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SMART CANE WITH PLUG AND PLAY WIRELESS GADGET TO ASSIST BLIND

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ABSTRACT:

Traditionally visually challenged individuals employ the cane to aid their mobility outdoors, which provide very limited utility. In order to improve the safety of visually challenge users and enhance their awareness of their surrounding while navigating in outdoor environment. A smart device is needed. In this paper, a smart walking cane for the visually challenged has been presented with distance measurement. The proposed device fulfils the three main purposes to detect obstacles, helps the blind in travelling to reach his destination take the routes reach the bus stops independently as he gets notification of the buses and bus stops through the Wi-Fi routers installed via all the bus stops and this smart cane also helps in identifying the valid and invalid products through the RFID reader. For obstacle detects on ultrasonic sensors are used, the presence of obstacle, notification about the buses bus stops, products is notified. To the user by the means of noise recordings played via earphones or through haptic feedback; the use of routers helps the blind person to get his present location and reach his destination through the simple press of button. There three main purposes are handled through a gadget box consists of switcher. Switches helps to choose the destination and for scanning of products. The gadget box is powered by a rechargeable battery. The basic objective of system lies in convenient and easy navigation aid for unsighted.

Keywords : Gadget box,RFID Reader,Ultrasonic Sensor,WiFi Router

1. INTRODUCTION:

Vision is one of the most important senses of as most of the information human gets from the environment in via sight. According to the World Health Organisations of 2010, over 285 million people in the world are visually challenged of whom 39 million are blind and 246 million have moderate to severe visual impairment[1]. India accounts for 21.5% of the total number of visually impaired with 53 million citizen suffers from some form of visionless.

Globally uncorrected refractive errors are the main cause of moderate and severe visual impairment; cataract is the leading cause of blindness in middle and clone income countries. The basic problem which every blind person falls is with regard to commutation and navigation in daily life.

The most commonly used tool is still the blind stick. With increasing of road accidents and pedestrian causalities, it is necessary to help increase the spatial awareness of the visually challenged. One of the simple ways to do this is to replace the conventionally used canes with smart walking canes.

We will try to modify this cane with electronic components and sensors. The ever growing and technology and with recent developments can help in artificial and accurate navigate our model uses ultrasonic sensor for hurdle detection and Wi-Fi routers are installed in every bus stops; where the buses bus stops names are informed or notified through the earphone.

Here the gadget box helps in setting up the destination for the users and it also helps in getting details about the products. We wish at preventing an inexpensive and light weight and accurate model which helps in effortless navigation for the blind.

Through the user of proposed device, the effort and risk taken by visually challenged people during navigation can be greatly minimised.

2 LITERATURE SURVEY

2.1 Blind aid stick has been a popular project with constant enhancement and modification.

2.2 Currently the commercial available of blind stick are that popular due to high cost and lack of accuracy.

2.3 Previous projects onto the same ideal – Akshay Salil Arora and Vishaka Gaikwad [2] proposed for blind aid stick for hurdle detection. Simulated perception, uses GPS for location detection. As they use GPS which requires internet connection it does not mean that GPS always given the accurate direction and current location detection. This Google maps based sound navigation cannot be used in place like closed buildings for navigation [3]. Another study done by David J Calder. It is an obstacle signalling system for the blind. The only signals are passed via sound alerts or vibrating buttons. Here the study for unsighted uses pulse echo technique for provides a warning sound when detecting the obstacles. This technique is used by the United States military for locating the submarines. These pulses are of ultrasound range from 21k to 50 Hz. When hit the laid surface they tend to generate echo. But the power requirement is high. [4] another study done by Sharada Minali, Shivakan a smart walking cane for visually challenged used to detect different types of obstacles as well as terrain changes in the user path. Here the ultrasonic sensors are mounted at appropriate location to detect obstacles steps and pits in the path of the user. It further employs GPS and GSM modules for the activation of the user location.

