ABSTRACT

The main motto of this article is pollution control by designing e-bike which is the need of the hour also saves time and energy of elderly people who have to walk long distances in college. In this project the IR sensors connected to Arduino controller are used to capture the hand movements of the person present on the e-bike based on the inputs given by the IR sensors to the Arduino controller. The classification of e-bikes is mainly decided by whether the e-bike motor assists the rider using a pedal-assist system or by a power-on-demand one. To overcome this drawback, we are introducing the sensor operated smart E-bike integrated on its dashboard to move in college campus or hospitals etc. The main intention of this paper is to build smart E-bike for higher authorities to move freely around the campus and monitor the classroom.

Keywords: Sensor, E-Bike, DC Motor, Arduino.

1. INTRODUCTION

In this paper the e-bike provides solution for the higher authorities in colleges or hospitals who cannot move for longer distances and monitor the classrooms, The e-bike moves on the hand movement of the person present on the vehicle. These hand movements are detected by IR sensors present at the handle [1-2]. The movement of the e-bike is controlled by motor drivers connect to motors along with wheels. IR sensors are interfaced to the motors for the e-bike movements with the help of microcontroller. In this project the microcontroller used is Arduino microcontroller [3]. The main concept of this methodology is to reduce the effort of higher authorities by moving around the campus freely with a self balanced bike. The E-Bike is powered by 12V rechargeable battery which can be charged after daily use [4]. The Bike can be moved with the help of IR sensors present on the handle of the bike as shown in Fig.1. These IR sensors detect the user’s hand and give signals to the Arduino development Board (ATMEGA328p). This Arduino microcontroller takes the signals from the IR sensors and produce signals to the Motor driver based on the logic [5-7]. The motor driver is interfaced with the DC motors fixed to the Bike which helps the bike to move in all four directions. When user’s both hands get detected by two IR sensors the bike moves forward, when user’s left hand get detected by left IR sensor the bike turns left and when the user’s right hand get detected by right IR sensor the bike turns right [8-11].

Literature Survey

Prabhakar Reddy et al. [12] proposed the new design “An intelligent cane robot” for aiding elderly and handicapped people’s walking. Author designed a device using ARM 32-bit microcontroller which supports features for the development of cane robot. A new designed robot is used as a support for elders and for handicapped people. The new system contains...
ultrasonic sensors, IR sensor and motors for controlling movement.

The author uses three ultrasonic sensors placed at three directions of robot which detects leg movement of person then based on that leg movement robot direction gets changed. If a person tries to move straight the ultrasonic sensor detects his leg movement then simultaneously cane robot also moves one foot forward. If ultrasonic sensor connected at sides detects leg movement then it changes one foot either left or right direction. The IR sensor is connected to robot at front which is used to detect obstacles in front. When it detects obstacles in front of it then it automatically stops movement of robot. Motors connected to controller are used for robot movement.

C. Sivapragash et al.[13] proposed a design based on the microcontroller with automation technology, consisting of components such as ATMEGA328 and PIC30F2010 as a controller, three phase inverter, solar panel, hall effect sensor, variable resistor etc. In the existing system, a traditional bicycle which is a two-wheel vehicle propelled by the rider, delivers 50% muscle power through pedals that rotate one of the two wheels and 50% motor powered to rotate the wheel for riding the bicycle, the motor used in the existing system is brushed dc motor, it has less efficiency. Electric bicycle have simultaneously gained popularity in many regions of the world and some have suggested that it could provide an even higher level of service compared to existing systems. In the proposed system an electric bicycle carries batteries that delivers electric power to a motor that is coupled to either wheel, the motor used here is brushless dc motor, it has high efficiency. The project consists of additional features such as LCD display, umbrella, mobile charger, Bluetooth connectivity, and speaker. The electric bicycle offers a cleaner environment, easy to travel short-to-moderate distances instead of driving a petrol/diesel-powered automotive which is a heavy toll for the environment.

Proposed Methodology

We proposed a new concept which is sensor based E-bike for college campus for monitoring which consist of two wheels connected to two dc motors arranged side-by-side, with a small platform between the wheels, on which the rider stands. Overall working of new methodology as shown in Fig. 2. The directions of the E-bike are controlled by the rider & the hand positions which are detected by IR sensors are connected to the arduino controller which gives commands to the E-bike to move accordingly as well as there is an integrated manual operation. The main intention of this new module is to build a smart E-bike for higher authorities to move freely around the campus and monitor the classrooms. This E-bike can be operated using hand movements or with manual joystick operations and also comes with a dashboard on which control switches for bike movements, horn and light can be mounted.

Fig. 1: Block Diagram of Proposed System

Fig. 2: Flowchart of Sensor Based E-Bike for College Campus
Algorithm

Step 1: Initially 5v power supply is given to the IR Sensor, Arduino microcontroller and motor driver.

Step 2: IR Sensor is ready to receive the commands.

Step 3: If the IR Sensor 1 is off and IR Sensor 2 is ON then the E-bike moves left side.

Step 4: If the IR Sensor 1 is ON and IR Sensor 2 OFF command is RIGHT the E-bike moves right side.

Step 5: If the IR Sensor 1 is OFF and IR sensor 2 OFF command is STOP the E-bike stops moving.

Step 6: If the IR sensor 1 is OFF and IR sensor 2 off command is STOP the E-bike stops moving.

Step 7: If the switch 1 is pressed the E-bike moves forward.

Step 8: If the switch 2 is pressed the E-bike moves backward.

Step 9: If the switch 1 is pressed the E-bike moves forward.

Step 10: If the switch 4 is pressed the E-bike moves left.

Results and Discussions

In this project, we are going to provide the help for higher authorities while moving in the college campus. This project will be a great help for those who cannot walk for longer distances by using IR sensors and manual operations the rider can interface the hand movements with microcontroller and E-bike.

Test Setup

Sensor Based E-Bike for College Campus Trainer Kit When the sensor 1 and sensor 2 is off then the E-bike get stops.

- The sensor 1 and sensor 2 is on then the E-bike moves forward.
computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). The name comes from the common use of a cloud-shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts remote services with a user's data, software and computation. Cloud computing consists of hardware and software resources made available on the Internet as managed third-party services. These services typically provide access to advanced software applications and high-end networks of server computers. Cloud Computing comprises three different service models, namely Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS). The three service models or layer are completed by an end user layer that encapsulates the end user perspective on cloud services.

**Conclusion**

It has been mainly designed in order to reduce human efforts. Many existing systems have discussed about E-bikes and have proposed many methods for reducing their efforts but still there is a difficulty in moving manually. So, in order to avoid the difficulty, instead of walking in campus electrically or by gestures, our project succeeded in moving the wheelchair using hand movement. When the hand movements are given by the person standing on the E-bike, using IR sensors the commands are received.

**REFERENCE**


