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Research Article

SIMULATION OF IOT APPLICATIONS USING PROTEUS

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A R T I C L E I N F O

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A B S T R A C T

The Internet of Things (IoT) is the inter-networking system administrates physical gadgets, vehicles, structures, and different things which are implanted with hardware, programming, sensors, actuators, and system network that empower exchange data, gather and trade information. The IoT enables articles to be detected and controlled remotely crosswise over existing system foundation, making open doors for more straight forward reconciliation between the physical world and PC based framework and bringing about enhanced effectiveness, exactness and monetary advantage. Internet of Things is playing a major role in automatic control of many applications remotely. In this paper variety of IoT applications such as automatic traffic control, railway crossing system and drip irrigation control systems are simulated using proteus software.

I. INTRODUCTION

Traffic congestion is one of the major problems, the world is facing today. Traffic monitoring and controlling is a difficult task. The point of the movement explore is to improve the stream of vehicular activity and goods. The flow of the traffic constantly changes depending on the time of the day, day of the week and time of the year on occasion, street work and mischance's additionally impact the multifaceted nature. Subsequently, movement light advancement is an entangled procedure. Consequently, an insightful control of activity is a critical issue to be considered. The activity observing specialist need to discover new techniques for defeating this issue like development of new streets, flyovers and so on and furthermore improvement of advanced movement checking and control frameworks. One approach to enhance the movement stream and security of the present transportation framework is to apply computerization and astute control techniques to roadside foundation and vehicles.

The IoT has emerged as a combination of multiple technologies with different applications. Today, Internet application development demand is very high. So, IoT is a major technology by which we can produce various useful internet applications [1]. Some of the applications such as traffic at junction are controlled based on time slots assigned in cyclic manner in automation traffic control system.

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Railway road is one of transition mode, which has an important role in moving passengers and freights. However, railway road-related accidents are more dangerous than other transportation accidents due to negligence of watchman. An IoT based framework is proposed to avoid these problems, which uses LED display and LED lights to show the railway crossing in the case study of automatic railway gate control.

This framework is outlined utilizing PIC 16F877A microcontroller to maintain a strategic distance from railroad mishaps occurring at rail line entryways where the level intersections. Microcontroller plays out the entire activity i.e., detecting train arrival, gate closing and opening. This control framework accessible to all over and at all places.

In India, agriculture is the need of most of the Indians livelihood and it is one of the main sources of livelihood. Agriculture also has a major impact on economy of the country. The consumption of water increases day by day that may lead to the problem of water scarcity. To overcome this problem, we have implemented a new technique by using arduino microcontroller. A moisture sensor is used to sense moisture level whether the soil is dry or wet. The dampness sensor is interface with arduino microcontroller that will work by the way toward reproducing on proteus software and it activates the DC motor through LM016L which compare the level of moisture content of the soil with the reference value that will operate the pump through relay. Based on moisture levels the DC motor is automatically selected ON and OFF and corresponding messages are displayed on LED displays.

The rest of this paper is structured as follows: section II presents literature survey on different applications; section III

describes algorithms and flowcharts, section IV is focused on experimental results and finally, future work and conclusions of the paper in section V.

II.LITERATURE SURVEY

Nipun Sharma, Palkin Sharma [2] mainly focused on traffic congestion, the main aim of their work is to reduce blocked traffic, collisions (which occur due to tight spacing and constant stopping and going), and wastage of time for waiting. To overcome these, an Intelligent Traffic Light Control system was developed which will eradicate traffic congestion and make paths for emergency and VIP vehicles so that it won't disturb the other vehicles on road. For these microcontrollers, IR transmitters and receivers are used. These two factors act as most important hardware components in the project. Microcontrollers have been quite successful in determining the density of vehicles and giving delays according to the working. The parameters which are considered for controlling traffic light system lead to higher completion delays making it inconvenient to allow emergency vehicles also.

Bilal Ghazal *et.al*., [3] proposed a method to realize smooth motion of vehicles in the transportation routes. The synchronization of multiple traffic light systems at adjacent intersections is a complicated problem. The disparity of vehicles flow with time, the accidents, the passage of emergency vehicles, and the pedestrian crossing are not implemented in the existing traffic system. This leads to traffic jam and congestion. The proposed smart traffic system consists of a traffic light controller that manages the traffic lights of a "+" junction of mono directional roads. The system is capable of estimating the traffic density using IR sensors posted on either side of the roads. Based on this information, the time dedicated for the green light will be extended to allow large flow of vehicles in case of traffic jam, or reduced to prevent unnecessary waiting time when no vehicles are present at the opposite route. Due to accidents or vehicle failures the vehicle density remains constant or some duration leading to more number of vehicles accumulated on other side of traffic.