2.4 Keeping in mind the ease of use and simple design with low cost we have proposed our model. We have incorporated a gadget box for ease of user. All the information about buses are updated at all times. The Wi-Fi routers overcome the GPS technology to give accurate direction. All the details about

the products can be found by the use of RFID reader. The recorded voice through the earphone is played as and when obstacles are found

3 DESIGN COMPONENTS:

The key drawn for selection of this component is

3.1 ARM CORTEX M3: Arm Cortex M3 is low cost also it STM32103 operates at 3.3v and is suitable for battery operated environment, also with comparison with PIC controller. It has better resource. As 8051 lacks in memory and also peripherals. The ARM is 32 bit, flash is of 128kb RAM is 20kb. It equates at frequency 72MHz and power supply is 2 to 3.6v. it is also pin IC. 37 pin are for general purpose input and output register. Two ports for I2C, 2 for SP1 and 3 for UART. Port 2 is connected to relay contacts via two transistors. When obstacle is detected current flows through current limiting resistors of base of two transistors which magnetic the relay coils. Software uses is STMIDE, hyperterminal Xampp with embedded C language.

3.2 OBSTACLE DETECTION UNIT: the sensor used is HC8R04- it consists of ultrasonic range detector. Ultrasonic sensors use 40khz signals to detect obstacle between 2-450cm. its accuracy is of 3mm operates at 15ma current triggering input= 10kb TTL pulse. The sensor works with the simple high school formula that Distance = speed * time .The ultrasonic transmitter transmits an ultrasonic wave, this wave travels in air and when it sets objected by any material it gets reflected back toward the sensor. This reflected wave is observed by the ultrasonic receiver module.

3.3 ESP 8266-12E Wi-Fi module: Microcontroller to communicate to a wireless network it requires wireless hardware interface so we are using ESP-12E along with microcontroller. It is low cost Wi-Fi device available. The operating voltage is 3.6v frequency range is 2- 3GHz. it has flash memory of 4mb and RAM 96kb.This Wi-Fi module is installed at is all the bus stops and in the main bus stop. The blind person as reaches the bus stop connects to this Wi-Fi through the gadget box. All the buses reached or yet to reach the bus stop through this Wi-Fi module notify the user through the earphone.

3.4 YX5300: this is connected to the microcontroller bidirectional. As this converts the voltage signals provided by the controller to the audio signals and sent to the earphone.

3.5 RFID reader: RFID methods utilise radio wave to accomplish this RFID tags contain an integrated circuit and an antenna which are use to transmit data to the RFID reader. The RFID used is RC5222.

3.6 H BRIDGE: The H bridge is CM7805 operates at 1.5A. it is an electronic circuit that enable a voltage to be applied across a load in opposite direction. The C293D consist 16 pins which are used to control a set of two DC motors. The H bridge is used in bus in our model as a prototype.

