

AVOIDANCE OF FIRE ACCIDENT ON RUNNING TRAIN USING IOT

Mr.Subramanian¹, V.B.Magha Lakshmi², S.Revathi³, D.Aboorna⁴

Department of electronics and communication engineering
Velammal engineering college, Chennai

Abstract

Fire accidents are one of the most frequently occurring disasters leading to life and property loss. Training for fire escape skills and designing efficient building evacuation plans are increasingly important research topics. Virtual environments (VE) are widely used to support training and simulating human response under emergency situations. However, current VE based training systems have limited intelligent non-player characters (NPC) which are lacking in support of fire science knowledge. This project will introduce a hybrid method combining gaming technology, agent programming and fire science knowledge to design an evacuation training system for fire wardens. The success of using professional numerical fire simulation tool to support NPC behavior in virtual environment will provide a new way to enhance the realism of virtual environment by using high fidelity fire data sources.

Keywords: Virtual environment ,non player characters ,IOT

Introduction

It is an important problem in the current study of fire department and safety production department to make an objective and scientific analysis of the fire accident and find out the real cause of the accident [1-2]. Especially, nowadays China is experiencing an exploding growth of electric bicycles. The existing number of the bicycles has been up to 220 million, and the number is still expanding. With the number of bicycles increasing, so is of the fire. Every year, thousands of fires, which are mainly caused by electrical circuits in the bicycle, are occurring in China. With the rapid development of cloud computing [3, 4] and big data technology [5, 6], the fire department and related organizations can accumulate a large amount of data about fire. It provides a large number of fire historical data as well as a variety of economic, demographic, social, and geographic information of the spatial area fire occurred for the study on the occurrence and development of fire law, the relationship between fire and society, economy, regional population structure and other factors, and the interrelationship between accidents. Exploring the potential law of the fire, preventing and controlling from the source are the fundamental ways to prevent the fire and its foundation is to analyze the existing data of the fire. For complex mass fire data, how to find the hidden knowledge and rules behind it, which is a great challenge to the current management and analysis of fire

accident data. Data mining technology is to solve the above problem, it can find out the potential relationship between data and make a deeper analysis, in order to find a better basis for decision-making and forecast future trends. The concept of data mining is the deepening of the concept of "knowledge discovery", which is the process of identifying effective, novel, potentially useful and ultimately understandable patterns and knowledge from data sets. Knowledge discovery will change information into knowledge, and find the hidden knowledge nuggets from data mines, which will contribute to the development of knowledge innovation and knowledge economy. In recent years, data mining has shown strong vitality in various fields. At present, there are two main kinds of fire analysis methods: one is for a single case study. Through the investigation and analysis of the causes and related conditions of the historical fires, it finds out the factors of the fire cases

Lei Wang, Yuntao chen, Huaiyuan Zhai, Shouxin Song, "Analysis of Fire Safety Risks in Urban Rail Transit", 2017 IEEE*

In order to overcome the shortcoming of urban rail transit fire safety issues in the vulnerability, an improved method based on the improved theory of urban rail transit vulnerability assessment was proposed. First, the basic knowledge of the vulnerability of urban rail transit and its perturbation factors was introduced. Urban rail transit fire safety problem identification and control of the relevant three years of data were presented and applied. Second, a new method to verify the effectiveness of 6 urban rail transit vulnerability control measures was given out. And it was employed into the urban rail transit control fire safety problems related to the problem. And this work has of great significance in theory and practical.

"NG, 7 VOL. 61, Integrate and Fire Pulse Train Automaton for QRS detection" by Gabriel Nallathambi*, Student Member, IEEE, and Jos'e C. Pr'ncipe, Fellow, IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING NO. 2, FEBRUARY 2014 317 Monitoring heart activity from electrocardiograms (ECG) is crucial to avoid unnecessary fatalities; therefore, detection of QRS complex is fundamental to automated ECG monitoring. Continuous, portable 24/7 ECG monitoring requires wireless technology with constraints on power, bandwidth, area, and resolution. In order to provide continuous remote monitoring of patients and fast transmission of data to medical personnel

for instantaneous intervention, we propose a methodology that converts analog inputs into pulses for ultralow power implementation. The signal encoding scheme is the time-based integrate and fire (IF) sampler from which a set of signal descriptors in the pulse domain are proposed. Furthermore, a logical decision rule for QRS detection based on morphological checking is derived. The proposed decision logic depends exclusively on relational and logical operators resulting in ultrafast recognition and can be implemented using algorithm was evaluated using the MIT-BIH arrhythmia database and results show that our algorithm performance is comparable to the state-of-the art software-based detection

