Automated Notify for Vehicle Using Arduino and Android Application

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Abstract—With the development of modern technology and Android Smartphone, Smart Driving is gradually changing peoples life. Bluetooth technology, which aims to exchange data wirelessly in a short distance using short-wavelength radio transmissions, is providing a necessary technology to create convenience, intelligence and controllability. However, this paper looks into the development of an ANDROID application which is interfaced with vehicle hardware and subsequently to display call name, location, message on the hardware using bluetooth module.

In todays hectic world where people are always having short-age of time and when many important works are done through phone calls, urgent messages are exchanged through phone and at the same time all are facing so many traffic problems. At that time it is not possible to receive calls and check messages everywhere and anytime. So for this reason, we require some technology to make life easy.Disadvantages of current system are that while using phone people can face serious problems of life and that also violates the traffic rules.

Our system, Automated Notifier for Vehicle overcomes all these problems. Smart vehicle will display your calls, messages and maps on your dashboard according to your convenience. As it is risky to operate phone or any other device while driving, we will just display your calls and messages.

This system is extremely useful while driving the vehicles. It ensures specific accuracy in locating location on the LCD display during cases of emergency.

All messages which is programmed and controlled by an Arduino Mega and an Arduino Uno microcontroller.

Also, the main control system implements wireless Bluetooth technology to provide remote access from computer and smart phone.

Using our Android application, our vehicle will have a display on dashboard and then user will get aware for their calls and messages while driving using Bluetooth. Then in your application you can choose those things which you want to display and only those things will be displayed. We are here using android as it is most used today and it is user friendly even

It is shown that Android Smartphone can provide a platform to implement Bluetooth-based application for Smart Driving.

Index Terms—ANFV, LCD,KC

I. Introduction

The controller we are going to use is Arduino Uno. The Arduino Uno is a microcontroller board based on the ATmega328. It has a 14 digital input/output pins, 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. The software we

are going to use is Proteus and Android. Proteus is a software technology that allows creating clinical executable decision support guidelines with little effort. The Proteus guidelines are created with modular entities called Knowledge Components (KCs). The KCs may be easily modified. Simple drag and drop operations constitute significant part of editing.

Bluetooth technology has been one of important technolo-gies to home automation or Smart Living. It is a wireless technology developed to replace cables on devices like mobile phones and PCs. Although "cable-replacement" could create a point-to-point communication, Bluetooth allows wireless devices to be able to communicate with each other within range. The network of a set of Bluetooth devices is called "piconet", which is an ideal technology to network a smart modern home.

In many wireless networks, the data link layer performs error recovery according to some automatic repeat request (ARQ) protocol. Fig.1 shows basic idea of wireless network.
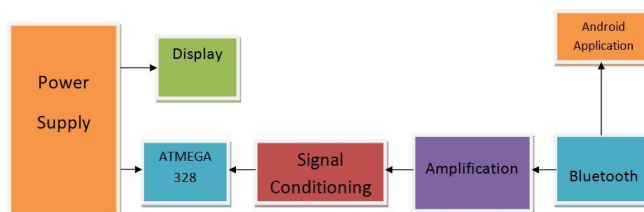

Fig. 1. Block diagram of Automated Notifier for Vehicle

Supply unit is the block from where whole system will get supply. Supply can be provided in two ways, either direct from the vehicles battery or by connecting external battery. The supply will be directly given to control unit i.e. to our microcontroller and display unit. Microcontroller is meant to deal with digital information. They only understand 0 and 1 values. So what if we need to get some non-digital data in to microcontroller. The only way is to digitize or simply speaking to convert analog in to digital. This is why almost all microcontrollers are featured with ADC module. Atmega328 microcontroller also have 8 (or 6 PDIP package) ADC input channels. All these can be used any analog value that is within reference voltage range.

Here amplification process is used to amplify the signal. It detects the unwanted signals. It easily transfers the long signals. Conditional signal checks the unwanted signals. It makes smooth signals without error. It checks the received signal equals to transmitted signal.

