A PROJECT REPORT ON

AUTOMATIC BRIDGE FORMATION

SUBMITTED IN PARTIAL FULFILLMENT OF

THE DEGREE M.SC.IT (PART-II)

SUBMITTED BY

MAUSAM RANI & NEHA SINGH

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PROF.RAKHI GUPTA

AND CO-GUIDANCE OF

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KISHICHAND

CHELLARAM COLLEGE

D.W.ROAD, CHURCHGATE, MUMBAI:400033

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Introduction

ABSTRACT

The Primary objective of Automatic Railway Bridge System is to help the physically Challenged Passenger to move from one Platform to another. Crossing the railway track inside the railway station is very difficult. But it is quite difficult to the handicapped and aged persons to cross the railway track without the help of others. There are many old peoples suffering from leg cramps walking difficulties leg vain problems and chronic foot pains etc. That's why to solve this problem we are making a solution for that is we are going to make a project on a horizontal adjusted platform which is connected between both stations platform. Because due to this there will be no need to climbing on a bridge by adults as well as children's. This will be time saving for passenger with a smoother operation going to experience by the people or by passengers and also we have provided the led and buzzer functionality in our project for specialized people.

PROBLEM DEFINITION

Due to old technique to climb on bridge we may goes too late for our upcoming train. Also due to electric bridge (escalator) more electricity required to drive the motor which is lives under the escalator.

The uneducated person directly crosses the trains' routes. This may be dangerous for their life. Now, to overcome this problem, we prepared this project. By which the problem of more electricity consumption can be reduce to less.

Due to this unwanted accident can be prevents. This also time saving much more than the other remaining techniques.

In railway stations normally we use bridge but it is very difficult for the elderly persons and for differently abled person to use the bridge. Also carrying heavy luggage from one platform to other platform is difficult.

Limitations of Existing System

Existing prototype does not give any warning to the passengers so that they would get to know that train is coming.

Existing prototype did not provide any solution of the problem that what if the bridge did not open before train arrival.

Existing prototype did not provide any warning system for the deaf people.

Proposed System

Our project is used for automatically closing or opening the footbridge in between two platform . The footbridge connects the two railway platform through which the passengers can walk on the footbridge to reach on the next platform which can save their time and energy. And also ease the movement of elder and differently abled person between platforms.

Our system provide advance warning to the passenger so they can vacant the platform quickly and this done by using a buzzer which warns the people.

 In our project we used led which shows red signal when bridge is opened and turns to green when bridge closes so this is used to tell the train driver about the bridge status.

Our system use one more led which is used to warn the deaf people about train arrival.

Review of Literature

This paper shows the implementation of automatic formation of footbridge when there will be no train being present there then, the footbridge will have been closed and peoples or senior citizen will cross it with all safety providence. When the train at the specific distance away from the platform then the buzzer will sound and led signal will be given to the train for close Barricades at platform as well as the remaining peoples those who are standing on footbridge they will cross the platform and after that the footbridge tends to open because the train is coming on platform accordingly with all safety measures will have been done. After opening of footbridge signal will indicate the GREEN signal, so that train can proceed further. If any fault or problem occurs in system, footbridge will not open; incise of this signal will indicate the red light & train will stop. So there is no risk of any type of accident. This method helps in reducing the time and area requirement.

In this paper, the author has added the features in the footbridge like automatic bridge formation with a sense of a sensors . The footbridge provides a natural means of interaction. Emphasis is also given to ensure convenience in accessing this service with no user intervention. For example, when the train reaches the first sensor then the first sensor sense it and will notify the user with the help of buzzer sound and also led signals and also the train will notify about the bridge status by signal light and when the second sensor detects the train then the bridge will open.When the sensor detects the train then the bridge will close again.

Survey of Technology

Methodology

When there will be no train being present there then, the footbridge will have been closed and peoples or senior citizen will cross it with all safety providence. When the train at the specific distance away from the platform then buzzer will sound for close Barricades at platform as well as the remaining peoples those who are standing on footbridge they will cross the platform and after that the footbridge tends to open because the train is coming on platform accordingly with all safety measures will have been done. After opening of footbridge signal will indicate the GREEN signal, so that train can proceed further. If any fault or problem occurs in system, footbridge will not open; incise of this signal will indicate the red light & train will stop. So there is no risk of any type of accident. This method helps in reducing the time and area requirement. Further in future we can make the bridge as a rotating one for the effortless crossing of railway track for disabled persons.

