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Self Guided Auto Platform for Handicapped

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Abstract:
In today's world things should be work with less time consumption and accuracy, so here we came up with an idea which is going to help handicaps which works as a helping hand. For them in this world which is full of technologies. The main focus is on railway station platform. They face many problems while accessing staircases and high altitude area with their wheel chairs and etc. So, to help them we came up with an idea named as "self guided auto platform for handicapped". The system works on basic data communication and the base motion. It will have robust mechanical structure like a trolley which can be further intended for other uses. In the mechanical part of this structure contains material are water resistant, it can withstand in any type of whether, atmospheric conditions and it can easily carry heavy loads/weights. In this system we are using Arduino UNO board as main controller, color sensor for sensing the exact location of bogie door, for communication purpose we are using Zigbee to communicate with control system by which we can know that it is going to stop and start. The overall system of self guided auto platform will is a line follower which will start with signal from Zigbee. After this it activates the trolley and then trolley is such that it levels the train's door height by which users can easily enters into the trains. This trolley is designed in such a way that users can use it easily in slope areas also. The inclined angle is tentaviley decided around 15-30 degree. So, when users get entered into train then when train departs the Zigbee module gives signal to trolley and with the help of time then when train departs the Zigbee module gives signal to trolley and with the help of time break trolley comes back to its initial position and after some time it again goes back to its starting position.

Keywords: Railway, Platforms, Handicapped, Disabled, Lift, Automation, Trolley, Mobile Device, Wheelchair, Automatic Moving Platform

I. INTRODUCTION

In recent years, accessing the places with high altitude and slope is very difficult for handicap peoples. So, for that we visited some places and gone through some railway ministry projects and found problem for handicap peoples while accessing train bogies on railway station and other places with high altitude and slopes. In our project first we made a block diagram then found components and software to be used in our project. We are going to make a machine or Escalator which helps them to access the high altitude and slope areas easily in which we are using microcontrollers interfacing, Zigbee and some other components related to our project. In this project we found a solution for above mentioned problem that we make a trolley which carry handicap peoples to doors of train bogies by doing so they can easily access the train and this whole system is automatic which works automatically when train arrives.

II. PROBLEM AND SPECIFICATION

The main problem we have observed that it is not easy for handicaps to access the high altitude and slope areas like in trains the distance between train doors and platform is very wide due to which they face problem while climbing that train ladder to get into train sometimes trains start moving because of their short stopping time and due to which they are not able to catch trains.

III. TOOLS USED

1. AURDINO UNO

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board – you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.

2. Zigbee

Zigbee is a wireless networking standard that is aimed at remote control and sensor applications which is suitable for operation in harsh radio environments and in isolated locations. Zigbee technology builds on IEEE standard 802.15.4 which defines the physical and MAC layers. Above this, Zigbee defines the application and security layer specifications enabling interoperability between products from different manufacturers. In this way Zigbee is a superset of the 802.15.4 specification. With the applications for remote wireless sensing and control growing rapidly it is estimated that the market size could reach hundreds of millions of dollars as early as 2007. This makes Zigbee technology a very attractive proposition for many applications.

3. Ultrasonic Sensor HC-SR04

It emits an ultrasound at 40 000 Hz which travels through the air and if there is an object or obstacle on its path It

will bounce back to the module. Considering the travel time and the speed of the sound you can calculate the distance. In order to generate the ultrasound you need to set the Trig on a High State for 10 µs. That will send out an 8 cycle sonic burst which will travel at the speed sound and it will be received in the Echo pin. The Echo pin will output the time in microseconds the sound wave traveled. For example, if the object is 10 cm away from the sensor, and the speed of the sound is 340 m/s or 0.034 cm/µs the sound wave will need to travel about 294 u seconds. But what you will get from the Echo pin will be double that number because the sound wave needs to travel forward and bounce backward. So in order to get the distance in cm we need to multiply the received travel time value from the echo pin by 0.034 and divide it by 2.

4. 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. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and these output voltages, change in proportion to the magnitude of the IR light received.

5. L298N Motor Driver

Double H driver module uses ST L298N dual full-bridge driver, an integrated monolithic circuit in a 15- lead Multiwatt and PowerSO20 packages. It is a high voltage, high current dual full-bridge driver designed to accept standard TTL logic levels and 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 input signals. The emitters of the lower transistors of each bridge are connected together and the corresponding external terminal can be used for the con-section of an external sensing resistor. An additional supply input is provided so that the logic works at a lower voltage.