Bluetooth is a wireless technology for exchanging data over short distance from fixed or mobile devices. It was originally conceived as a wireless alternative to RS-232 data cables. Bluetooth operates in the range of 2400-2483.5MHz. It uses a radio technology called frequency hopping spread spectrum.

II. FLOW CHART OF PROJECT

In the flow chart of project, we discussed the basic flow of program in terms of logic. First we start with the application of the project. Open the application android application from the mobile and the On the Bluetooth of the mobile to connect the Bluetooth of hardware. Bluetooth provides security of the system. After pairing of bluetooth of hardware and mobile, we can run no of future of the application likes call, message and network and maps. Using this feature, we can see all this things on our hardware means vehicle without pick the phone.
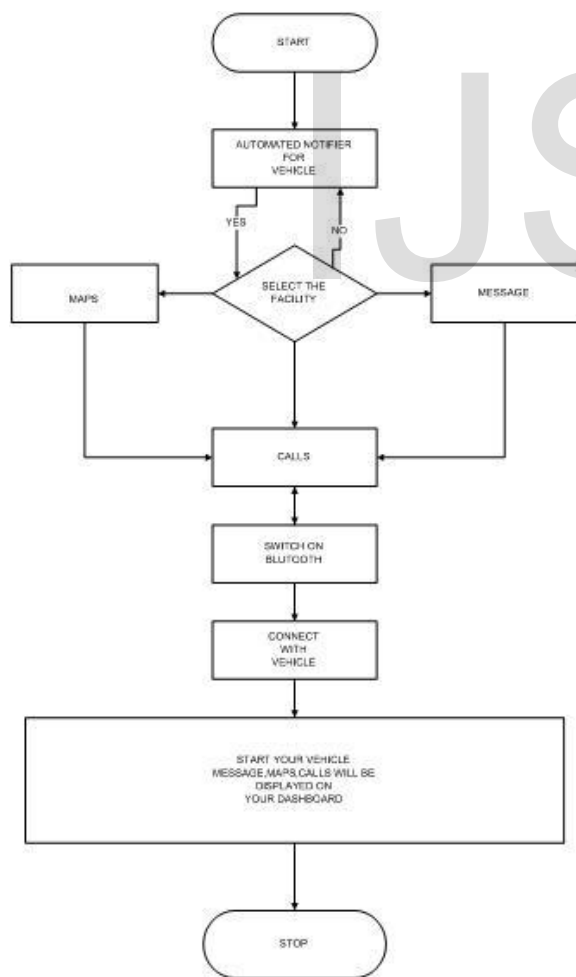

Fig. 2. Flow Chart of Project

This flow-charts shows how ANFV works. As shown in figure it checks whether ANFV android application is installed or not? Our Hardware is placed on the vehicle so we could display the message on the display of the mopped.

1) If (yes) in application four options will be available
   a) Calls
   b) Location
   c) Message
   d) Battery Level
2) Then select any one option or two or more options as per your choice
3) If (no) than install the ANFV android application first
4) After selecting options turn on your mobile Bluetooth and paired it with our hardware provided hardware here we use (HC-05)
5) Now whatever notifications comes on your phone will be displayed on LCD
6) Than whenever you want off the application than just disconnect the Bluetooth.

III. COMPONENT

Here, we discussed list of important component in detail. The major part of this paper is divided in to two part android and embedded system. First we discuss embedded component likes Bluetooth module and microcontroller and LCD.

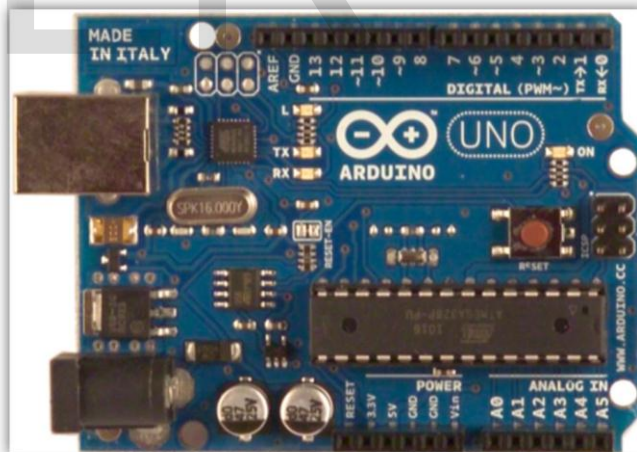### A. Microcontroller - ATMEGA-328

Fig. 3. Arduino uno Module

The microcontroller is the most important component of the Processing System. There are many microcontroller available that can be used for this subsystem. For this project Arduino Uno was chosen. Arduino Uno is microcontroller board based on ATMEGA328 [5]. It provides 14 digital I/O pins and 6 analog I/O pins which are sufficient for this project. The Arduino Uno operates at 16 MHz. Arduino Uno is shown in fig 3.

