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SMART TRAFFIC CONTROL SYSTEM USING WIRELESS COMMUNICATION

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ABSTRACT:
In this project smart traffic control system using wireless communication is implemented. By using Arduino microcontroller entire system is controlled. When an emergency vehicle approaches the crossing, the RFID Reader reads the information and this information is passed to the poles of nearest junction. When the sensing device nearest to the traffic light finally receives the signal from its preceding pole, the traffic light changes to green. In the same way when green light is on then buzzer also give indication. This facilitates the smooth and quick passage of the emergency vehicle.

KEY WORDS: Arduino, RFID reader, Buzzer, LCD Display.

I.INTRODUCTION

Smart Card may be recognized as a plastic card that consists of a microprocessor that has the capability to perform calculations. The chip embedded on the card is usually an integrated circuit (IC). The information in a smart card is preserved electronically and it can control the access and modifications to that information. The IC is responsible to store the information in a way that it makes easy and secure for the authorized user to access this information by using a “reader” (data acquiring and processing equipment) [1]. The smart cards can be majorly categorized in two types: a memory card and a microcomputer integrated circuit.
The Reader, i.e. the memory card can only store the information or certain values. Examples can be a simple toll card or a phone card. The latter, i.e. microcomputer integrated circuit not only stores the information, but also allows different ways to access that information.
The IC consists of a Central Processing Unit (CPU) which is able to store the information and keep it secure Smart card have two different type of interfaces: contact and contact less. Contact smart cards are inserted into a smart card reader, making physical contact with the reader. However, contact less smart cards has an antenna embedded inside the card that enables communication with the reader without physical contact [2].
The standard for contact less smart card communications is ISO/IEC 14443 and allows for communications up to 10 cm (3.9 in). Smart cards commonly use the ISO/IEC 7810 ID-1 format their standard size is 85.6 X 53.98 mm (3 3/ 8 in 2 1/ 8 in) and rounded corners with a radius of 2.88–3.48 mm. Smart cards provide ways to securely identify and authenticate the holder and third

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parties who want to gain access to the card [3-4]. A PIN code or bio metric data can be used for authentication.
Smart card technology is capable of storing the information present in possibly all the cards that we majorly use these days, like credit cards, toll cards, driver license, birth certificate records, phone cards and many more. If all of this information is securely stored in one card, it will prove to be highly beneficial to both, the users and the issuing agencies [5].
Mobile agents are flexible software programs supporting platform independence and good compatibility among computer workstations, client and servers and between controllers and peripheral devices. They are autonomous and re-configurable during run time so that they have the ease of being used as a support with any application program. Mobile agents are greatly used in database applications, digital signatures and on-demand network applications. Throughput of the mobile agent based applications is greatly affected as per the level of complex task handled by the agent. The challenge lies in carefully selecting the scripting language which can be smoothly implemented to communicate between platforms. In the proposed application, mobile agent has been used to implement the congestion control algorithm in an automated traffic control system in smart city context.

II. LITERATURE REVIEW

Today, people spend the majority of their time outside of their home environments, they travel daily to work, and they go frequently to the shopping centers and attractions, without forgetting the displacements to the center of the city. This certainly caused an imbalance in the daily mobility that led to the development of parking services to avoid unnecessary driving around the city center to simply search for a parking space. This, on the one hand, causes additional carbon dioxide emissions and damages the environment of the city's ecosystem.
On the other hand, it increases the driver's frustration and traffic congestion in the city, which will certainly cause traffic accidents. Recently, the cities are growing at an exponential rate due to the changing global economy and modern life. Information and communication technologies play a crucial role in sustainability plans and urban development of cities. New technologies and various smart devices connected to the network (the Internet of things or IoT) provide modern and solid solutions with the aim of creating smart cities and optimizing the efficiency of urban operations and services connected to citizens Smart cities are used in all areas of life, including medical facilities, industry, hospitals, offices, transport, and parking lots.
In the past five years, the number of vehicles has increased in a frightening manner which has caused several major problems for the development of cities causing traffic jams, accidents, and even illnesses due to the frustration and stress of the drivers. These problems are due, on the one hand, to poor management of road traffic in cities, especially at road intersections based on traditional traffic light management systems, and, on the other hand, to unnecessary movement of drivers when looking for free parking spaces in congested areas of cars that only injects more traffic into the roads.
In this article, we will present an intelligent and connected system based on the deployment and implementation of wireless sensor networks (WSNs) at road intersections and also in car parks in order to make roads and cities smarter. This system is different from existing systems, because it regroups two intelligent systems (the traffic light control system and the intelligent parking system)

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into a single innovative system in order to connect citizens to roads and parking spaces in their city remotely and in real time using only one mobile application.
Several traffic control systems have been implemented in recent years using different communication and surveillance technologies to control and manage the problem of urban traffic in cities and resolve the limitations of traditional traffic light systems.