Domain – Internet of things (IoT):

Internet of Things (IoT) term represents a general concept for the ability of network devices to sense and collect data from around the world, and then share that data across the Internet where it can be processed and utilized for various interesting purposes. The IoT is comprised of smart machines interacting and communicating with other machines, objects, environments and infrastructures. Now a days every persons are connected with each other using lots of communication way. The essential idea of the Internet of Things (IoT) has been around for nearly two decades, and has attracted many researchers and industries because of its great estimated impact in improving our daily lives and society. When things like household appliances are connected to a network, they can work together in cooperation to provide the ideal service as a whole, not as a collection of independently working devices. This is useful for many of the real-world applications and services, and one would for example apply it to build a smart residence; windows can be closed automatically when the air conditioner is turned on, or can be opened for oxygen when the gas oven is turned on.

Fig shows the main parts of IoT and its working and their components used for its working.
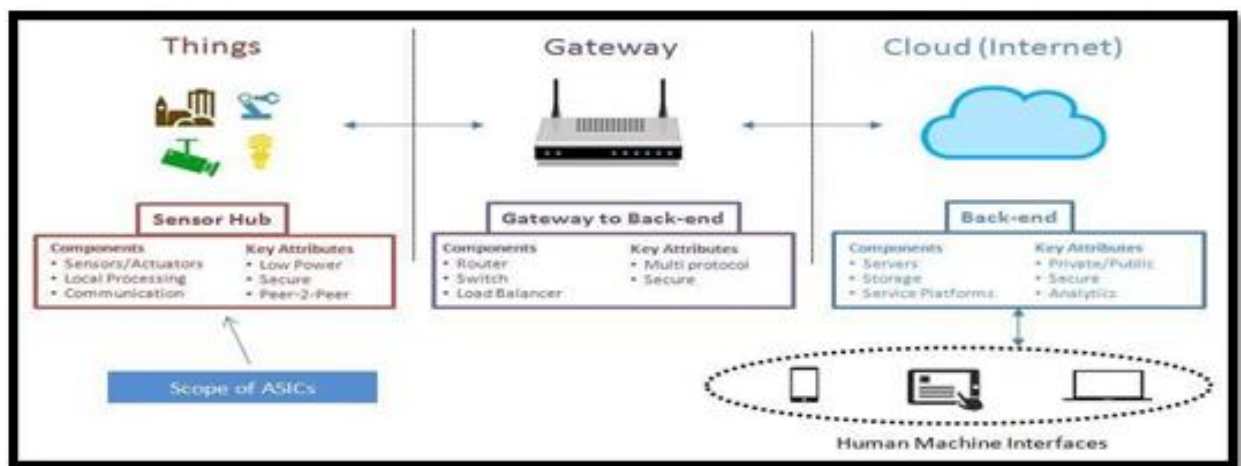
Hardware Requirements

Aurdino board:

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. 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 ('shields') or breadboards (For prototyping) 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 can be programmed using C and C++ programming languages. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.
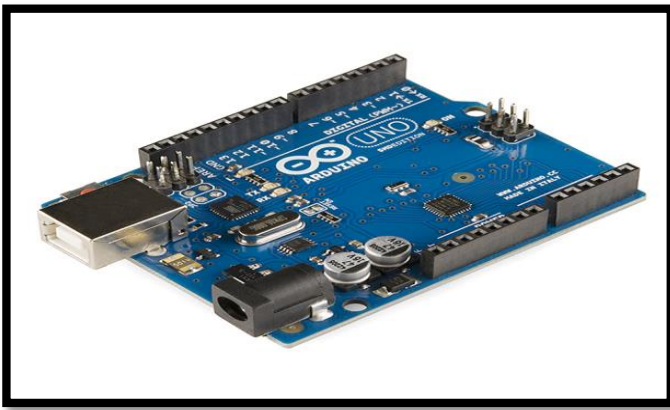
IR Sensor:

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.
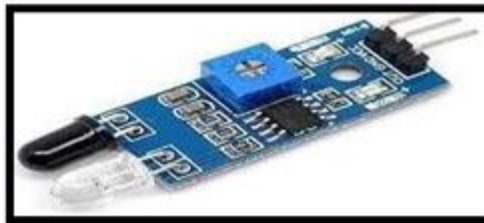
**Led:**

A light-emitting diode (LED) is an electronic light source.LEDs are based on the semiconductor diode. When the diode is forward biased (switched on), electrons are able to recombine with holes and energy is released in the form of light.

