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Seamless Mobility

Priya S[1], Gugan R S[2], Haarish Kishore S[3] , Hemarija S[4]

Assistant Professor, ECE, Muthayammal Engineering College, Rasipuram, Tamil Nadu, India[1]

UG Student, ECE, MuthayammalEngineering College, Rasipuram, Tamil Nadu, India[2]

UG Student, ECE, Muthayammal Engineering College, Rasipuram, Tamil Nadu, India[3]

UG Student, ECE, Muthayammal Engineering College, Rasipuram, Tamil Nadu, India[4]

Abstract: Vehicular Ad Hoc Networks (VANETs) are self-organizing, self-healing networks which provide wireless communication among vehicular and roadside devices. Applications in such networks can take advantage of the use of simultaneous congestions, thereby maximizing the throughput and lowering latency. In order to take advantage of all radio interfaces of the vehicle and to provide good quality of service for vehicular applications, we developed a seamless flow mobility management architecture based on vehicular network application classes with network-based mobility management. Now-a-days accidents are mostly caused by delay of the driver to hit the brake or by the negligence by the driver.

Keywords: VANET, simultaneous congestion, mobility management, brake.

I. INTRODUCTION

Vehicular Ad Hoc Network (VANET) is a rising subclass of Mobile Ad Hoc Networks which provides wireless communication among vehicles as well as between vehicles and roadside devices. In VANETS, each vehicle can have multiple radio interfaces, thus being able to simultaneously connect to different domains and radio access network technologies . Although these vehicles can connect to these different network technologies simultaneously, nowadays vehicles are limited to choosing a default interface for sending and receiving information. This limitation is related to the current model of multiple interface management, where several interfaces are attached to the operating system. Usually, operating systems use configuration files from the user, or consider the types of applications to select a default network interface to send and receive data.

This proposed system aims to develop a prototype system that offers collision functionality in production vehicle, a system which can operate automatically with the help of high-profile sensors based on relay circuit and some changes in traditional braking system and apply the brake automatically in emergency situation.

The resulting system can achieve measurements with high accuracy and improved short distance measurement also. This distance measurement is used to control smart braking system for safety applications. The brain of the system part can be developed on Arduino Nano microcontroller. The Ultrasonic sensors are the eyes of this system, which are cheaper and the system comprises of a less demanding hardware. A wireless sensor network (WSN) is a computer network consisting of spatially distributed autonomous devices using sensors.

II. PROPOSED SYSTEM

The project aims to distinguish between systems currently in production like traction control (TC), electronic brake force distribution (EBD), Anti-lock Braking System (ABS) and electronic stability control (ESC) functions and future systems that are currently in development. Braking system is such a vital component that is necessarily required when a vehicle is considered. It reduces the kinetic energy of the vehicle in conditions when a vehicle has to slow down or also it has to be stopped. Thus making sure the vehicle and the passengers inside it are safe. Thus a braking system is always used to ensure the safety of the drivers and passengers uncountable valued lives. He circuit connections of the control unit of the smart braking system. This unit consists of an Arduino microcontroller which is operated with an external power supply. The ultrasonic sensor is connected to the microcontroller which is powered by the microcontroller itself. The microcontroller is further connected to the solenoid which operates. The resulting system can achieve measurements with high accuracy and improved short distance measurement also. This distance measurement is used to control smart braking system for safety applications. Progress is being made on the adoption of electrical brake systems with the aim of improving safety, environmental performance, and ride comfort. To meet the demands of electric power trains and autonomous driving, two areas where rapid expansion is expected, brake systems will need higher levels of reliability, responsiveness, and control performance than ever before. Meanwhile, it is anticipated that brake-by-wire (BBW) systems that operate under the control of both the vehicle and the driver will be needed to provide customers looking for greater driving enjoyment with better brake feel, and such systems are currently under development.