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4.BLOCK DIAGRAM

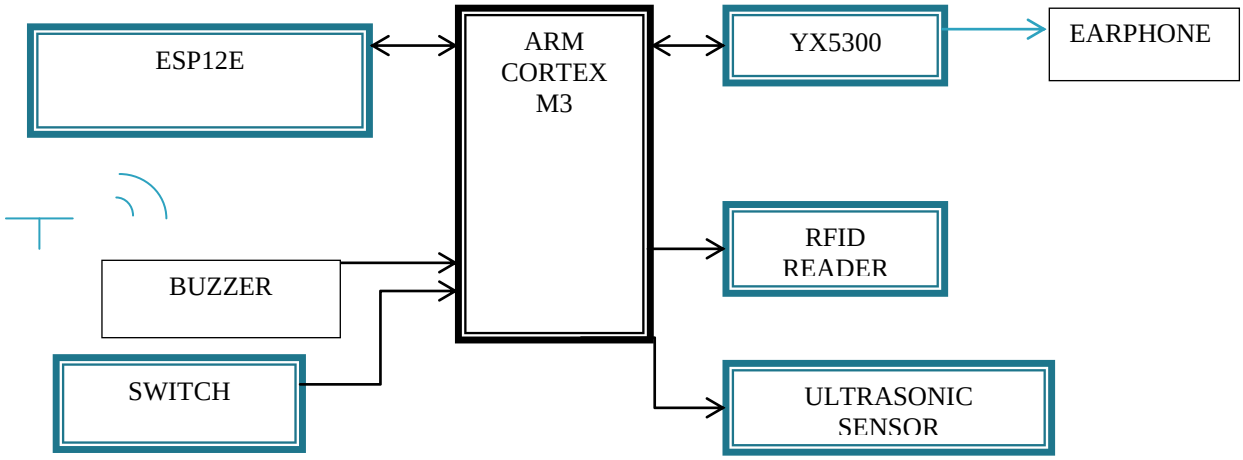
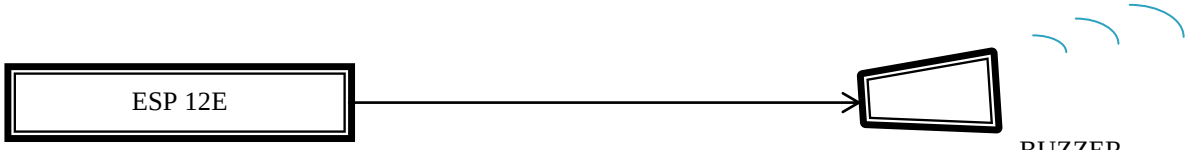
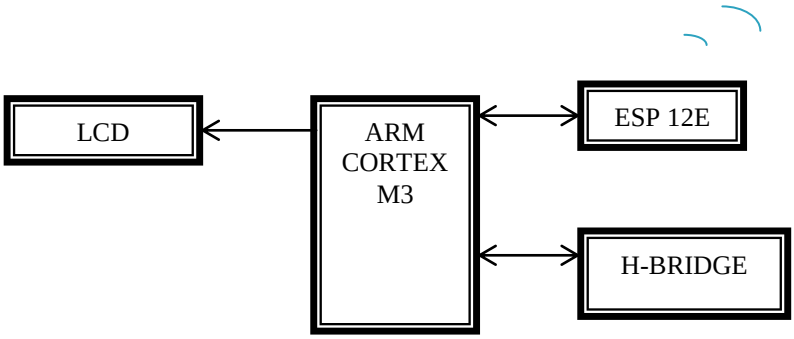


FIG (4.1) GADGET BOX



FIG(4.2)BUS STOP



FIG(4.3) BUS

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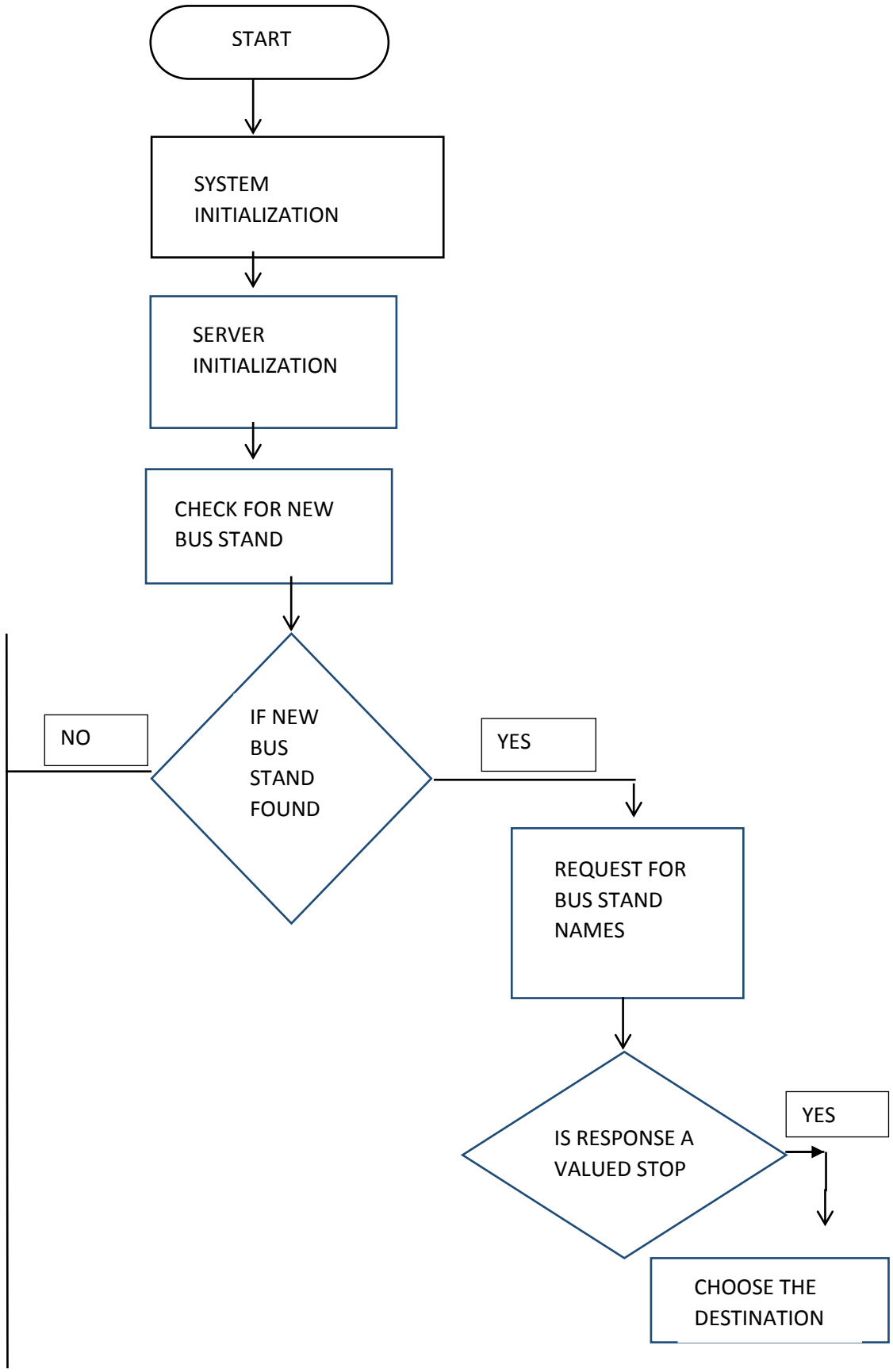
5.FLOWCHART