B. Bluetooth- HC05

Bluetooth was selected as our way of communicating mobile with a central system. Bluetooth module receives the data serially in RS232 format from controller and sends it to wireless network. For interfacing it with microcontroller we need to build the circuit because Bluetooth module understands data in RS232 standard and controller understands data in TTL format. So we need to design circuit to make these two compatible with each other. Bluetooth module we are using is LM400 from LM technology. LM400 is designed to provide Bluetooth 2.0+EDR function on small form factor. Bluetooth function is based on CSR blue core 4-EXT Bluetooth system, which implements the full speed class 1 bluetooth operations with full seven slave piconet support [4].
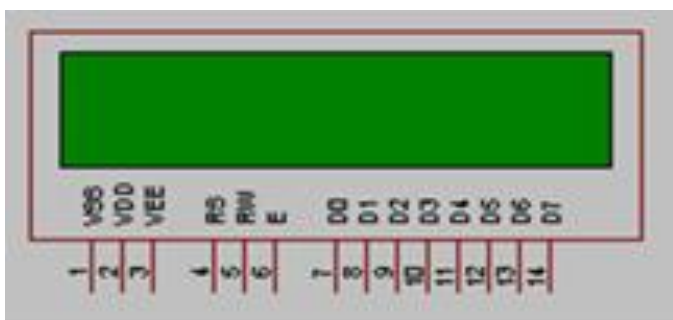

Fig. 4. Bluetooth Module - HC05

C. LCD

Fig. 5. LCD

In recent years the LCD is finding widespread use replacing LEDs (seven segment LEDs or other multi segment LEDs). This is due to the following reasons: The declining prices of LCs. The ability to display numbers, characters, and graphics.

This is in contrast to LEDs, which are limited to numbers and few characters. Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LCD must be refreshed by the CPU (or in the some other way) to keep displaying the data. Ease of programming for characters and graphics.

Table I shows Pin description of LCD Command

TABLE I
PIN DESCRIPTION OF LCD COMMAND

Pin	Symbol	I/O	Description
1	Vss	-	Ground
2	NC	-	+5v Power Supply
3	Vee	-	Power supply to control contrast
4	RS	I	to select command or data register
5	R/W	I	R/W=0 for write,R/W=1 for read
6	E	I/O	Enable
7	DB0	I/O	The 8-bit data bus
8	DB1	I/O	The 8-bit data bus
9	DB2	I/O	The 8-bit data bus
10	DB3	I/O	The 8-bit data bus
11	DB4	I/O	The 8-bit data bus
12	DB5	I/O	The 8-bit data bus
13	DB6	I/O	The 8-bit data bus
14	DB7	I/O	The 8-bit data bus
15	LED+	-	0V

IV. SIMULATION SOFTWARE

In this we used following software for the implementation of android intellijidea 13.1 software, for coding Arduino software and simulation proteus software.

A. Intellijidea Software

Android Studio is the official IDE for Android application development, based on IntelliJ IDEA. On top of the capabilities you expect from IntelliJ, Android Studio offers following fetures.

Fig. 6. Intellijidea Software Image

1) Flexible Gradle-based build system
2) Build variants and multiple apk file generation

3) Code templates to help you build common app features
4) Rich layout editor with support for drag and drop theme editing
5) Lint tools to catch performance, usability, version com-patibility, and other problems
6) ProGuard and app-signing capabilities

B. Arduino Software

The Arduino integrated development environment (IDE) is a cross-platform application written in Java, and derives from the IDE for the Processing programming language and the Wiring projects. It is designed to introduce programming to artists and other newcomers unfamiliar with software devel-opment. It includes a code editor with features such as syntax highlighting, brace matching, and automatic indentation, and is also capable of compiling and uploading programs to the board with a single click. A program or code written for Arduino is called a sketch.