Khivsara B.A., Ms.Gawande Pooja,Ms.Dhawante Mayuri,Mr.Sonawane Kishor,Ms.Chaudari Trupti “IOT Based Railway Disaster Management System”,Reference proposed Train Collision Avoidance System by using RFID,2018 Now a days train accidents is a major issue in all over the world due to increase in rash driving.Accidents are responsible for a large number of collision, derailment,fire in trains ,level crossing accident each year. In some cases death are caused due to unavailability of immediate medical facility to the injured passengers which can be avoided with the help of an automated system that will reduce the time 5 consumed in activities such as taking the victim to the nearest hospital completing formalities such as filling forms and also involving police in case of major crashes .So the proposed system is using motion and smoke/fire detection sensor based on IOT application integrated with android to send information about train accident location to local citizens and administration using google map/GSM location system.

Proposed system:

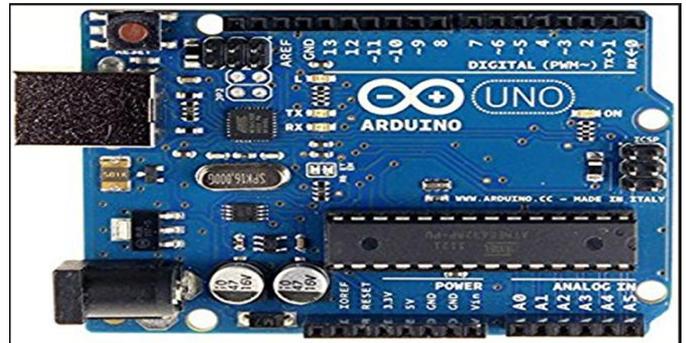
Existing and proposed system:Existing system Proposed System In the olden days human→ monitoring and controlling Any one abnormal state that time→ human go to work and any information that time Conway wired used and no wireless communication Drawbacks: Cost high→ No wireless→ In this system we are used all→ port working automatic and all data send IOT No need for manual check by→ human Advantages Can be used in all application→ More flexible→ More efficient

Components:

Arduino UNO

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, 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. You can tinker with your

UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.



LCD (Liquid Crystal Display)

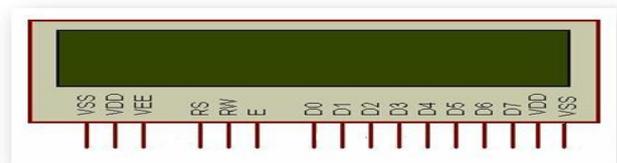
LCD screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD. Click to learn more about internal structure of a LCD.

Pin

Diagram:

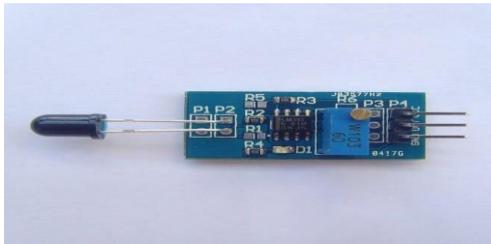


Internet of Things

The **internet of things (IoT)** is the network of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "the infrastructure of the information society. The IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct

integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Experts estimate that the IoT will consist of almost 50 billion objects by 2020.

Fire/FlameSensorModule



Flame sensor is the most sensitive to ordinary light that is why its reaction is generally used as flame alarm purposes. This module can detect flame or wavelength in 760nm to 1100nm range of light source. Small plate output interface can and single-chip can be directly connected to the microcomputer IO port. The sensor and flame should keep a certain distance to avoid high temperature damage to the sensor. The shortest test distance is 80cm, if the flame is bigger test it with far distance. The detection angle is 60 degrees so the flame spectrum is especially sensitive. The detection angle is 60 degrees so the flame spectrum is especially sensitive.