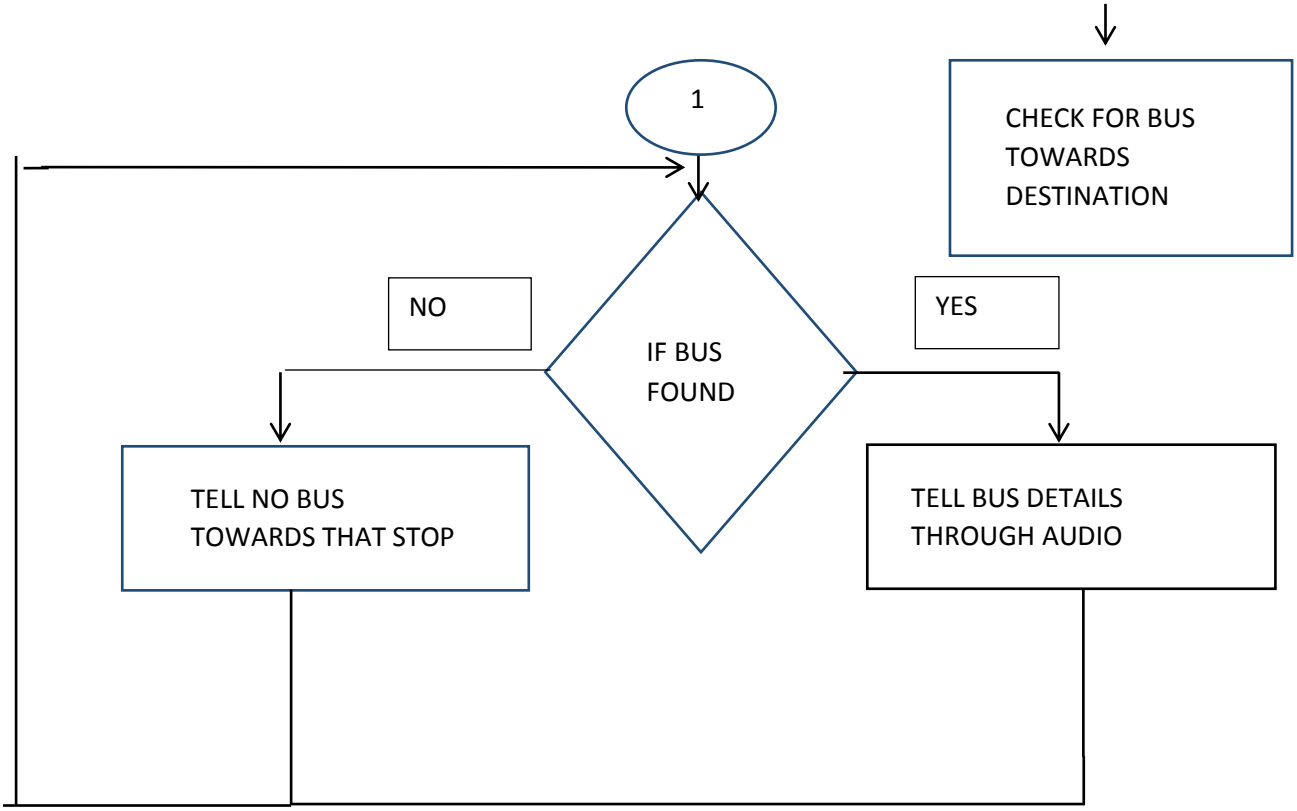


FIG (5.1) FLOW CHART OF BUS

