marks then it signs which are not proper for blind persons. Through this purpose of balancing the access to services, this work proposes an innovative navigation and information system which is used to help the navigation of blind people within new environments.

### III. PROPOSED SYSTEM

In late patterns, numerous electronic gadgets have just been created and actualized in a few territories to help the visually impaired individuals like Sonic Guide, Mowat Sensor, Laser Cane and Navbelt. Be that as it may, every one of them are to help them while person on foot crossing and there hasn't been produced any fruitful gadget to help them boarding a transport. This paper means to fill that pit. All android versatile working frameworks offer some openness devices inside the working framework itself for handicap clients. The apparatuses which are default in portable gives the vital highlights to the individuals who can't see the gadget's screen. Android and IOS mobiles telephones offers these highlights. It comprise of a voice overlay and extraordinary motions for outwardly disabled people to get to alternate applications in cell phones.

The proposed work coordinates GPS and voice route framework in which client's issues the directions and the signs are gotten utilizing sound flag. The proposed GPS recipient is utilized to get the scope and longitude esteems persistently. With the headway in innovation utilization of voice acknowledgment is simpler to send directions in regards to bearings to the visually impaired individuals. This visually impaired route framework is worked with the real parts like Microcontroller, GPS collector, voice acknowledgment module, voice playback unit, speaker unit, control supply unit. This voice recognition module identifies the client talked word through a mouthpiece. Discourse examination will happen by this unit after information sound flag is taken. This framework comprise of two stages as preparing stage and other is acknowledgment stage. Android's Talk Back highlight is an administration that gives a voice overlay of what is in the screen anytime, and also an alternate method for perusing the gadget. Clients can swipe around the screen and the gadget will disclose to them what thing they have chosen. For opening an application, they need to twofold tap it. This guarantees the client dependably knows where his finger is on the screen thus, he can open any application he needs. The framework can likewise peruse messages and instant messages so anyone can hear and with the utilization of a voice acknowledgment application, the client can answer.

GPS is utilized to discover the area of the transport. Versatile GPS innovation has empowered the present cell phones with advantageous and exceedingly effective means for end clients to get exploring guidelines through a worldwide situating framework process called "trilateration."

A telephone's worked in GPS collector additionally speaks with a variety of satellites which gives route gives route directions to those either in a car or by walking. All the more innovatively propelled telephones can recognize singular lanes and attractions on maps, and additionally give described following capacity. Administrator is approved to change and alter the information which is accessible in cloud .administrator has rights to adjust everything in cloud. A Cloud Account Administrator screens and oversees administrations of at least one Cloud Accounts. The Cloud Account Administrator can likewise make new clients, give access, redesign or end memberships. A record manager signs in to the My Account application in Oracle Cloud utilizing their Oracle Account and oversees administrations having a place with a customary Cloud Account or a personality area. A cell phone is a cell phone with a coordinated PC and different highlights not initially connected with phones, for example, a working framework, Web perusing and the capacity to run programming applications. Cloud is an online stockpiling .it comprises of transport data and it will store the new data exchanged from GPS .Cloud stockpiling is a distributed computing model in which information is put away on remote servers got to from the web, or "cloud." It is kept up, worked and overseen by a distributed storage specialist organization on a capacity servers that are based on virtualization systems.

### IV. EXPERIMENTAL ANALYSIS

Discovering ones path to an obscure goal is trying for outwardly debilitated people. With the end goal to achieve a similar goal, dazzle people on foot may pick one of the four distinct ways spoken to by various hues. Some of them are shorter or have less turns however might be less appropriate for visually impaired pedestrians (e.g. Gabsence of person on foot crossing). Our point is the choice of the most suitable route, in light of client needs, and depending on the proposed classification of topographical information. We recommend that an ideal course might be figured by taking care of the minimization issue utilizing the Dijkstra calculation, mulling over the defined classes of articles in an associated diagram.

For each segment connecting two hubs, a score is computed. Figure 3 demonstrates a hypothetical case of a chosen course as indicated by the nearness of various kinds of proposed focuses. Points of interest on the calculation are introduced in the consequent areas.

$$P = \sum_j X_i [(X * Up), (Y * Sp)] \quad Up = \sum_j X_i [(2 * POI), LM] \quad Sp = \sum_j X_i (VP * 0.5)$$

#### A. 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\_PrimThresh)
  - Primary Threshold for SFM (SF\_PrimThresh)
- 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 dominant 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\_ PrimThresh \*log(Min\_ E) =
      - Thresh\_ F F\_PrimThresh =
      - Thresh\_ SF SF\_PrimThresh =
    - 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) - >= then Counter ++ .
- 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:  $Min\_E = \min(Min\_E, E(i))$ 
  - + = Silence Count
  - Silence Count Min E E i Min E
  - 3-8- Thresh\_ E Energy\_ PrimThresh \*log (Min\_ E) =
- 4- Ignore silence run less than 10 successive frames.
- 5- Ignore speech run less than 5 successive frames.

#### B. Improved DTW algorithm for location estimation

The guide following strategy comprises of an attractive guide, information gathering and limitation calculation; the initial two are firmly related and contributions to the area calculation practically equivalent to a pioneer devotee approach. The pioneer readies a 1D attractive guide along a course important to enable the adherent to decide the area progressively by coordinating estimated information with the prerecorded attractive guide. Since both the attractive guide and ongoing tested information (that fluctuate in time or speed under specific limitations) are time-arrangement with M and N components individually, the calculation assesses the spatial area by assessing likenesses between the two transient successions to locate an ideal arrangement between them utilizing a DTW technique. The biggest comparability infers that the attractive examples probably relate to the area on the attractive guide. DTW is time-autonomous making it appropriate for this application since voyagers stroll with various velocities and on changing ways.

## V. RESULT ANALYSIS



## VI. CONCLUSION

In the past framework, the visually impaired individual used to convey a transport stop unit however as indicated by the framework proposed, the transport stop unit is made stationary at the transport stop. The mix of a voice synthesizer and the speaker framework will help the visually impaired at the transport stop, to discover his/her transport that goes through a required/wanted course. The point of the proposed framework is to give some assistance to the outwardly debilitated for helpful route is satisfied. With the assistance of GPS tracker associated with sound yield the goal picked by the visually impaired is insinuated when the transport achieves the right area. PDA's can be utilized for GPS following yet it isn't savvy. This model to help the Visionless individuals while boarding the transport has wide applications other than simply helping the visually impaired individuals illuminate their essence to the transport driver. In further phases of improvement this task can be utilized to upgrade the wellbeing and solace of a bigger segment of society. Following are a portion of the foreseen future extensions:

1. This framework can be introduced over the navigates what's more, not simply open transports, everywhere throughout the city so that individuals can without much of a stretch speak with them.
2. This framework, whenever produced monetarily, is exceptionally monetary and in this way can be made accessible at the stores with the goal that ladies, kids, senior nationals or any segment of society can utilize it.
3. With few changes in the equipment and programming, this model can be transformed into a security gadget. Ladies may have this constantly with them while they are out of their homes. Each policeman will likewise be given more than one gadget. So at whatever point any lady feels any sort of threat, regardless of whether she is having system in her cell phone or then again not, she can immediately switch on her gadget, so that any policemen here will know and she can be rescued. Looking towards the present situation of the country, this gadget can be turned out to be extremely valuable, to the extent ladies security is concerned.

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