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BLOCK DIAGRAM

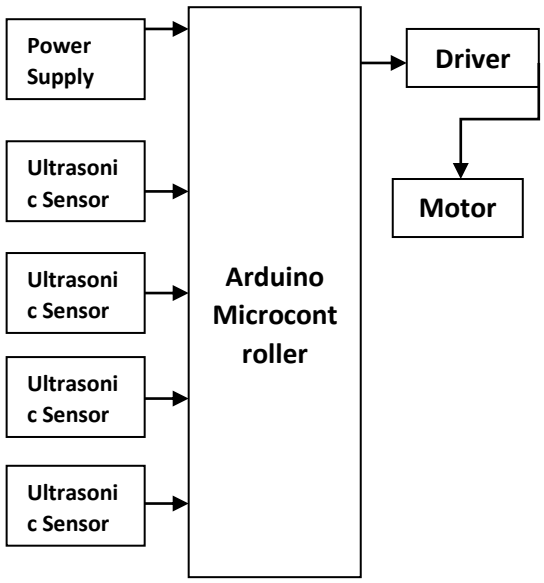

Figure 2: Block Diagram

III. MATERIALS AND METHODS

Keil C51 C Compilers

The **Keil C51** C Compiler for the **8051** microcontroller is the most popular **8051** C compiler in the world. The **C51** Compiler translates C source files into relocatable object modules which contain full symbolic information for debugging with the µVision Debugger or an in-circuit emulator.

Direct C51 to generate a listing file,

• Define manifest constants on the command line
• Control the amount of information included in the object file
• Specify the level of optimization to use
• Specify the memory models

Specify the memory space for variables The Keil C51 C Compiler for the 8051 microcontroller is the most popular 8051 C compiler in the world. It provides more features than any other 8051 C compiler available today.

The C51 Compiler allows you to write 8051 microcontroller applications in C that, once compiled, have the efficiency and speed of assembly language. Language extensions in the C51 Compiler give you full access to all resources of the 8051.

Embedded C

An embedded system is an application that contains at least one programmable computer (typically in the form of a microcontroller, a microprocessor or digital signal processor chip) and which is used by individuals who are, in the main, unaware that the system is computer-based.

PROTEUS

Proteus PCB design electronic circuits can computer-aided design and circuit boards are designed. The environment for the design and simulation of electronic circuits is ISIS Intelligent Schematic Input System (Intelligent Switching input system). The component library includes claims more than 10,000 circuit components with 6000 Prospice Simulations models. Own components can be created and added to the library.

ISIS includes a base VSM engine with support for the following functions:

• DC / AC voltmeter and ammeter, oscilloscopes, logic analyzers
• Analog signal generators, digital pattern generator
• Timer functions, protocol analyzers (including RS232, I2C, SPI)

The graphical SPICE circuit simulation and animation directly in the ISIS environment is provided by VSM (Virtual System Modeling). The SPICE simulator is based on the Berkeley SPICE3F5 model. One of the main components of Proteus 7.0 is the Circuit Simulation -- a product that uses a SPICE3f5 analogue simulator kernel combined with an event-driven digital simulator that allow users to utilize any SPICE model by any manufacturer. Proteus VSM comes with extensive debugging features, including breakpoints, single stepping and variable display for a neat design prior to hardware prototyping. In summary, Proteus 7.0 is the program to use when you want to simulate the interaction between software running on a microcontroller and any analog or digital electronic device connected to it.

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Arduino UNO A3 Microcontroller

The Arduino Uno R3 is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. Revision 2 of the Uno board (A000046) has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode. Revision 3 of the board (A000066) has the following new features:

• 1.0 pin out: added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board. In future, shields will be compatible with both the board that uses the AVR, which operates with 5V and with the Arduino Due that operates with 3.3V. The second one is a not connected pin, that is reserved for future purposes.

• Stronger RESET circuit.

• Atmega 16U2 replace the 8U2.