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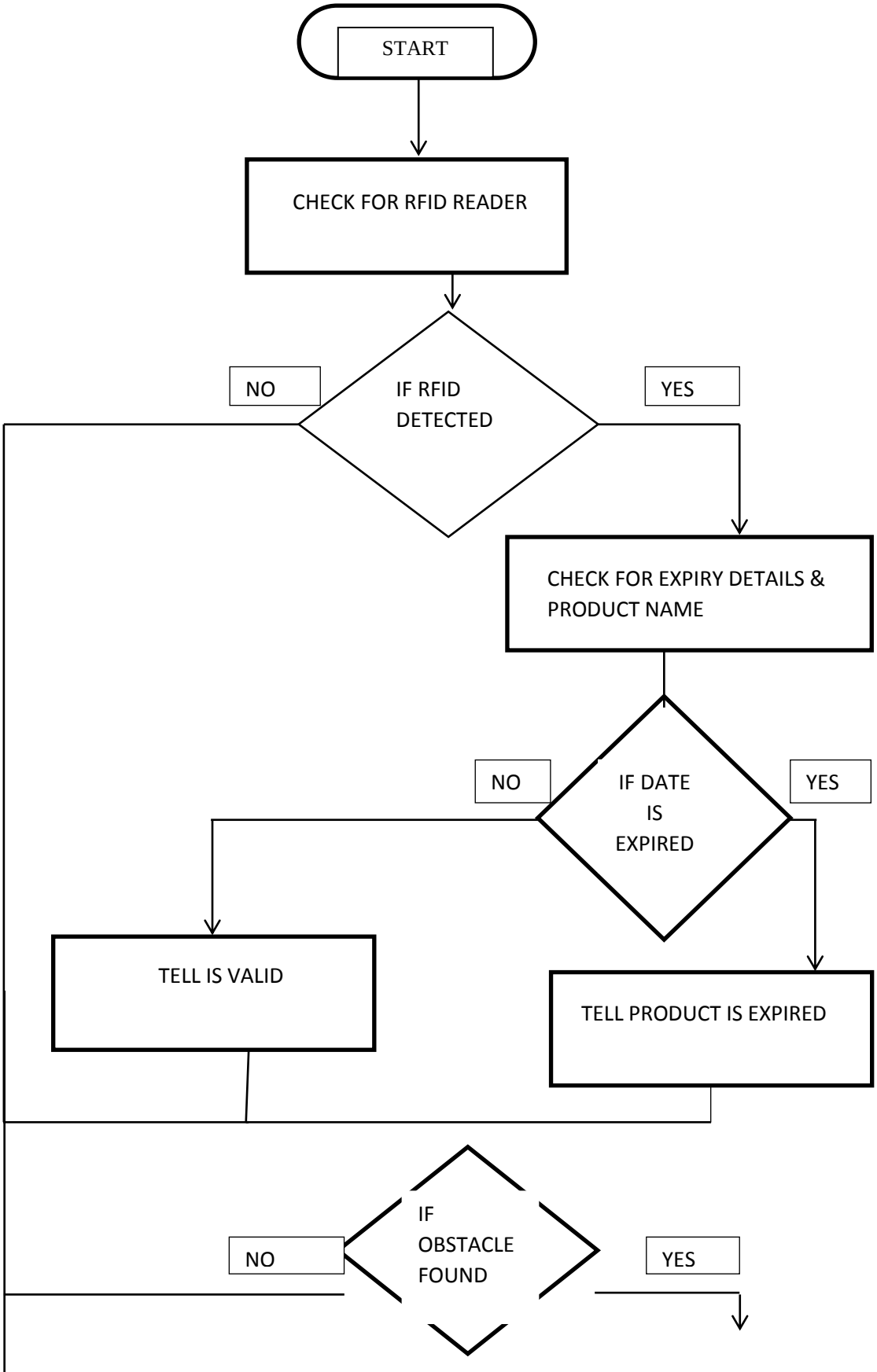
