

Railway Track Pedestrian Crossing between Platforms

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Abstract: This project is used for automatically close or open the mobile platforms in between the track trains. Normally the mobile platform connects the two platforms through which the passenger can walk on the platform to reach on the next platform. Sensors are placed on the two sides of track. If the train reaches one sensor the mobile platform will automatically close and allows the train to go through the tracks and then when the train leaves the second sensor the mobile platform will automatically open the bridging platforms. The microcontroller will sense the presence of train by using infrared sensor. So on sensing the train on one path the controller will give pulses to the stepper motor to close the mobile platform automatically.

Index Terms: IR-Sensor, Dc Gear Motor, Pic Microcontroller .

I. INTRODUCTION

The present railway systems in India are not automated which are fully manmade. In railway stations normally we use bridges. It is very difficult for the elderly persons or handicapped persons to use the bridge. This paper finds a good solution. Mainly the tracking of a train is sensed by sensor, this is used for automatically close/open the mobile platform. Sensors are placed on two sides of track to sense the motion of train. The microcontroller will sense the presence of trains by using infrared sensors. So on sensing the train on one path, the controller will give pulses to the stepper motor to close the mobile platform automatically.

II. COMPONENT OF AUTOMATED SYSTEM

Embedded system is a system which comprises both hardware and software to perform specific function. It is designed to do some specific task, rather than to be a general purpose computer for multiple tasks. The hardware components to be used are:

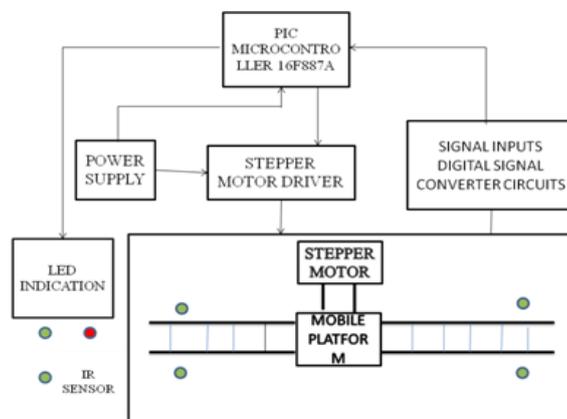
1. IR SENSOR: IR SENSOR is a device that emits and detects infrared radiation in order to sense some aspect of its surroundings. It can sense the heat of an object and detection motion. The radiation is invisible to our eyes but can be detected by an infrared sensor that accepts and interprets it.

2. LCD: It is a type of display used in digital watches and many portable computers. It utilizes two sheets of polarizing material with a liquid solution between them.

3. LED: It is a semiconductor light source used as indicator lamps and are used for lighting.

4. DC MOTOR: The gear having smaller radius will cover more RPM than the one with larger radius. The comparison between input and output gear gives the gear ratio.

III. BLOCK DIAGRAM AND SPECIFICATION



POWER SUPPLY: The main components used in power supply are transformer, rectifier, filter and regulator. The 230V ac supply is converted into 12V ac supply through the transformer. The output of the transformer has the same frequency as in the input ac power. The ac power is converted into dc power through the diodes. The bridge diode is used to convert the ac supply to dc supply. This converted dc supply has the ripple

content and for the normal operation of the circuit, the ripple content of the dc power supply should be as low as possible because the ripple content of the power supply will reduce the life of circuit.

1. **TRANSFORMER:** Transformers convert ac electricity from one voltage to another voltage. Step-up transformers increase voltage, step-down transformer reduce voltage. Power supplies use a step-down transformer to reduce the high main voltage to a safer low voltage.

2. **RECTIFIER:** The rectifier is a device such as a semiconductor capable of converting sinusoidal input waveform units into a unidirectional waveform with a non zero average component. The input to the circuit is applied to the diagonally opposite corners of the network and the output is taken from the remaining two corners.