Gas sensor:



The sensors contain two in contact with an electrolyte. The electrodes are typically fabricated by fixing a high surface area precious metal on to the porous hydrophobic membrane. The working electrode contacts both the electrolyte and the ambient air to be monitored usually via a porous membrane. The electrolyte most commonly used is a mineral acid the electrodes and housing are usually in a plastic housing which contains a gas entry hole for the gas and electrical contacts. The gas diffuses into the sensor, through the back of the porous membrane to the working electrode where it is oxidized or reduced. This electrochemical reaction results in an electric current that passes through the external circuit. In addition to measuring, amplifying and performing other signal

processing functions, the external circuit maintains the voltage across the sensor between the working and counter electrodes for a two electrode sensor or between the working and reference electrodes for a three electrode cell. At the counter electrode an equal and opposite reaction occurs, such that if the working electrode is an oxidation, then the counter electrode is a reduction.

DC Motor: A DC motor is designed to run on DC electric power. Two examples of pure DC designs are Michael Faraday's homo polar motor (which is uncommon), and the ball bearing motor, which is (so far) a novelty. By far the most common DC motor types are the brushed and brushless types, which use internal and external commutation respectively to create an oscillating AC current from the DC source—so they are not purely DC machines in a strict sense. **DC motor** is any of a class of rotary electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current flow in part of the motor.

Principle of DC Motor: This DC or **direct current motor** works on the principal, when a current carrying conductor is placed in a magnetic field, it experiences a torque and has a tendency to move. This is known as motoring action. If the direction of current in the wire is reversed, the direction of rotation also reverses. When magnetic field and electric field interact they produce a mechanical force, and based on that the working principle of **DC motor** is established.

The direction of rotation of a this motor is given by Fleming's left hand rule, which states that if the index finger, middle finger and thumb of your left hand are extended mutually perpendicular to each other and if the index finger represents the direction of magnetic field, middle finger indicates the direction of current, then the thumb represents the direction in which force is experienced by the shaft of the **DC motor**.



Ultrasonic sensors (also known as **tranceivers** 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 20,000 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.



Conclusion:

Fire accidents on running train is the one of the issues face in recent times. This problem is critical since it take many lives,hence it is necessary to prevent from occurring.here we used iot method to avoid fire accident in running train.we designed this based on real time applications.

References:

- [1]“Fault-Secure Multi detector Fire Protection System for Trains”by Hassanein H.Amer, Member, IEEE, and Ramèz M. Daoud, Student Member, IEEE IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT, VOL. 56, NO. 3,JUNE 2007
- [2]“Decision Making During a Simulated Mine Fire Escape” by Henry P.Cole, Charles Vaught, William J. Wiehagen, John V. Haley, and Michael J. Brnich, Jr. IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT, VOL.45, NO. 2, MAY 1998
- [3] “Integrate and Fire Pulse Train Automaton for QRS detection”byGabriel Nallathambi*, Student Member, IEEE, and Jos é C. Pr íncipe,Fellow, IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING,VOL. 61, NO. 2, FEBRUARY 2014 317
- [4]“DECONTAMINATION OF IREQ'S HIGH VOLTAGE LABORATORY FOLLOWING A PCB FIRE” by. Chamber land IEEE Transactions on Power Delivery, Vol. PWRD-2, No. 1, January 1987

[5].Lei Wang,Yuntao chen,Huaiyuan Zhai*,Shouxin Song ,”Analysis of Fire SafetyRisks in Urban Rail Transit”,2017 IEEE

[6] Hassanein H.Amer and Ramez M.Daoud “ Fault-Secure Multidetector Fire Protection System For Trains”, in IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT,VOL.56,NO.3,JUNE 2007

[7] Khivsara B.A., Ms.Gawande Pooja, Ms.Dhawante Mayuri,Mr.SonawaneKishor,Ms.Chaudari Trupti “IOT Based Railway Disaster Management System”,Reference proposed Train Collision Avoidance System by using RFID,2018