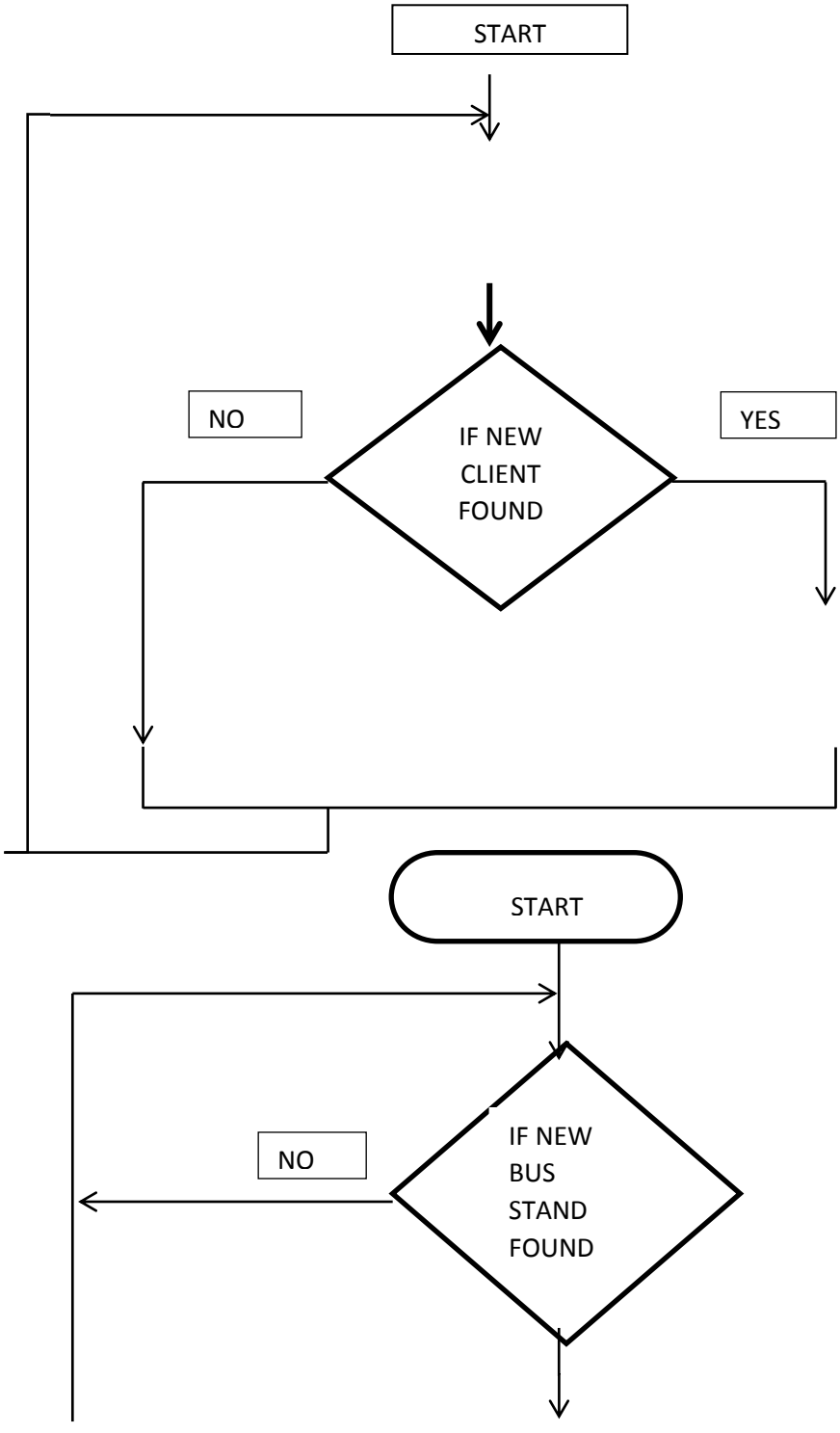