3. **FILTER:** The capacitors are used as filters in the power supply unit. Shunting the load with the capacitor, effects filtering. The action of the system depends upon the fact the capacitor stores energy during the conduction period and delivers this energy to the load during the inverse or non conducting period.

4. **REGULATOR:** The voltage regulator comprise a class of widely used IC's. Regulator IC units contain the circuitry for reference source, comparator amplifier, control device, over load protection all in a single IC. IC units provide regulation of either a fixed positive voltage, a fixed negative voltage or an adjustable set voltage.

5. **MICROCONTROLLER:** Separate code and data spaces. A small number of fixed length instructions. Most instructions are single delay cycle upon branches and skips. The program is also mapped into the data space and writable. It consist of a memory which is used to permanently save the program being executed.

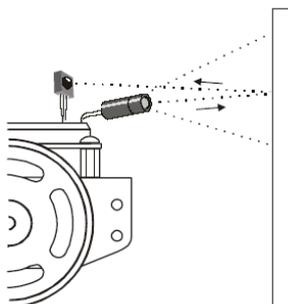
6. **DC MOTOR:** The gear having smaller radius will cover more RPM than the one with larger radius. The larger gear will give more torque to the smaller gear than vice versa. Multiple gears are connected together, conservation of energy is followed.

7. **LED:** The wavelength of light emitted, and thus its color, depends on the band gap energy of the materials forming the p-n junction. In silicon or germanium diodes, the electrons and holes recombine by a non-radiative transition, which produces no optical emission, because these are indirect band gap materials.

IV. INFRARED SENSOR

An infrared sensor is an electronic device that emits and detects infrared radiation in order to sense some aspect of its surrounding. It can measure the heat of an object, as well as detect motion. In a typical infrared sensor like a motion detector radiation enters the front and reaches the sensor itself at the center of the device.

WORKING PRINCIPLE OF IR



The IR detector is only looking for infrared that's flashing on and off 38500 times per second. It has built in optical filters that allow very little light except 980nm IR. It also has an electronic filter that only allows signals around 38.5kHz to pass through. When IR rays get emitted from led, it moves in the direction it is angled. When any obstacle interferes in the path, the IR rays get cut and it produces secondary wavelets which propagates mostly in return direction or in a direction opposite to that of the primary waves, which produces the net result like reflection of IR rays.

TYPES OF INFRARED SENSORS

- **ACTIVE INFRARED SENSOR**

Active sensors employ both infrared source and infrared detectors. They operate by transmitting energy from either a light emitting diode or laser diode. A led is used for a non-imaging active IR detector, and a laser diode is used for an imaging active IR detector.

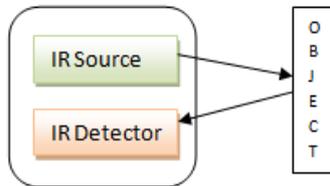
- **BREAK BEAM SENSOR**

This type of sensor consist of a pair of light emitting and light detecting elements. Infrared source transmits a beam of light towards a remote IR receive creating an electronic fence.



• **REFLECTANCE SENSOR**

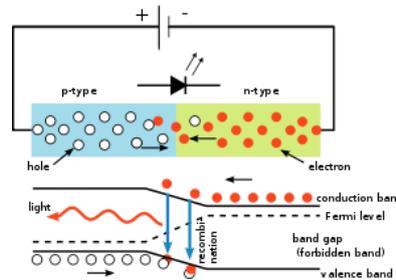
This type of sensors house both an IR source and an IR detector in a single housing in such a way that light from emitter LED bounces off an external object and is reflected into a detector .Amount of light reflected into the detector depends upon the reflectivity of the surface.



V. Led And Its Specifications

LEDs are used as indicator lamps in many devices and are increasingly used for lighting .When a light emitting diode is switched on ,electrons are able to recombine with holes within the device ,releasing energy in the form of photons .This effect is called electroluminescence,and the color of the light is determined by the energy band gap of the semiconductor.