6. RFID

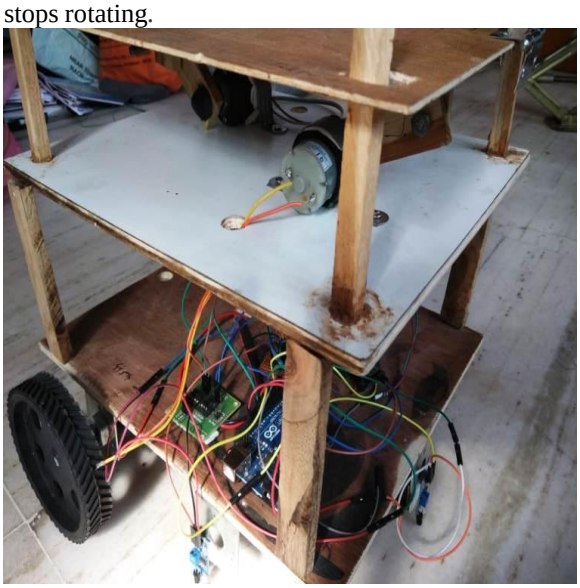
Radio-frequency identification uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically-stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source and may operate hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is one method for Automatic Identification and Data Capture.

RFID MODULE

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader.

IV. IMPLEMENTATION

The line fallowing robot is one of the self-operating robots. That detects and fallows a line drawn on the area. The line is indicated by white line on a block surface or block line on a white surface. This system must be sense by the line. This application is depends upon the sensors. Here we are using two sensors for path detection purpose. That is proximity sensor and IR sensor. The proximity sensor used for path detection and IR sensor used for obstacle detection. These sensors mounted at front end of the robot. The microcontroller is an intelligent device the whole circuit is controlled by the microcontroller. It consists of an IR-LED and Photodiode arrangement for each motor which is controlled by the switching on and off of the transistor. The IR LED on getting proper biasing emits Infra red light. This IR light is reflected in case of a white surface and the reflected IR light is incident on the photodiode. The resistance of the photodiode decreases, which leads to an increase in current through it and thus the voltage drop across it. The photodiode is connected to the base of the transistor and as a result of increased voltage across the photodiode, the transistor starts conducting and thus the motor connected to the collector of the transistor gets enough supply to start rotating. In case of a black color on the path encountered by one of the sensor arrangement, the IR light is not reflected and the photodiode offers more resistance, causing the transistor to stop conduction and eventually the motor stops rotating.



V. SIMULATION

The below program is containing the motion as well as sensor command interface where four Wheels of the moving automatic platform are given command on the basis of sensor readings. The motors have been initialized as mot1, mot2, mot3 and mot4 for output pins of the Arduino chip 9, 6, 5 and 3 respectively. The ADC pins have been connected to the individual sensor to direct the bot as per the readings. Initially, the pins are 0 when no start command is given to the moving bot. the sensors have been given an initialization as left sense and right sense for sensing the left and right direction of the moving platform. When left sense is high, the controller sends the operating command to the mot1 and mot4 for the given direction. Similarly, when right sense becomes high, mot2 and mot3 are made high as their set command respectively. Thus the loop for color sensor increments to 1 the motor run command is executed. But before it enter the do loop to set the motion of the platform; it compares the high value 1 by the communication module and the high value from the color sensor. If the value of color sensor as well as communication module goes low i.e.; 0, then the

reverse motion of moving platform is executed and thus the platform gets set to its final position of rest.

VI. SUMMARY OF PROJECT

The aim of our project is to help handicaps by making a trolley which carry handicap peoples to doors of train bogies by doing so they can easily access the train and this whole system is automatic which works automatically when train arrives. For making it automatic we use microcontroller interfacing, Zigbee, motors and etc. by the help of all these things it activates by itself and works automatically.