Hnin Ngwe Yee Pwint *et.al*., [4] said that in everywhere at level crossing between railroad and highway there are so many accidents happening due to carelessness in manual operations or lack of workers, to avoid these problems developed a model for automatic railway gate control system using PIC microcontroller for saving precious human lives and preventing major disasters in railway track. This system can contribute a lot of benefit either to the road users or to the railway management. Sensors are placed at two sides of gate. It is used to sense the arrival and departure of the train. This system uses the DC motor to open and close the gates automatically when it is rotated clockwise or anticlockwise direction. The LCD display shows the status of the railway gate control system.

Oborkhale, Lawrence *et.al*., [5] aimed to automate irrigation control is to avoid the human in agriculture system for gardening. This can be done by placing sensors(i.e., soil moisture sensor using hygrometer module, water level sensor using the LM 324 Op-amp was configured here as comparator, light sensor with the aid of Light dependent resistor and temperature sensor using LM 35) around the field. ATMEGA32microcontroller is programmed using embedded C language and is used to sense whether the field is wet/dry. So the control system automatically performs this action. Use automatic micro controller based drip irrigation system in which the irrigation will take place only when there will be intense requirement of water. Therefore modern drip irrigation systems, which can supply water route zone to avoid large quality of water requirement.

III.METHODOLOGY

In today's world IoT plays a major role in day to day activities therefore in this paper simulation of IoT applications, such as automatic traffic control, railway crossing gate control and drip irrigation control is done. For this purpose Arduino 1.8.5 and Proteus 8.0 versions are used.

The following applications are developed:

1. A 4-way traffic control system is based on timer.
2. An automatic railway gate control system when train is nearer, the sensor alerts and displays the message to stop the vehicles crossing over the railway track vice versa.
3. A soil moisture measuring system using microcontrollers and LED displays, shows the status of wet field or dry field of soil.

a.Algorithms and Flowcharts

Algorithm 1: 4-way traffic control system

Start
1. Declare variables
   directions: EN,EW,NS,NW,SN,SE,WE,WS
   t_i = time slot for vehicle movement;
   Repeat
2. for (t_i = 0; t_i<=9; t_i++)
   {
   (Set traffic directions == EN, EW);
   Set on yellow light for 60 seconds
   Set on green light for 60 seconds
   }
3. for (t_i = 0; t_i<=9; t_i++)
   {
   (Set traffic directions == NS, NW);
   Set on yellow light for 60 seconds
   Set on green light for 60 seconds
   }
4. for (t_i = 0; t_i<=9; t_i++)
   {
   (Set traffic directions == WE, WS);
   Set on yellow light for 60 seconds
   Set on green light for 60 seconds
   }
5. for (t_i = 0; t_i<=9; t_i++)
   {
   (Set traffic directions == SN, SE);
   Set on yellow light for 60 seconds
   Set on green light for 60 seconds
   }
   End

Algorithm 2: Automatic railway gate control system

Start
1. Declare variables R_s, T_s, traffic directions, t_i = time slot for vehicle movement;
   Repeat
2. for (t_i = 0; t_i<=9; t_i++)
   {

(Set traffic direction == train side);
Set on yellow light for 9 seconds
Set on green light for 9 seconds
Set on red light for 9 seconds in road side
}

3. for (t_i = 0; t_i<=9; t_i++)
{
(Set traffic direction == road side);
Set on yellow light for 9 seconds
Set on green light
Set on red light in train side
}
End

Algorithm 3: Automatic drip irrigation system

Start

1. Declare variables: moisture level, status;
Repeat
2. Display "dry field"
3. If (moisture level<= threshold)
{
Set on motor;
}
Else
If (moisture level>= threshold)
{
Set off motor;
Display "wet field";
}
End