Buzzer:

Buzzer is used as an audio alarm and is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave ovens, or game shows.

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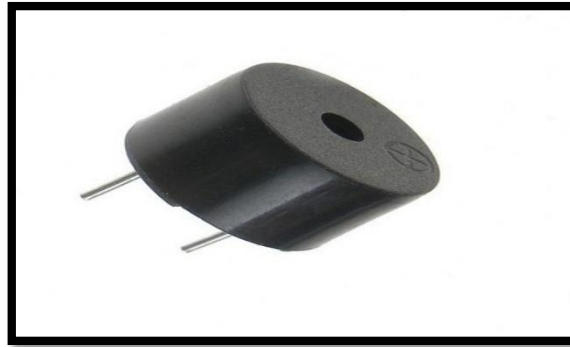
DC Motor:

A DC motor is any of a class of rotary electrical motors that converts direct current electrical energy into mechanical energy. 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 in part of the motor.

Power supply:
A 9 volt, battery is used to provide power to the system.

L298N driver:
The L298N is an integrated monolithic circuit in a 15- lead Multiwatt and Power SO20 packages. It is a high voltage , high current dual full-bridge driver de-signed to accept standard TTL logic level sand drive inductive loads such as relays, solenoids, DC and stepping motors. Two enable inputs are provided to enable or disable the device independently of the in-put signals .The emitters of the lower transistors of each bridge are connected together rand the corresponding external terminal can be used for the connection of an external sensing resistor. An additional Supply input is provided so that the logic works at a lower voltage.
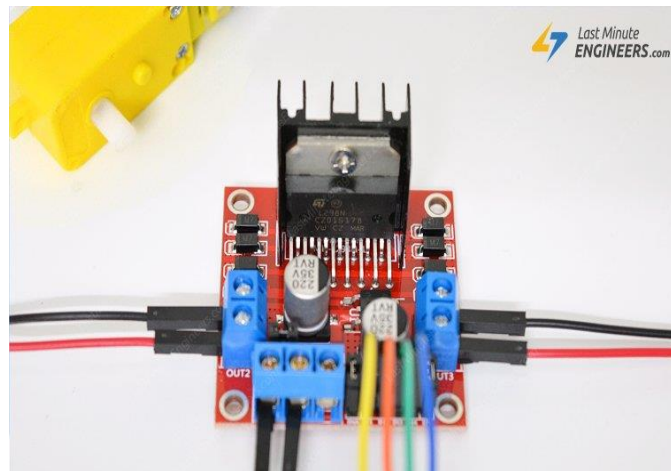
Software Requirements

ARDUNIO IDE (INTEGRATED DEVELOPMENT ENVIRONMENT):-
The Ardunio Integrated Development Environment is a cross platform application(for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to **Arduino** compatible boards, but also, with the help of 3rd party cores, other vendor development boards.

C:-
We are going to use embedded c language through out the project. Embedded C is a set of language extensions for the C programming language by the C Standards Committee to address commonality issues that exist between C extensions for different embedded systems.

C is a procedural programming language. It was initially developed by Dennis Ritchie in the year 1972. It was mainly developed as a system programming language to write an operating system. The main features of C language include low-level access to memory, a simple set of keywords, and clean style, these features make C language suitable for system programmings like an operating system or complier development.

Many later languages have borrowed syntax/features directly or indirectly from C language. Like syntax of Java, PHP, JavaScript, and many other languages are mainly based on C language. C++ is nearly a superset of C language.

Requirements and System Analysis

Feasibility Study

The very first phase in any system developing life cycle is preliminary investigation. The feasibility study is a major part of this phase. A measure of how beneficial or practical the development of any information system would be to the organization is the feasibility study.

The feasibility of the development software can be studied in terms of the following aspects:

1)Operational Feasibility:

The tools which are to be used in this project are not that costly and easy to handle. And also an uneducated person can easily use it without having any knowledge of it.

2)Technical Feasibility:

- Microsoft Windows XP with SP2, Windows 7, Windows 8/8.1 and Windows 10 operating system.
- Microsoft.
- Intel Pentium / AMD Athlon **processor** or equivalent running at 1 GHz or more.
- 512 MB RAM (1 GB RAM recommended).
- 10MB free hard drive space or more (only for PROGRAMING **IDE** for **Arduino**)

3)Economical Feasibility:

The infrastructure cost is high but it is one time investement and there is no software cost.In elevators the electricity cost is there but this system save the electricirty cost.