WORKING PRINCIPAL OF LED



The LED consist of a chip of semiconducting material doped with impurities to creates p-n junction. Charge carriers electrons and holes flow into the junction from electrodes with different voltages. When an electron meets a hole, it falls into a lower energy level and releases energy in the form of a photon.

The of the light emitted , and thus its color,depends on the band gap energy of the material forming the p-njunction.The materials used for the LEDs have a direct band gap with energies corresponding to near-infrared,visible,or near-ultraviolet light.

COLORS AND MATERIALS

COLOR	WAVELENGTH	MATERIAL
Infrared		Gallium arsenide
Red		Aluminium gallium
Orange		Indium phosphide
Yellow		Gallium phosphide

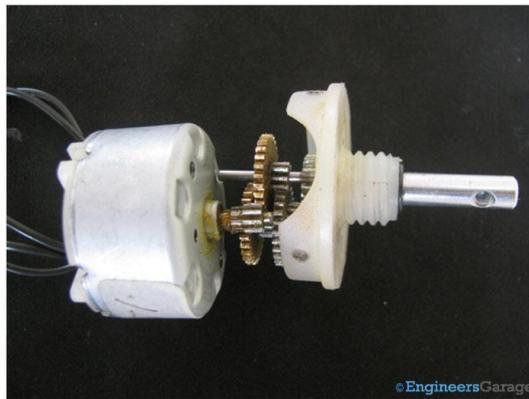
VI. Dc Gear Motor

DC motor works over a fair range of voltage .The higher the input voltage more is the RPM of the motor .if the motor works in the range of 6-12V ,it will have the least RPM at 6V and maximum at 12V.

RPM=K1*V, where ,
 K1=induced voltage constant
 V = voltage applied

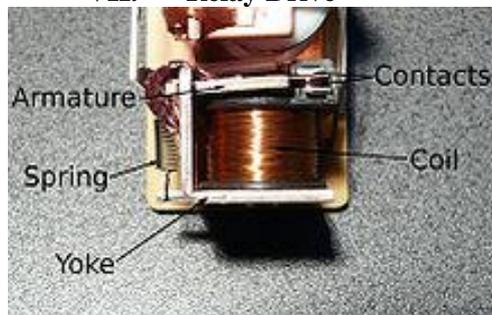
WORKING OF DC GEAR MOTOR

The working of the gears is explained by the principal of conservation of angular momentum.The gear having smaller radius will cover more RPM than the one with larger radius,the larger gear will give more torque to the smaller gear than vice versa.RPM and torque are inversely proportional.The gear having more torque will provide a lesser RPM and converse .



The gear connecting the motor and the gear head is quite small, it transfers more speed to the larger teeth part of the gear head and makes it rotate. The larger part of the gear further turns the smaller duplex part. The small duplex part receives the torque but not the speed from its predecessor which it transfers to larger part of other gear and so on.

VII. Relay Drive



A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism, but other operating principles are also used. Relays find application where it is necessary to control a circuit by a low-power signal. Relays found extensive use in telephone exchange and early computer to perform logical operations. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device triggered by light to perform switching.

WORKING PRINCIPLE

A small electronic relay consists of a coil surrounding a soft iron core, an iron yoke, which produces a low reluctance path for magnetic flux, a movable iron armature, 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 is closed, and the other set is open. Other relays may have more or fewer sets of contacts depending on their function. When an electric current is passed through the coil, the resulting magnetic field attracts the armature, and the consequent moment of the movable contact or contacts either makes or breaks 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, if the contacts were open.

VIII. RESULT

This experiment is used for automatically close/open the mobile platform. It saves the time for passengers to cross the next platform. Thus the sensing is made continuously whenever the train arrives and passes through.

IX. CONCLUSION

Thus the tracking of train is sensed continuously, which automatically close/open the mobile platform is partially automated which is beneficial for passengers to cross the rail grade crossing. The system is a fully automated instead of climbing the staircase. This efficient method will be more compact for scheduling the train timings for reaching the particular destination and also for crossing the suitable platforms.

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