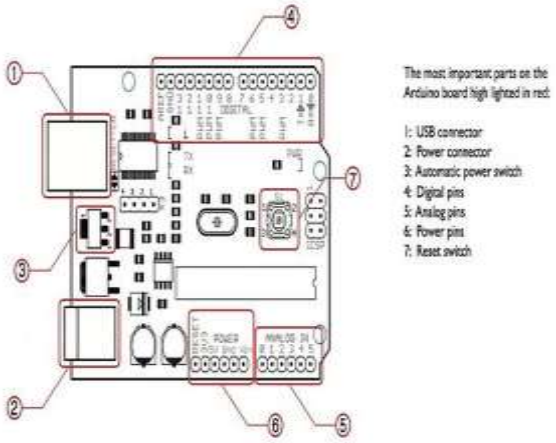

Figure 3: Arduino UNO A3 Microcontroller

A simple electromagnetic relay consists of a coil of wire wrapped around a soft iron core, an iron yoke which provides a low reluctance path for magnetic flux, a movable iron armature, and one or more sets of contacts (there are two in the relay pictured). The armature is hinged to the yoke and mechanically linked to one or more sets of moving contacts. It is held in place by a spring so that when the relay is de-energized there is an air gap in the magnetic circuit. In this condition, one of the two sets of contacts in the relay pictured is closed, and the other set is open. Other relays may have more or fewer sets of contacts depending on their function. The relay in the picture also has a wire connecting the armature to the yoke. This ensures continuity of the 21 circuit between the moving contacts on the armature, and the circuit track on the printed circuit board (PCB) via the yoke, which is soldered to the PCB. When an electric current is passed through the coil it generates a magnetic field that activates the armature, and the consequent movement of the movable contact(s) either makes or breaks (Depending upon construction) a connection with a fixed contact. If the set of contacts was closed when the relay was de-energized, then the movement opens the contacts and breaks the connection, and vice versa if the contacts were open. When the coil is energized with direct current, a diode is often placed across the coil to dissipate the energy from the collapsing magnetic field at deactivation, which would otherwise generate a voltage spike dangerous to semiconductor circuit components. Some automotive relays include a diode inside the relay case. Alternatively, a contact protection network consisting of a capacitor and resistor in series (snubber circuit) may absorb the surge. If the coil is designed to be energized with alternating current (AC), a small copper "shading ring" can be crimped to the end of the solenoid, creating a small out-of-phase current which increases the minimum pull on the armature during the AC cycle.

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Ultrasonic sensor:

Ultrasonic sensors (also known as transceivers when they both send and receive) work on a principle similar to radar or sonar which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor. Sensors calculate the time interval between sending the signal and receiving the echo to determine the distance to an object. This technology can be used for measuring: wind speed and direction (anemometer), fullness of a tank and speed through air or water. For measuring speed or direction, a device uses multiple detectors and calculates the speed from the relative distances to particulates in the air or water. To measure the amount of liquid in a tank, the sensor measures the distance to the surface of the fluid. Further applications include: humidifiers, sonar, medical ultrasonography, burglar alarms and non-destructive testing.

Systems typically use a transducer which generates sound waves in the ultrasonic range, above 18,000 hertz, by turning electrical energy into sound, then upon receiving the echo turn the sound waves into electrical energy which can be measured and displayed. The technology is limited by the shapes of surfaces and the density or consistency of the material. For example, foam on the surface of a fluid in a tank could distort a reading.

Figure 4: Ultrasonic Sensor

An ultrasonic transducer is a device that converts energy into ultrasound, or sound waves above the normal range of human hearing. While technically a dog whistle is an ultrasonic transducer that converts mechanical energy in the form of air pressure into ultrasonic sound waves, the term is more apt to be used to refer to piezoelectric transducers that convert electrical energy into sound. Piezoelectric crystals have the property of changing size when a voltage is applied, thus applying an alternating current (AC) across them causes them to oscillate at very high frequencies, thus producing very high frequency sound waves.

Ultrasonic sensor provides a very low-cost and easy method of distance measurement. This sensor is perfect for any number of applications that require you to perform measurements between moving or stationary objects. Naturally, robotics applications are very popular but you'll also find this product to be useful in security systems or as an infrared replacement if so desired. You will definitely appreciate the activity status LED and the economic use of just one I/O pin.