Project Scheduling

Sr. No	Contents	Proposed Date	Submission Date	Teacher's Signature	Remark
1.	**Investigation**				
	Project Fixing				
	Synopsis				
2.	**Analysis**				
	Project history				
	Requirement Gathering				
	Objective and scope of the project				
	Problems with existing system				
	Advantages of proposed system				
	Feasibility study				
	Cost benefits analysis				
	Requirement Specification				
	Tools and Technology				
3.	**Design Phase**				
	Detailed Life Cycle of the project (Logical design)				
	Circuit Diagram				
	Flow Diagram				

4.	**Coding Phase**				
	Forms				
	Modules Design				
	Validating Forms/ Application				
5.	**Testing Phase**				
	Module Testing/Unit Testing				
	Integration Testing				
	System Testing				
	Acceptance Testing				
6.	**Evaluation and Enhancement**				
	System maintenance and future				
	Enhancement				
	User Manual				
7.	**Review**				
8.	**Project/Black-Book and Back-upSoftcopy Submission**				

Gantt Chart:

System Design
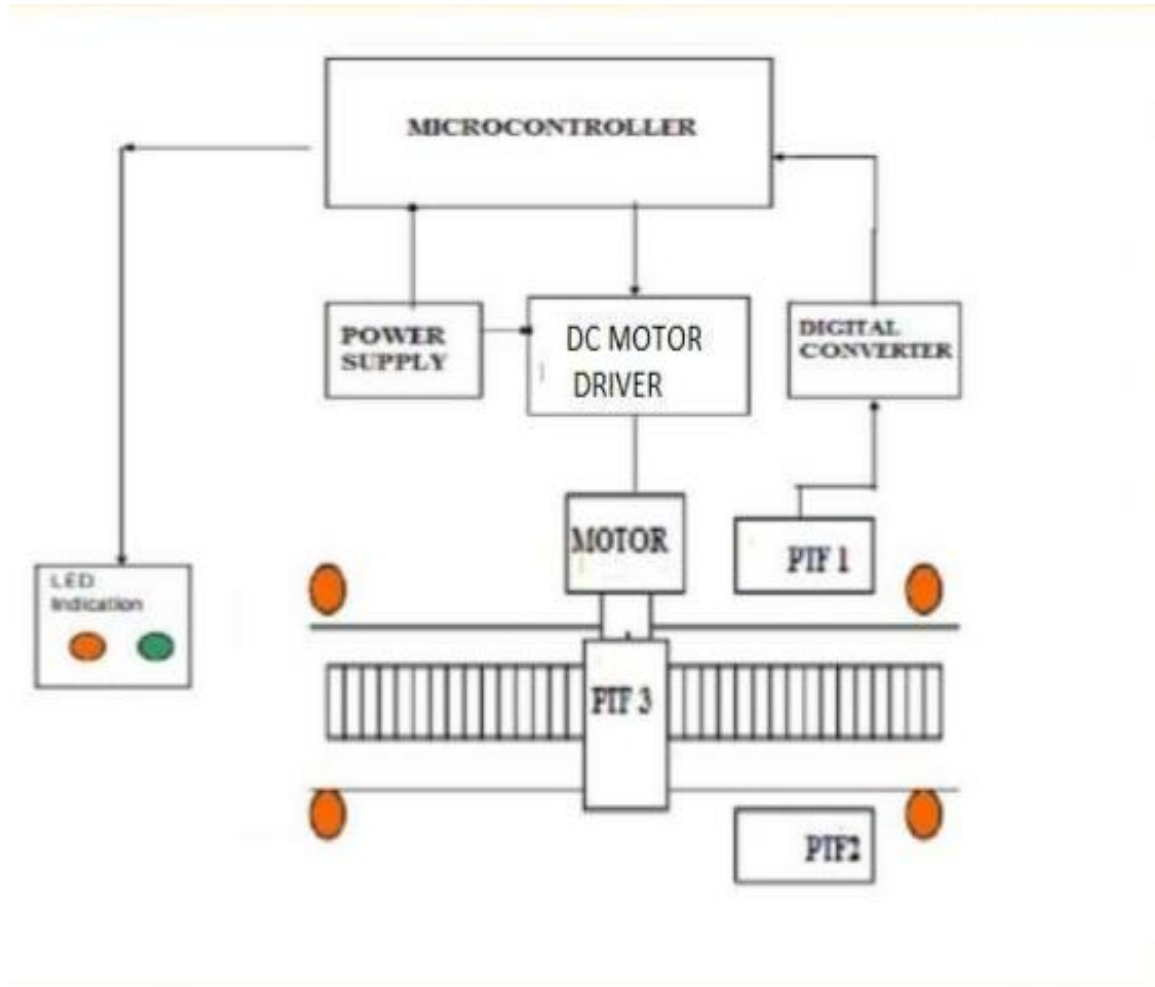
Project Structure

Block Diagram

Fig shows the basic block diagram of footbridge with block shows the components required for the project (footbridge).