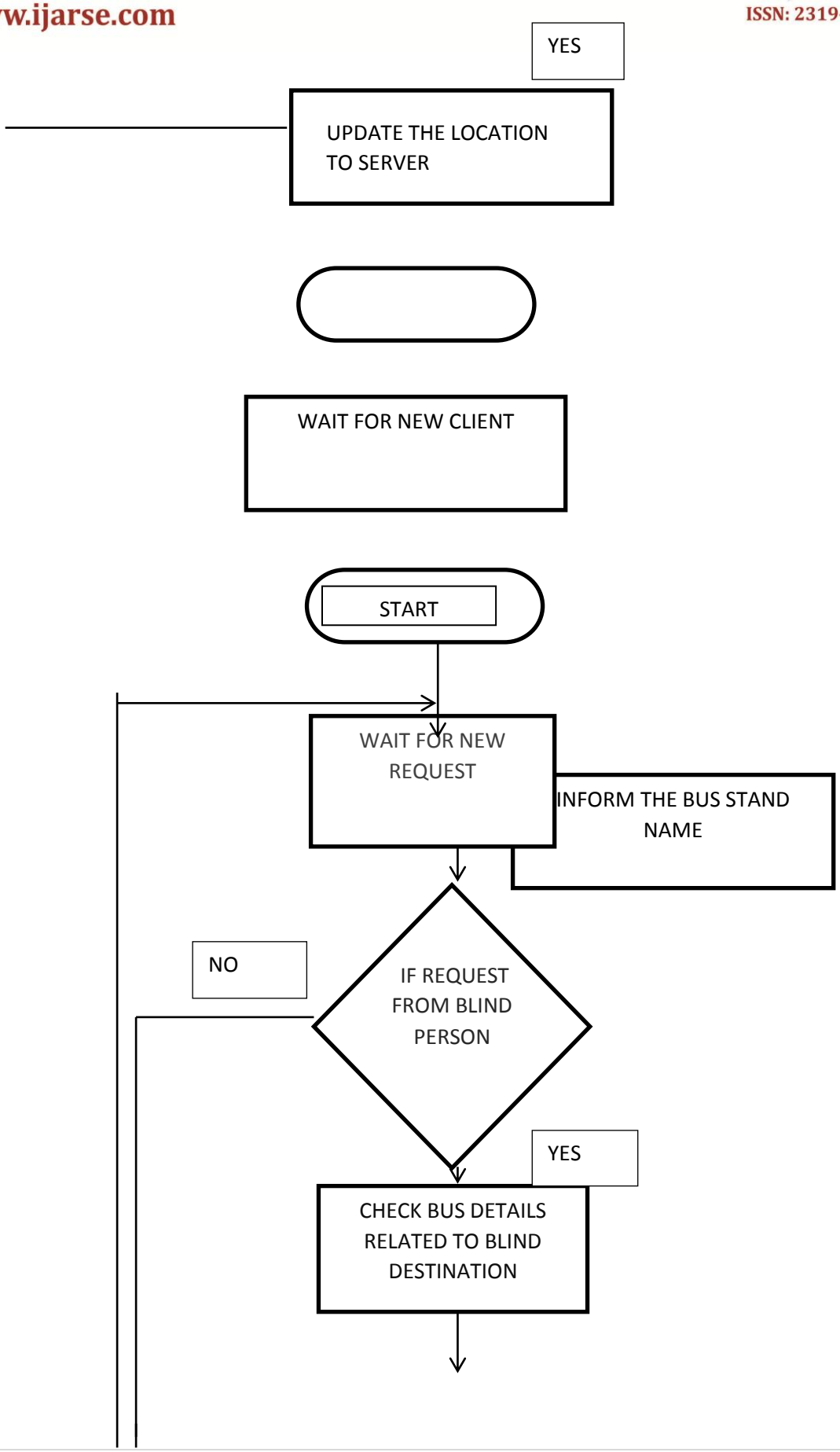
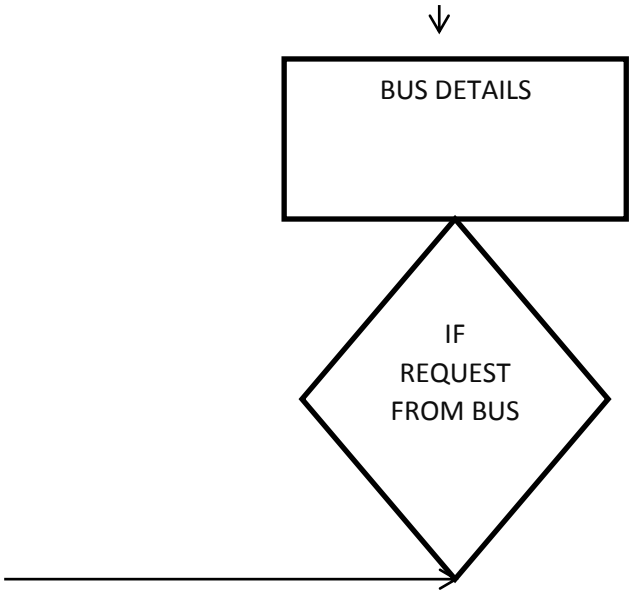