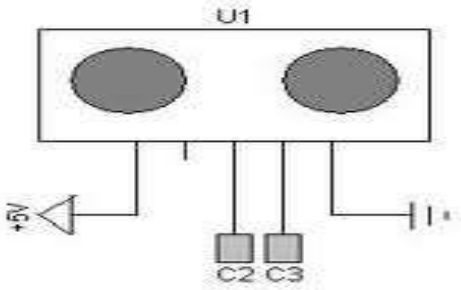

Figure 5: Ultrasonic transducer

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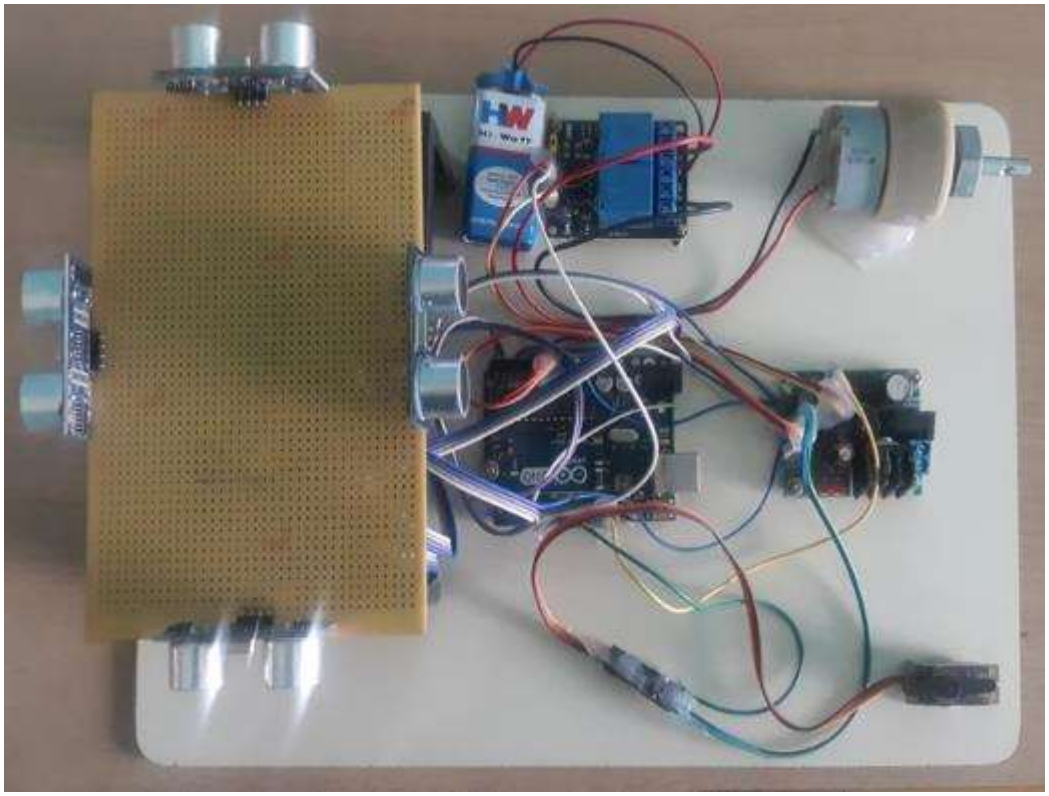
IV. RESULT AND DISCUSSION



V. CONCLUSION

Communication has offered many new opportunities for the automotive industry. This paper proposes a technology to improve traffic congestion and road safety. Also we have analyzed situations like collision, delay and redundancy etc. which can be improved or overcome with simple warning message transmission. The contemplated system is designed into small car models as a prototype to control the distance between a vehicle and the preceding vehicle and also distance between the front obstacles and initiates automatic braking. Future scope Vehicle-to-vehicle or V2V communication is the wireless transmission of data between motor vehicles and the primary motive of this communication is to prevent accidents. This will enable the vehicles to know what oncoming vehicles are doing or vehicle those are around corners and out of sight. Cautioning of vehicle implosion can be transmitted all through the remote correspondence territory with the goal that the mischance can be avoided. This way, the ratio at which accidents occur on a daily basis will be reduced radically

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