- The goal of the footbridge is to connects the two railway platform through which the passengers can walk on the footbridge.
- To reach on the next platform which can save their time and energy.
- And also ease the movement of elder and differently abled person between platforms.
- Buzzer provide advance warning to the passenger so they can vacant the platform quickly.
- Led which shows red signal when bridge is opened and turns to green when bridge closes so this is used to tell the train driver about the bridge status.
- There is one more led which is used to warn the deaf people about train arrival.

Circuit Diagram:

A circuit diagram is a visual display of an electrical circuit using either basic images of parts or industry standard symbols.

Symbol usage depends on the audience viewing the diagram. These two different types of circuit diagrams are called pictorial (using basic images) or schematic style (using industry standard symbols).

Circuitry Board of Arduino:
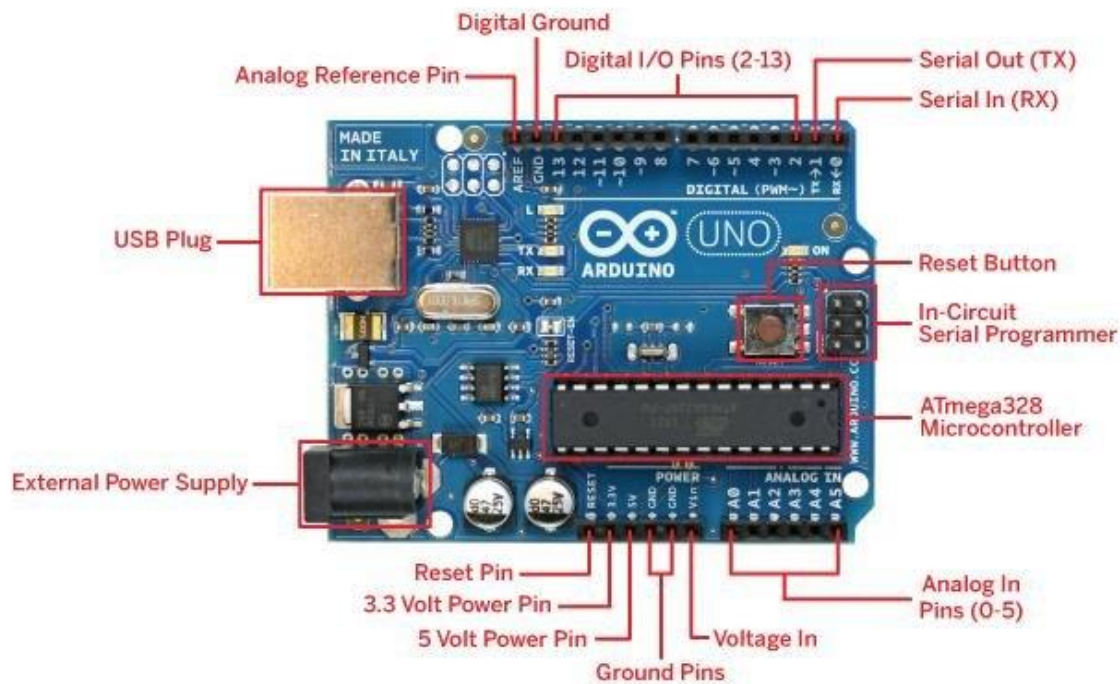
System Flow Chart :