Arduino programs are written in C or C++. The Arduino IDE comes with a software library called "Wiring" from the original Wiring project, which makes many common input/output operations much easier.

Fig. 7. Arduino Software Image

C. Proteus Software

Fig. 8. Proteus Software Image

Proteus software is used for the graphical representation of circuite as well as simulation for the interfacing of arduino with andriod application.

V. RESULT ANALYSIS OF ANDRIOD APPLICATION

In this section, first we discussed android application fea-tures and second we discussed the hardware of our project with their operations. This android application has a list of option and based on this option we took simulation and hardware screenshot.

A. SYNC CALL

Fig. 9. SYNC CALL

As shown in this figure 9 sync cal option is selected. After selecting this feature whatever notification Regarding incoming call name will be displayed on LCD

B. SYNC MESSAGE

Fig. 10. SYNC MESSAGE

As shown in figure 10 sync message option is selected. After selecting sync message feature whatever notification Regarding to message will be displayed on LCD
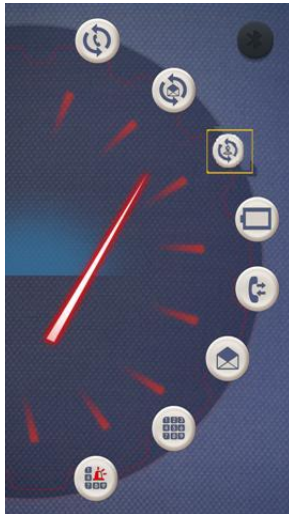
C. SYNC LOCATION

Fig. 11. SYNC LOCATION

As shown in figure 11 sync location option is selected. After selecting this sync location feature whatever network location with street, area and state will be displayed on LCD.

D. BATTERY LEVEL

Fig. 12. BATTERY LEVEL

As shown in figure 12 select the battery level and the battery level of phone will be displayed on LCD.

E. CALL LOG

As shown in figure 13 call log option is selected and call log of phone will appear.

F. MESSAGE LOG

As shown in figure 14 message log option is selected so that all the information of message will be appear through application.

Fig. 13. CALL LOG

Fig. 14. MESSAGE LOG

G. DIALER

As shown in figure 15 dialer option is selected and using this option all the information of dialer of phone directly display on the application.

H. EMERGENCY DILER

As shown in figure 16 emergency dialer option is selected. any one selected emergency number can be dial by using that option in emergency case.

I. SETTINGS

As shown in figure 17 SETTINGS option is selected. In this option we can select list of Call blocking, choose emergency number, notes.

J. BLOCK NUMBER

As shown in figure 18 Bolck Number option is selected. In this option Whichever number we want to block just add that number into the blocking list and click on Block button and that number would be block for our application.
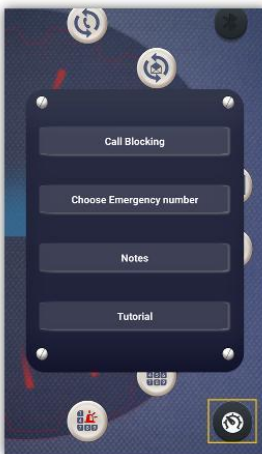
Fig. 15. DIALER

Fig. 16. EMERGENCY DILER

Fig. 17. SETTINGS

K. CHOOSE EMERGENCY NUMBER

As shown in figure 19 emergency number option is selected. In this option whichever one number we want to select as

Fig. 18. BLOCK NUMBER

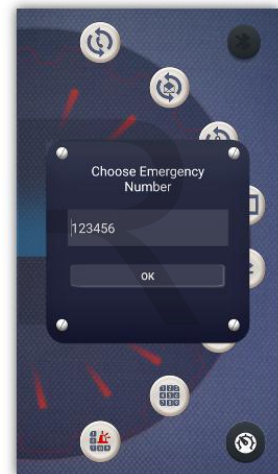emergency number we type it and click on Ok button than that number would be select as a emergency number.