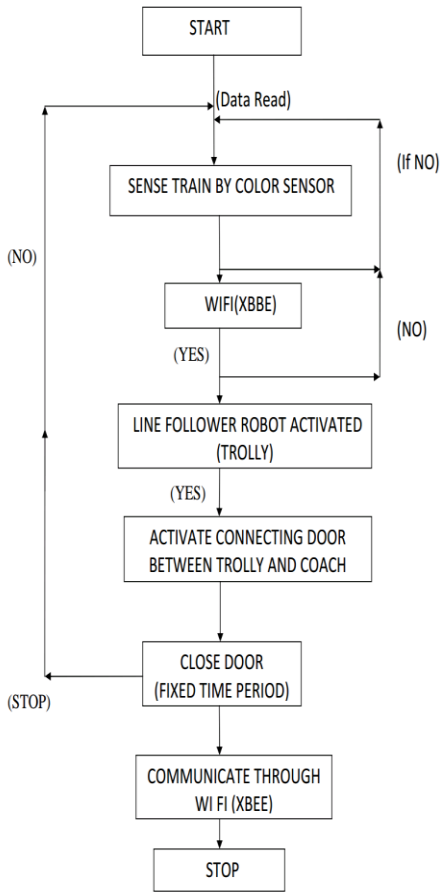
VII. ADVANTAGES

- No Air Pollution.
- Compact machine.
- No Noise.
- Smooth Speed control.
- Efficient Control due to the use of Microcontroller.
- Efficient Control due to the use of Microcontroller.
- Low cost.
- Economical for every people.

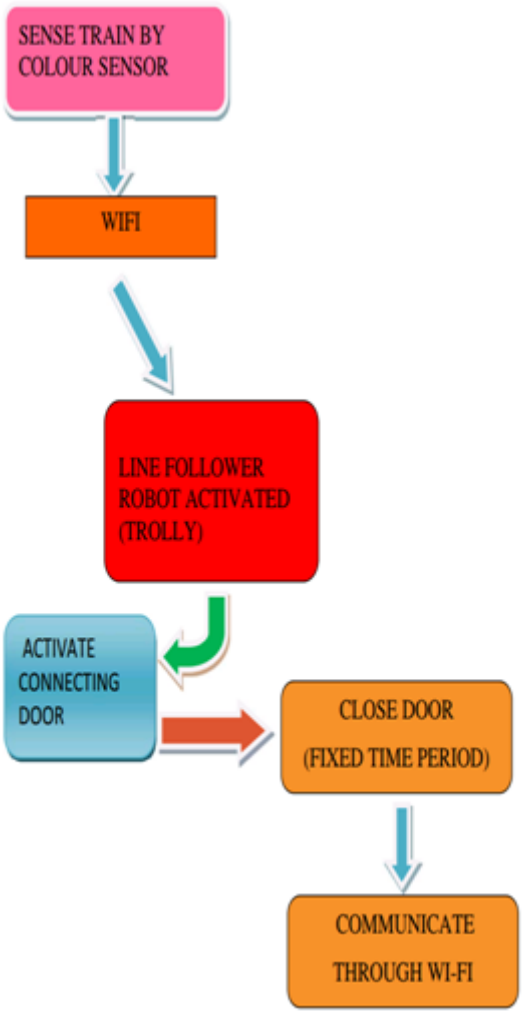
VIII. APPLICATION

-Vehicle leveler for aged peoples.
-For heavy luggage carriers at stations.
-To carry handicapped peoples to different stops.
-Can also help visually impaired peoples to access their stops easily.
-Can be used as mobile carrier device in industries.

IX. FLOW CHART



X . FLOW CHART



XI . FUTURE SCOPE

In this semester we are working on our programming section for our project and in next semester we are going to make mechanical structure for our project which is going to work automatically Some improvements that could be made are as follows: Increasing the range of the ultrasonic sensor and implementing a technology for determining the speed of motors foe the moving trolleys. We can use buzzers to make people alert about the moving trolley and some more useful specifications which would increase the reliability for the use at crowded areas. We can also use another sensor for detecting any pillar and other big Obstacles in the way of trolley which are not detected easily by ultrasonic sensor.

XII. CONCLUSION

The aim of this concept is a development work of an assistive movable trolley for the impaired people that help them to easily carry them through the heavy crowd and cross the obstacle such as getting inside the train's bogie without anyone's help, which is named self guided auto platform. With the proposed architecture, if we construct it with more accuracy, the disabled people will be able to move from one place to another without others help. If such a system is developed, it will act as a basic platform for the generation of more such devices and more products for the disabled and handicapped in future which will be cost effective. The developed prototype gives good results in covering the level between the floor and the bogie's door entrance

paced at distance in front of the user. The solution developed is a moderate budget navigational aid for the physically handicapped. However minimizing cost leads to compromises in performance. It is advised that the design be improved before commercial production.

XIII. REFFERENCES

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