RETURN TO LOOP

ALERT THE PERSON




YES
UPDATE THE LOCATION TO SERVER
WAIT FOR NEW CLIENT
START
WAIT FOR NEW REQUEST
INFORM THE BUS STAND NAME
NO
IF REQUEST FROM BLIND PERSON
YES
CHECK BUS DETAILS RELATED TO BLIND DESTINATION



6 **OUTCOME:**

Obstacle detection via ultrasonic blind person will be notified through earphones about the buses which are about to approach the bus stops. ESP 12E helps to identify the bus stand names during journey.

RFID reader helps to scan and get details of products during purchase process.

Working smart cane with gadget box for obstacle detection and product scanning

Bus stop track with Wi-Fi routers installed at all the bus stops where the blind users get the details about the buses nearing him and the location of the bus stop to the user.

7 CONCLUSION AND FUTURE SCOPE:

This paper presents the system design and concept of smart and easy to the cane for visionless. The key features are the simple design. Efficient yet easy to use and modify system design. Hence it can provide a low cost device for millions of blind people in the entire world.

The proposed system combines various existing easily technologies and real time system. Sensors that help in monitoring the position of user and also help in effortless navigation.

The project can further be modified to increase ranges for obstacles like height, steps and pits in the path of the user.

It is capable of delivering specific field of view information is a way that enable were increased freedom and confidence when walking. It has been designed to offer an easy leaning transition for users.

The advancement in mobile technology will pushes help is developing better application for continuous environment of surroundings. Further uses of technology of WIFI along with IOT features like whether traffic prediction, details of product such as manufacturing and expiring date can help the blind to further evaluate better.

8 REFERENCE:

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[2] Akshay Salil Arora, Vishaka Gaikwad "*Blind aid stick: Hurdle recognition, Simulated perception, android integrated voice based cooperation via GPS along with panic alert system"* published 2017 international conference on nascent technology-2017 in engineering field ICMTE-2017.

[3] Calder, DavidJ, Curtin "*An obstacle signalling system for the blind, digital eco system and Technologies*", Conference (DE 51)2011 proceeding of the 5th IEEE International conference on 30 June 2011.

[4] Sharada Murali, Shivatsan R, Sreenivas V," *Smart walking cane for the visually challenged" IEEE* international conference 2016.