Fig. 19. CHOOSE EMERGENCY NUMBER

L. NOTE

As shown in figure 20 note option is selected. In this option Title and Message two type of insert box is ther. using this we can give heading and write our note and save that note that message will be store at cloud and whenever we want that Message we can get it

VI. RESULT ANALYSIS OF PROJECT HARDWARE USING ITS OPERATION

A. LED blinking using Android application

In this application interfacing of Arduino and Bluetooth is done with Led and ON and OFF commands are given through android application.
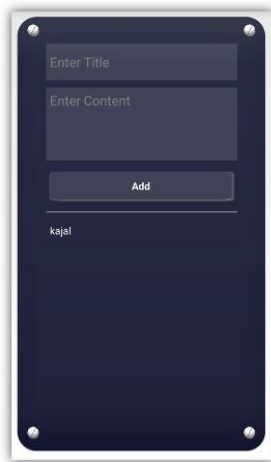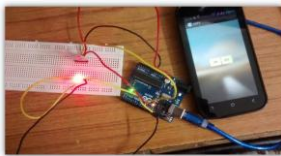
Fig. 20. NOTE

Fig. 21. LED blinking using Android application

B. Interfacing of motor using Android application

In this application interfacing of Arduino and Bluetooth is done with DC motor and ON and OFF commands are given through android application.

Fig. 22. Interfacing of motor using Android application

C. Android application searching Bluetooth device

As shown in figure 23 first searching the bluetooth device in to ANFV andriod application and then connect bluetooth module with ANFV application.

Fig. 23. Android application searching Bluetooth device

D. Pairing Android application with HC05 Bluetooth

As shown in figure 24 HC-05 bluetooth device is connected to mobile by paring through ANFV andriod application.

Fig. 24. Pairing Android application with HC05 Bluetooth

E. Android application get started after pairing Bluetooth

As shown in figure 25 after connecting Bluetooth device with ANFV application its look like this.

Fig. 25. Android application get started after pairing Bluetooth

F. Battery Level of phone displayed on LCD

As shown in figure 26 ANFV application selecting the battery level option which is shown battery level on the LCD.
As select the option of battery level of phone will be displayed on lcd.

Fig. 26. Battery Level of phone displayed on LCD

G. Notification of call displayed on LCD

As shown in figure 27 after selecting the SYNC CALL in application whatever notification regarding incoming call will be displayed on lcd. here we see the name of the calling person.

Fig. 27. Notification of call displayed on LCD

H. Current location of phone displayed on LCD

As shown in figure 28 after selecting locations option of application whatever location of Phone with area and city will be displayed on lcd.

Fig. 28. Current location of phone displayed on LCD

I. HARDWARE RESULTS
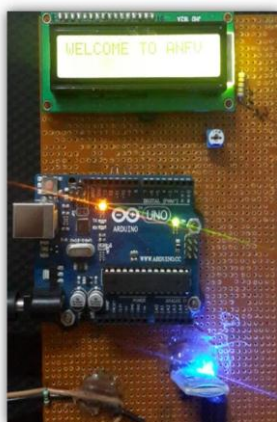
As shown in figure 29 how our hardware look like.

Fig. 29. HARDWARE RESULTS

CONCLUSION

Our system, Automated notifier for vehicle overcomes all these problems. Smart vehicle will display your calls, messages and maps on your dashboard according to your convenience. As it is risky to operate phone or any other device while driving, we will just display your calls and messages.

Using our Android application, our vehicle will have a display on dashboard and then user will get aware for their calls and messages while driving using Bluetooth. Then in your application you can choose those things which you want to display and only those things will be displayed. We are here using android as it is most used today and it is user friendly even.

Our application not oppose the traffic rules. According to traffic rules we provide only one directional communication .data through android phone we can send on LCD which mount on two wheeler dashboard. While driving a vehicle you can get the notifications like calls, message, location, mobile battery level which comes on your phone that all displayed on your vehicle dashboard.

ANFV also provide a features like notes, callblocking, emergency call dialer this all are the additional feature which makes your life easy.

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