The footbridge is designed and implemented such that differently abled people and a person with a heavy luggage can move easily from one railway platform to the other platform
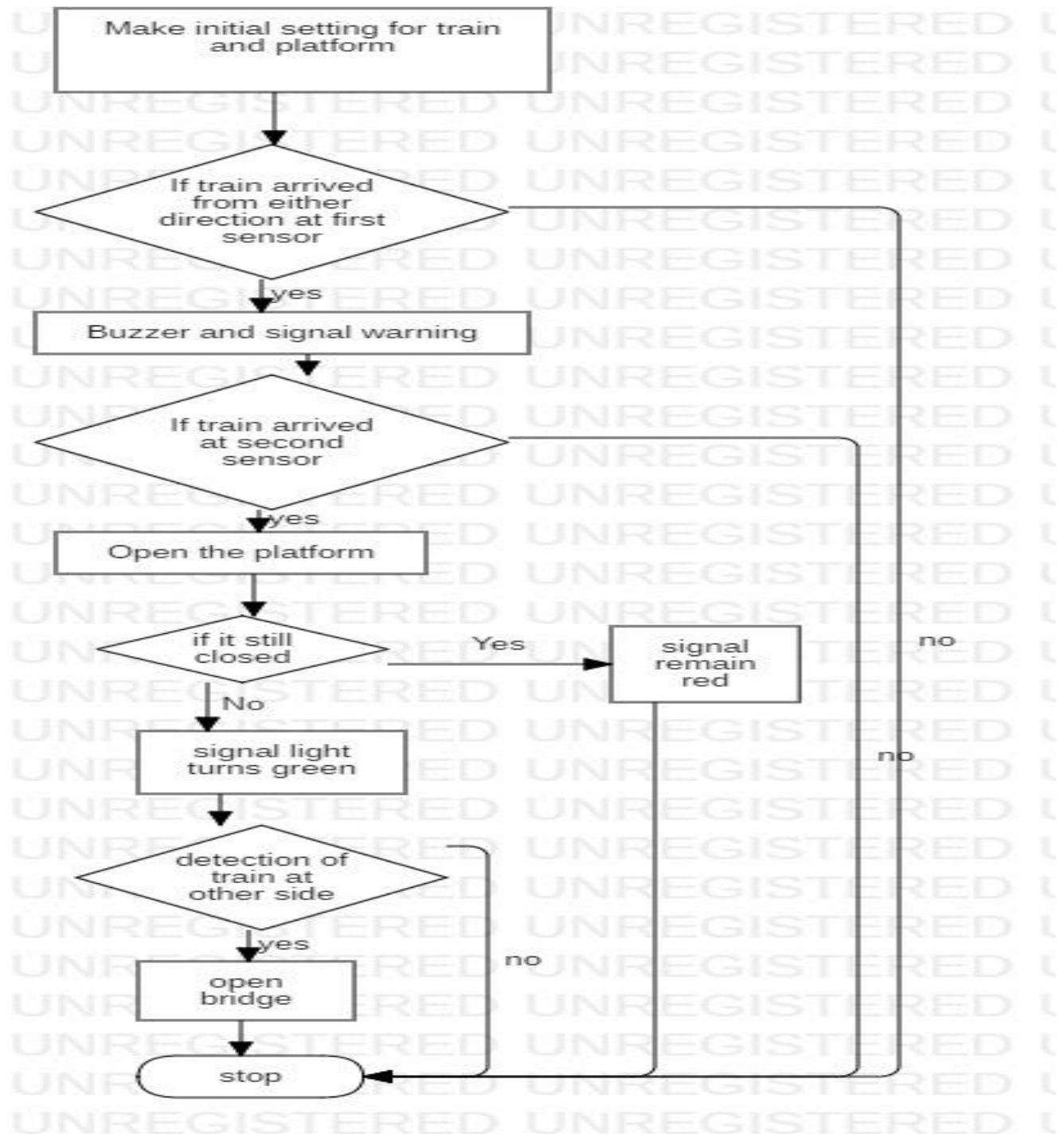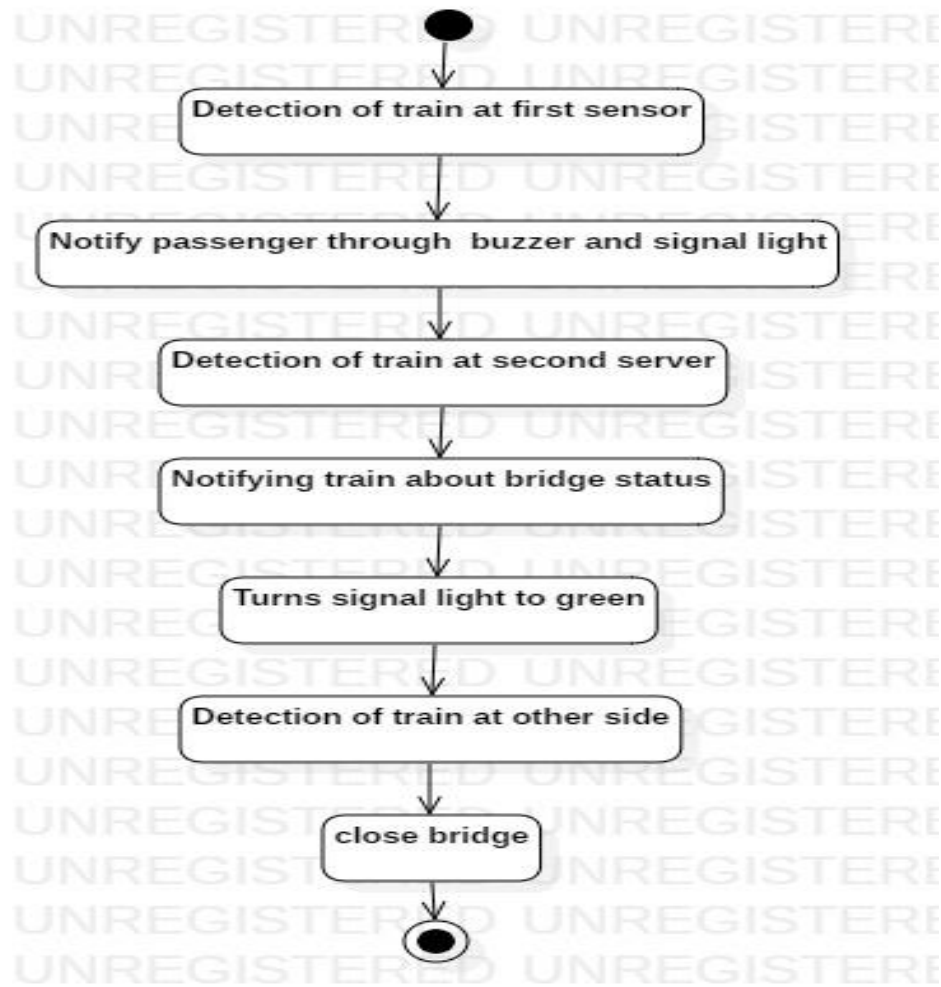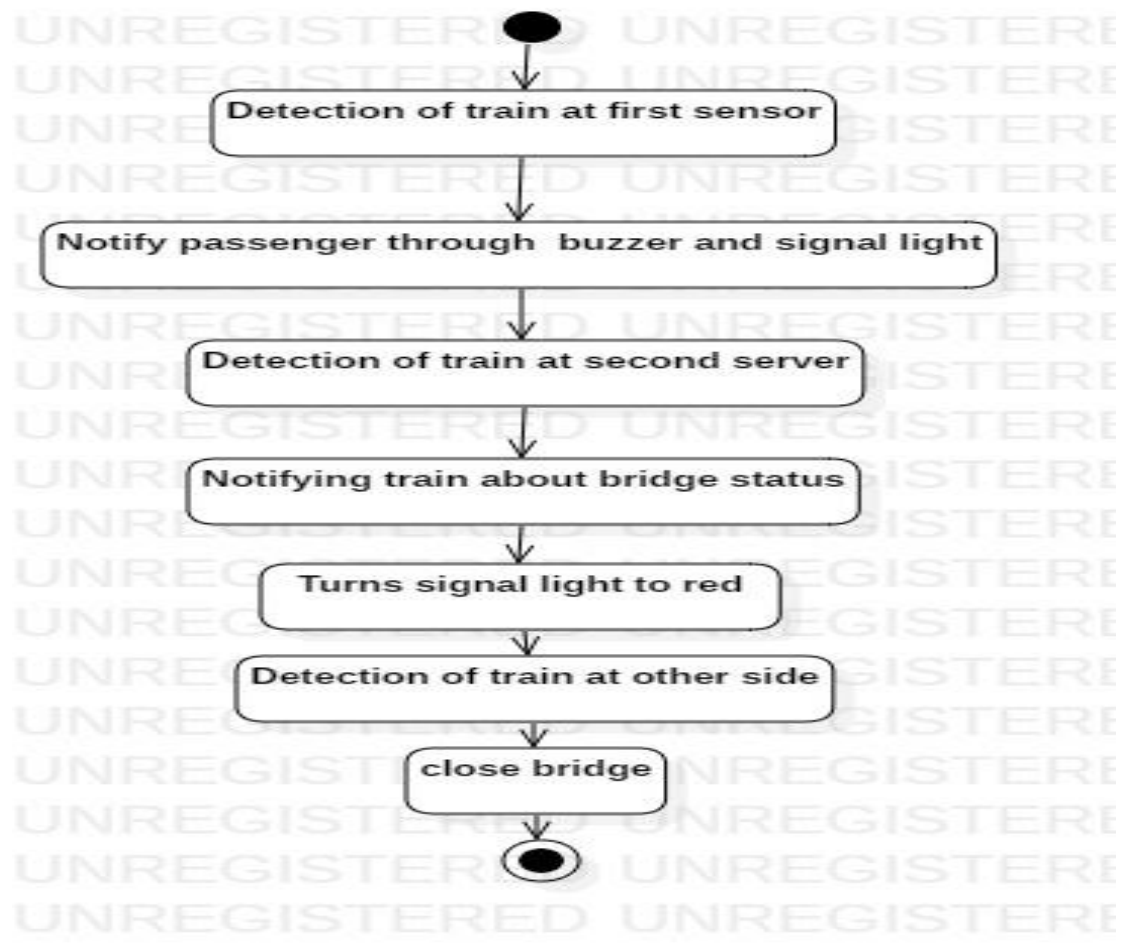
Activity Diagram :