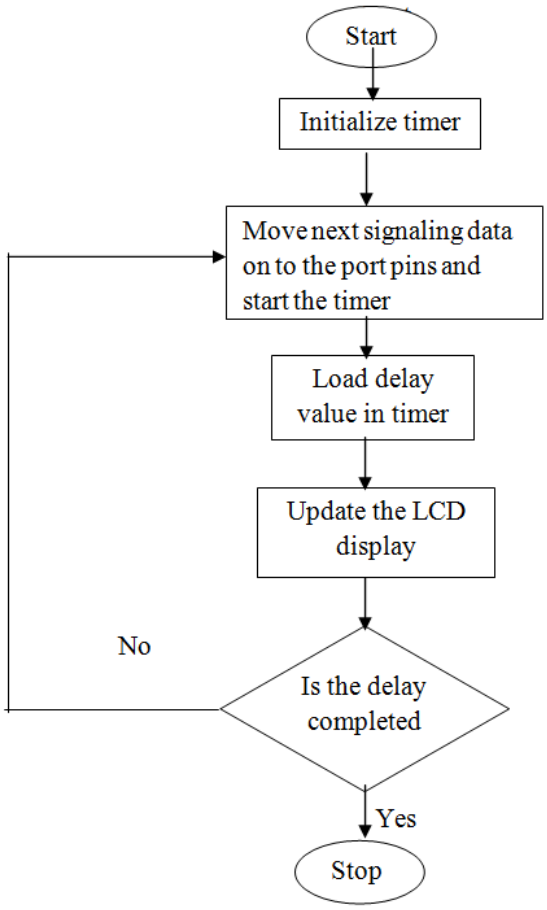

Figure 1 Flowchart for 4-way traffic control

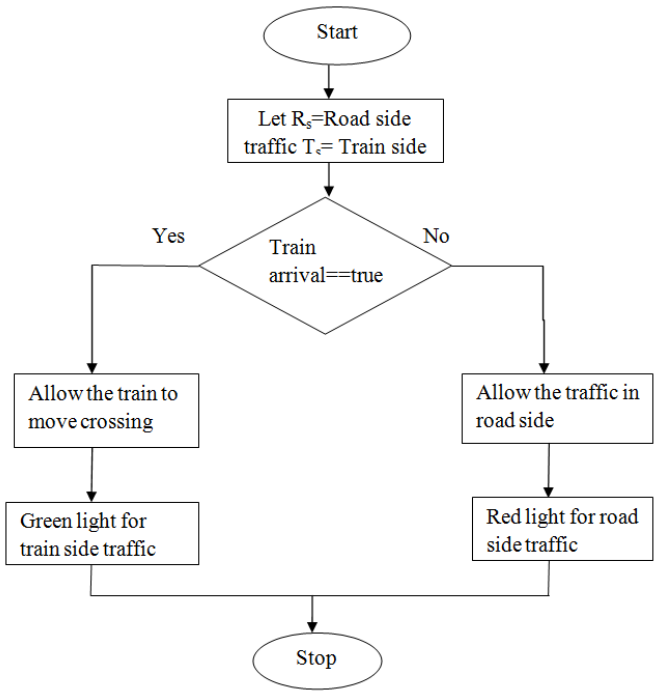

Figure 2 Automatic railway gate control system

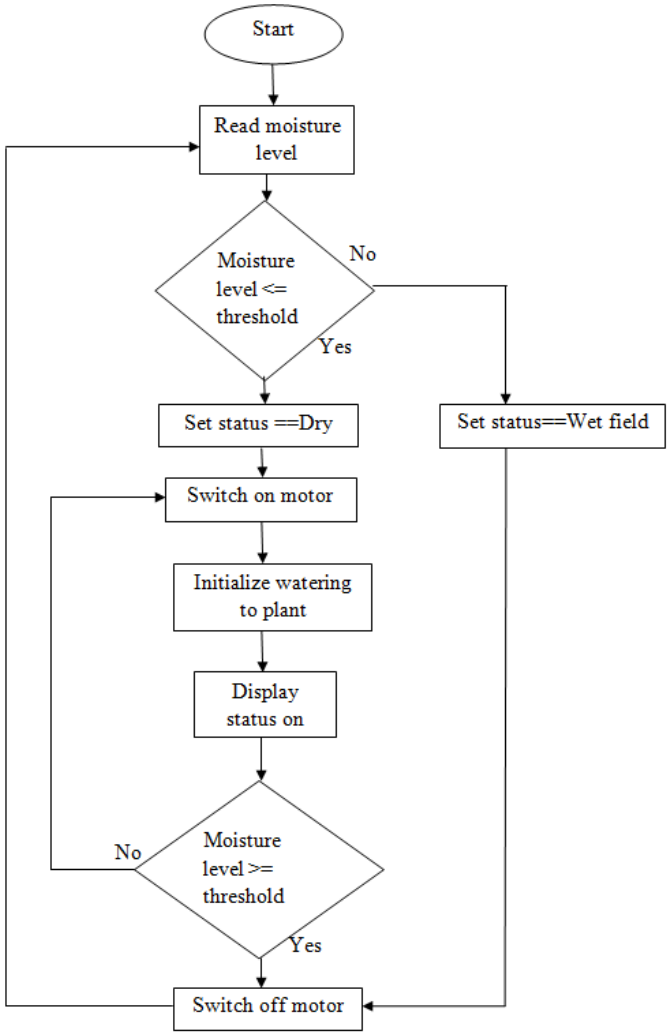

Figure 3 Automatic drip irrigation system

IV.EXPERIMENTAL RESULTS

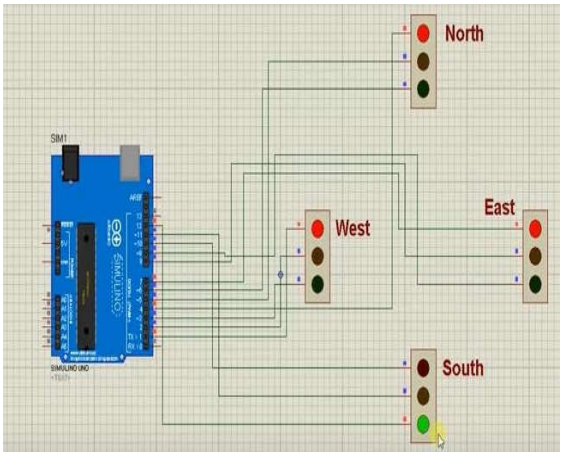

Figure 4 4-way traffic control on south side

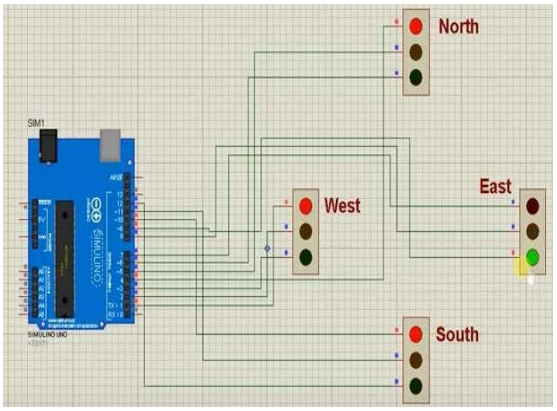

Figure 5 4-way traffic control on east side

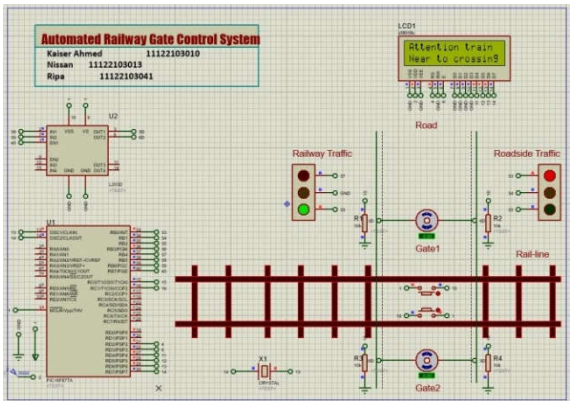

Figure 6 Automatic railway gate control system Near to crossing train

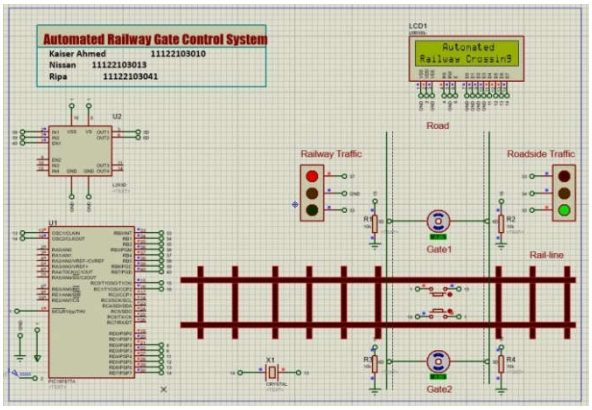

Figure 7 Automatic railway gate control system on road side traffic

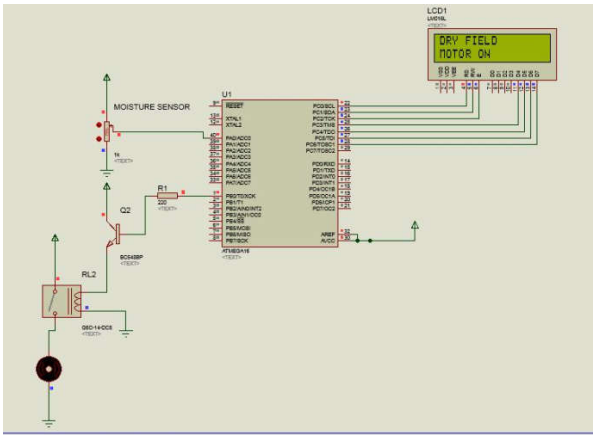

Figure 8 Drip irrigation system on dry field

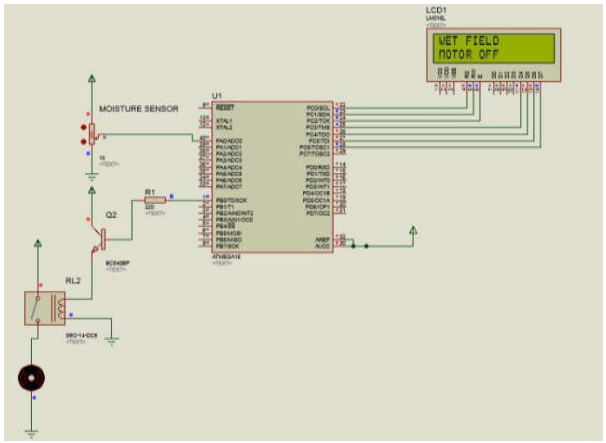

Figure 9 Drip irrigation system on wet field

V.FUTURE WORK AND CONCLUSION

The 4-way traffic control system can reduce traffic jams, and hence an automatic IoT based traffic control system is implemented. Still today in India manual railway crossing systems are existing, an automated railway crossing systems based on IoT is more flexible and easy to operate. IoT based automated irrigation system is useful for optimum utilization of water resources and avoids manual observation.

