Survey Paper on Automatic Cart Movement Trailer

Husain Bohra[1], Megha Akare[2], Dolly Chouhan[3], Nikita Guhe[4], Prof. Shailesh Kurzadkar[5]

[1,2,3,4]Computer Technology, K.D.K College of Engineering Nagpur, India
[5]Guide, KDK College of Engineering, Nagpur, India

Abstract—. With huge advancement of technology automation proved to be a key to forge future. Automatic cart movement trailer is a combination of two main activities performed constantly i.e., motion and dragging. The cart will move using the wheels attached to it. Whereas, dragging will be done by the remote-control cloud-based Wi-Fi module attached to the cart along with the controlled Ultrasonic sensors. This technology is needed as it lessens the human effort and makes it convenient to trail the baggage or luggage without having to drag it actually. Other than this, it will also contain an API modeled code which will give an alert to the owner of the cart by the means of alarm or text message which will inform that the cart has been separated by its targeted object or exceeds the range of the modeled ultrasonic sensors. Using IoT technology, a cloud based Wi-Fi module will send the data to cloud giving the knowledge of distance and confirming that whether the cart is in range with the targeted object or not and the computing platform enables the cart to follow its targeted object using the code and the algorithms includes in it and the cart will move.

Keywords- *Automation, cart, motion, API, wi-fi, cloud, message, alarm, distance, range, technology, IoT*

1. INTRODUCTION

In last few years automation has gained a huge success and development in the field of technology.

Information can easily be provided to the machines and they can adapt the requirements and work according to it. Automation provides its end-users with the advantage of efficiency and less time-work for accomplishing a task.

Automatic Cart Movement Trailer is proposed to make less human effort with more use of work. It provides ease for the dragging and carrying of the luggage.

For example, Line follower robot.

IoT (Internet of Things) is implemented within the cart to provide various details i.e., it will monitor whether the distance between the cart and the targeted object is within the ambit or not, it will try to maintain that distance and if the distance exceeds its limit, then it will provide an alert.

2. RELATED WORK

Mehran Pakdaman, M. Mehdi Sanaatiyan [1] have proposed that, the Line follower Robot which can detect and lead the way followed by the line drawn on the floor. It can also be used in motion trajectory to construct the object storage system and can be considered as self-operated machine. The Infrared Ray (IR) sensors are installed under the robot which is capable to sense the line. We explore the functioning of following the targeted object using sensors, the process of self-operation and analyze its applications for IoT in conference paper.

Mustafa Engin, Dilşad Engin [2] have proposed the Path planning of line follower wheeled mobile robot. To receive data from Infrared Line sensors the microcontroller is chosen which react towards it. To improve the navigation reliability a dynamic PID control algorithm has been proposed which can be performed under the system real-time requirements. Through Experimental results we can see the proposed algorithm can successfully achieve target following in various scenarios, which includes straight line, circular and sharp-turn motion.

3. ARDUINO

Arduino consist of a physical programmable circuit board (microcontroller) and a piece of software, or IDE i.e. Integrated Development Environment which runs on computer, used to write the computer code and upload it to the physical board [3].

3.1 Arduino requires following configuration:

- Microcontroller – Atmega328P – 8 bits
- Analog Input Pins – 6 (A0-A5)
- Digital I/O Pins – 14 (6 for output)
- DC Current – 40 mA (on I/O Pins)
- DC Current on 3.3V Pin 50 mA

Fig 1: Arduino

3.2 Arduino connects to the wheel of cart and provides movement as per the direction needed. Arduino proved as an easy tool for the students having no background in electronics and programming. Fast prototyping can be done using this tool. It has affected a wider community due to its simply accessible user experience.

3.3 Arduino is used as a brain for many projects for a long period counting from everyday objects to expertise instruments. They are open-source which enables user to construct them freely and make it as per user requirements.

4. INTERNET of THINGS

Internet of Things is a computing concept system in which various physical objects are connected to the internet and are able to individualize themselves to other devices. IoT is capable of transferring the data over network without the need of human-to-human or human-to-computer interaction. It provides the interface between internet and the devices which in-turn gives the output as an automation of the device. Like servers are used to store the information of local computers, similarly in IoT cloud computing is used to store the data and information which provides the data when and where required through internet connectivity.

Fig 2: IoT (Internet of Things) Cloud

IoT may include sensor technologies, wireless technologies or even QR codes when required as it is user friendly and work according to the algorithms given by user to fulfill user requirements. IoT is closely identified by RFID as it is used as a communication means to connect between device and cloud.

A. Wi-Fi Module

This is where all the codes will be written and deployed to the cloud for gaining remote connection. Wi-Fi module is the basic hardware which contains a Wi-Fi circuit which provides the connection of Internet through the ISP (Internet Service Provider) to the module which in-turn connect the module to the cloud.

Fig 3: Wi-Fi Module

B. Ultrasonic Sensors

Ultrasonic Sensors are used to find the targeted object and used to maintain contact with it till a distance of 400 cm. They are the highest technological sensors which are used in the cart to sense the targeted object and remain in its radius of 400 cm around that object.

Fig 4: Ultrasonic Sensors

C. SMS/ Buzzer technology

APIs are the connection made between a third-party application and the IoT Wi-Fi module which allows to send data notification in terms of text or attachment sharing the status of the module if it reaches or touches a threshold value which is marked in the algorithms of the module.

In this project, this technology is used to give a notification to the user notifying that the targeted object is not in the range of the module i.e., 400 cm. If so happens, then the module will send a text or notification to the respective targeted third-party software about the condition occurred.

5. CONCLUSION

This paper concludes that automation can be achievable in near future in each and every field which is related to living species and its environment. Automatic Cart Movement Trailer brings a new definition in the history of wheels by adding automation in the regular lifestyle. Internet of Things brought a whole new revolution in the lifestyle by providing ways in which such beneficial projects could be developed.

6. FUTURE SCOPE

This application can be used in any moving machine which needs to follow a targeted object. In future, Artificial Intelligence can be compiled in this application to make the device smarter and more specific to its object.

7. ACKNOWLEDGEMENT

We thank each and every person who was involved with us throughout the project and gave us confidence. Small efforts can also lead to biggest achievements. Without you we could have never reached this level of success in this project. We thank our teachers, guides and colleagues for their unwavering support.

REFERENCES

[1] Mehran Pakdaman, M. Mehdi Sanaatiyan, "Design and Implementation of Line Follower Robot", 2009 Second International Conference on Computer and Electrical Engineering.

[2] Mustafa Engin, Dilşad Engin, "Path Planning of Line Follower Robot", 2012 5th European DSP Education and Research Conference (EDERC).

[3] Dr. Antonio Carlos Bento, "IoT: NodeMCU 12e X Arduino Uno, Results of an Experimental and Comparative Survey", Volume 6, Issue 1, January 2018, International Journal of Advance Research in Computer Science and Management Studies.