Activity diagram is defined as a UML diagram that focuses on the execution and flow of the behavior of a system instead of implementation. It is also called object-oriented flowchart. Activity diagrams consist of activities that are made up of actions which apply to behavioral modeling technology.

➢ According to the activity diagram the flow of a system is as follows:

When the first sensor detects the train.A notification will be given to the passenger using buzzer and signal lights i.e leds.After that when the second sensor detects the train then bridge will open and if the bridge is still closed then the train will be notified about the bridge status by using a signal light.If sensor on the other side of the platform detects the train then the bridge will again close.

Detection of train at first sensor

Notify passenger through buzzer and signal light

Detection of train at second server

Notifying train about bridge status

Turns signal light to green

Detection of train at other side

close bridge

Detection of train at first sensor

Notify passenger through buzzer and signal light

Detection of train at second server

Notifying train about bridge status

Turns signal light to red

Detection of train at other side

close bridge

Sequence Diagram:

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System Implementation

Coding:-

User Manual

System Testing

Testing Methodology

Testing is a process of executing a program with the intent of finding errors. A good test case is one that has a high probability of finding an as yet undiscovered error. A successful test is one that uncovers an as yet undiscovered error.

If testing is conducted successfully, it will uncover error in the software and testing demonstrates that software functions appear to be working according to specification, that behaviour and performance requirements appear to have been met. In addition, data collected as testing provide a good indication of software reliability and some indication of software quality as a whole. But testing cannot show the absence of errors and defects, it can only show that errors and defects are present.

Testing Methodology to be adopted

All testing should be traceable to customer requirements.

- Test should be planned long before testing begins.
- Testing should begin in small scale and progress towards large scale.
- Exhaustive testing is not possible.
- To be most effective testing should be conducted by independent third party.

Testing Methods:

Test must be designed with the highest likelihood to find possible errors in the system to avoid major problems before the system goes live. There are two methods to design the test cases.

Verification and validation:

Verification refers to the set of activities that ensure, software correctly implements a specific function. Validation refers to different set of activities that ensures the software that has been built is traceable to customer requirements.

Types of testing

Alpha testing: It tests the software at the developer's site. Software testers conduct the tests using information about customer requirements. It is usually done in the presence of the developer.

Beta testing: It tests the software at the client's site. End user performs testing in absence of the developer and lists down all error and problems occurred during the testing.

System testing: Tests to examine compatibility of software with hardware such as CPU, RAM, and disk drives, etc.

Recover testing: Uses test cases to examine how easily and completely system recovers from disasters such as power failure, or disk crash or any natural disaster.

Performance testing: Tests the performance level of the software when load is low and when load is heavy or regular and records the amount of resource that the software uses.

<u>Test Cases</u>:

Conclusion and Future Enhancement

Conclusion:

The aim of this paper was to develop a system that could help the disabled person to cross the railway platform in far easy manner.

The project will save the energy comparatively to elevator, because of this project crossing of platform will be so easy. This project prevents the level of accidents. Peoples who have factures, leg cramps, chronic foot pains and etc. they also can cross the platform easily as well as it is also helpful for the senior citizens who have problem for crossing the platform by using the bridge.

FUTURE SCOPE

The modifications to be done in this project are in a new recognition method using stereo vision which calculates automatically volume of objects in bridge can be used. Moreover, we consider other dangerous factors, such as safety accidents as fall between a platform and a train, getting stuck between the bridges.

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