In future GSM module can be used to track location of vehicle and predict feature traffic and update traffic control accordingly. Display of train arrival timing can be intimated to the registered commuters in advance through SMS. Automatic drip irrigation system with temperature and humidity sensors can be used to capture the data and send it to centralized cloud server where it gets processed is to be developed.

References

1. https://en.wikipedia.org/wiki/Internet_ of things.
2. Nipun Sharma, Palkin Sharma, Intelligent Traffic Light Control System, *International Journal of Advanced Research in Electronics and Communication Engineering* Volume 5, Issue 7, July 2016.
3. Bilal Ghazal, Khaled Khatib, Khaled Chahine, Mohamad Kherfan, Smart Traffic Light Control System, IEEE, 2016.
4. Hnin Ngwe Yee Pwint, Zaw Myo Tun, Hla Myo Tun, Automatic Railway Gate Control System Using Microcontroller, *International Journal of Science, Engineering and Technology Research*, Volume 3, Issue 5, May 2014.

5. Oborkhale, Lawrence I, Abioye, A. E, Egonwa B. O, Olalekan T. A, Design and Implementation of Automatic Irrigation Control System, *IOSR Journal of Computer Engineering,* Volume 17, Issue 4.
6. Salmi P, and Torkkeli M., "Inventions Utilizing Satellite Navigation Systems in the Railway Industry-An Analysis of Patenting Activity", *Journal of Technology Management and Innovation,* Vol. 4, Issue 3, pp. 46-58. 2009.
7. Agrawal, Nikhil, and Smita Singhal, "Smart drip irrigation system using raspberry pi and arduino", International Conference onComputing, Communication & Automation (ICCCA), 2015.
8. Dube V, Dubey. N and Chouhan. S.S, "Wireless Sensor Network Based Remote Irrigation Control System And Automation Using DTMF", International Conference Communication Systems and Network Technologies (CSNT), pp. 3-5, June 2011.
9. Karan Kansara1, Vishal Zaveri1, Shreyans Shah, Sandip Delwadkar, Kaushal Jani, "Sensor based Automated Irrigation System with IOT: A Technical Review", *International Journal of Computer Science and Information Technologies* (IJCSIT), Vol. 6 (6), 2015.
10. Dr.S.Anila, B.Sarany, G.Kiruthikamani, P.Devi, Intelligent System for Automatic Railway Gate Controlling and Obstacle Detection, Volume-4, Issue-8, Aug 2017.

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