III. PROPOSED SYSTEM

The below figure (1) shows the block diagram of proposed system. In this we use mainly RFID reader, Buzzer, RS-232, GSM. By using Arduino microcontroller entire system is controlled. When an emergency vehicle approaches the crossing, the RFID Reader reads the information and this information is passed to the poles of nearest junction. When the sensing device nearest to the traffic light finally receives the signal from its preceding pole, the traffic light changes to green. In the same way when green light is on then buzzer also give indication ok.

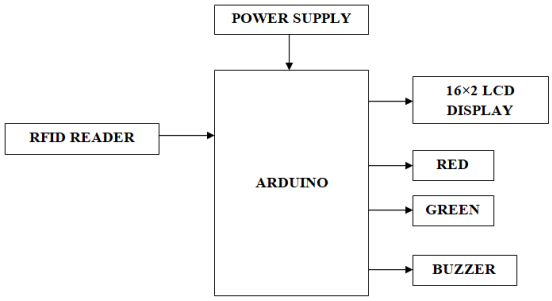

Fig. 1: PROPOSED SYTEM

A. CRYSTAL OSCILLATOR

An oscillator gives a wellspring of tedious A.C. motion over its yield terminals without requiring any contribution (aside from a D.C. supply). The flag produced by the oscillator is more often than not of steady sufficiency. The wave shape and sufficiency are controlled by the plan of the oscillator circuit and decision of segment esteems. The recurrence of the yield wave might be fixed or variable, contingent upon the oscillator structure.

B. POWER SUPPLY

Power supplies in recent times have greatly improved in reliability but, because they have to handle considerably higher voltages and currents than any or most of the circuitry they supply, they are often the most susceptible to failure of any part of an electronic system. Modern power supplies have also increased greatly in their complexity, and can supply very stable output voltages controlled by feedback systems. Many power supply circuits also contain automatic safety circuits to prevent dangerous over voltage or over current situations.

C. ARDUINO

The Arduino is an open - source hardware and software company, project and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world. Arduino board is an open-source platform used to make electronics projects. It consists of

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both a microcontroller and a part of the software or Integrated Development Environment (IDE) that runs on your PC, used to write & upload computer code to the physical board.

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or breadboards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler tool chains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

D. BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers. Early devices were based on an electromechanical system identical to an electric bell without the metal gong.

E. RFID READER

This technology is a rapidly growing technology. It has the potential to make great economic impacts on many industries and applications. RFID reader consists of an RF module that acts as a transmitter and receiver of radio frequency signal. RFID readers communicate with tags through an RF channel to obtain identifying information. Transmitter consists of an oscillator to create the carrier frequency; a modulator to make impact on data commands upon this carrier signal & a receiver that contains demodulator to extract the data returned. Depending on the type of tag, this communication may be a simple ping or may be a more complex multi-round protocol.

RFID is a simple concept. There are two types of RFID Tags such as active tags and passive tags. Passive Tags: - They have no power source of their own, generally operate at a maximum distance of 3 meters or less, and have the power only when it is in communication with an RFID reader. The simplest of these tags is capable of holding something in the range of 64 bits of factory-written unique data; these are called "Class 0" tags. Active Tags: Active tags have their own power source, can actively and intensively transmit and processing data and over considerable physical distances. Active tags can communicate with readers 100 meters or more away. Active tags need much less signal from the RFID reader. Active tags are better.

IV. RESULTS

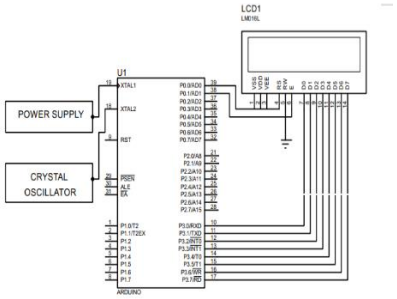

Fig. 2: BASIC CIRCUIT DIAGRAM

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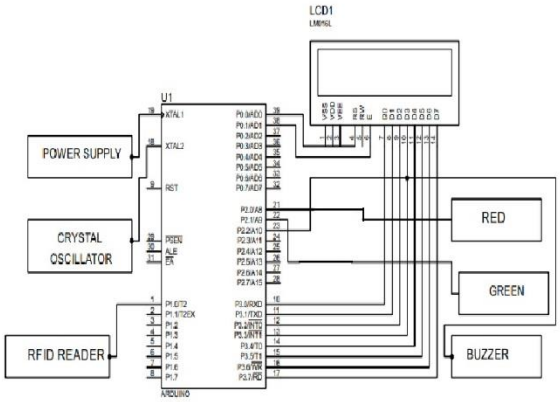

Fig. 3: PROPOSEC SHCEMATIC

V. CONCLUSION

As demand for road transport increases, it gets to a point of saturation where vehicles will have to compete for road usage. This leads to traffic congestion Hence In this project smart traffic control system using wireless communication was implemented. By using Arduino microcontroller entire system is controlled. This facilitates the smooth and quick passage of the emergency vehicle.

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