OBSTACLE AVOIDANCE ROBOT USING RASPBERRY PI

ANITHA B, Mrs. AMSAVALLI K

Student, Department of computer science Engineering, Anand Institute of Higher Technology, Chennai, Tamil Nadu, India
Assistant Professor, Department of computer science Engineering, Anand Institute of Higher Technology, Chennai, Tamil Nadu, India

ABSTRACT

An obstacle avoidance robot is used to detect the objects which are near and it is fast evolving technology, the number of robots and their complexity are increasing with different applications. It determines what, when and how a robot does something. In existing system, they made with only ultrasonic sensor module to detect the objects using ultrasonic waves. The proposed system focuses on how the objects are detected using pi camera using Image processing. Thus, it overcomes the flaws of existing system and increase the performance using fuzzy logic in artificial intelligence. This raspberry pi is used for the live streaming videos. This data will be feed to the system.

Keyword: *Artificial intelligence, Raspberry pi, pi camera, OpenCV algorithm*

1.INTRODUCTION

The concept of robotics is a branch of artificial intelligence, which is composed of computer science, electrical and mechanical engineering. This robot deals with the study of obstacles using artificial intelligence with the help of raspberry pi. Here so many obstacle avoidance robots are used to detect the objects which are in front. This robot is used with the help of ultrasonic sensors. But in this robot, it uses only raspberry pi and ultrasonic sensors. The robot is used with python program and OpenCV library.

The requirements for the robot are raspberry pi, raspberry pi camera, motor drivers. It performs several tasks like detecting the objects in front and far away. In the traffic signal the symbol data will be feed.

The steps to avoid the obstacles will be:
Step 1: Follow the path
Step 2: Using camera it detects the objects
Step 3: The robot moves accordingly.

1.1 OBJECTIVE

In this project it uses OpenCV library using python language. This robot can also be called as autonomous car, it greatly reduces the number of accidents on our roads. It will increase the safety by using artificial instead of human intelligence to detect objects in the road that should be avoided. Here the traffic data will be detected using the raspberry pi.

1.2 SCOPE

The scope of the project is to detect using raspberry pi camera, this robot is able to produce the basic walking movements using motors. It automatically detects the obstacles near by and it moves accordingly with left and right directions. It detects the traffic signals like stop signal and other signals.

2. EXISTING SYSTEM

In existing system only ultrasonic sensors are used to measures the distance of an object using ultrasonic waves. It is an intelligent device which can automatically sense the obstacles in front of it. Its main disadvantages are ultrasonic waves can't detect the objects if it is far away and the movement will be less when compared to the proposed system. Here temperature fluctuation affects the speed of an ultrasonic sensors sound waves.

3. PROPOSED SYSTEM

In proposed system, using pi camera to capture the exact obstacles using fuzzy logic in artificial intelligence. This robot can imitate biological behaviours such as avoiding obstacles or following walls, it detects the stop sign in traffic rules. And here image processing technique is used.

In this robot it detects the object by using raspberry pi camera with image processing on OpenCV. So, the object in front of the robot will be detected easily and precisely. Here the speed will be high when it compared with the existing robot.

3. DOMAIN DETAILS

3.1 Artificial Intelligence

Building machines that read, learn, and reason. **Artificial Intelligence** (**AI**) is a general term that implies the use of a computer to model and/or replicate **intelligent** behaviour. Research in **AI** focuses on the development and analysis of algorithms that learn and/or perform **intelligent** behaviour with minimal human intervention.

3.2 Internet of things

Open-source electronic prototyping platform enabling users to create interactive electronic objects.

3.3 Image Processing

Digital image processing is the use of a digital computer to process digital images through an algorithm. It has many advantages over analog image processing. Under this image processing the OpenCV is used. OpenCV is a free open source library used in real-time image processing. It's used to process images, videos, and even live streams.

4. MODULES

4.1 Input

Input consists of how the robot works using the pi camera. Here it consists of camera module that will capture the video and sends the data to the system. Then followed by raspberry pi where the process will be done using the python and OpenCV algorithm.
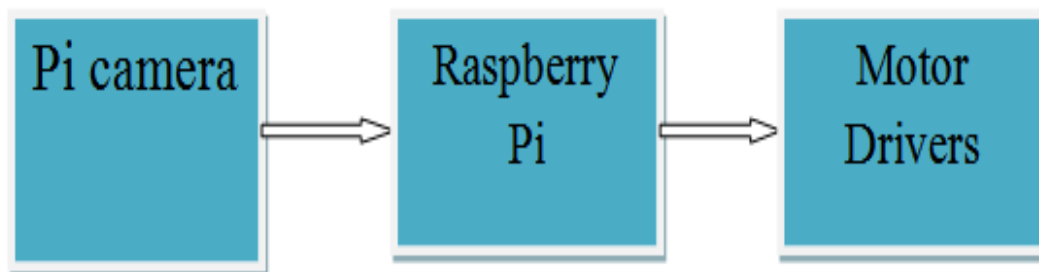
4.2 Raspberry pi

Raspberry pi is a small single-board computer developed in the United Kingdom. It is highly used in robotics for the movement of every actions. There are many types of raspberry pi models available in the market. Such as All model features a Broadcom system on a chip (Soc). The Operating system will be installed in the SD (Secure Digital) card. Most boards have four USB ports, HDMI and composite video output.

4.3 Raspberry pi camera

The **Raspberry Pi Camera** v2 is a high quality 8-megapixel Sony IMX219 image sensor custom designed add-on board for **Raspberry Pi**, featuring a fixed focus lens. In terms of still images, the **camera** is capable of 3280 x 2464-pixel static images, and also supports 1080p30, 720p60 and 640x480p90 video.

4.4 Output
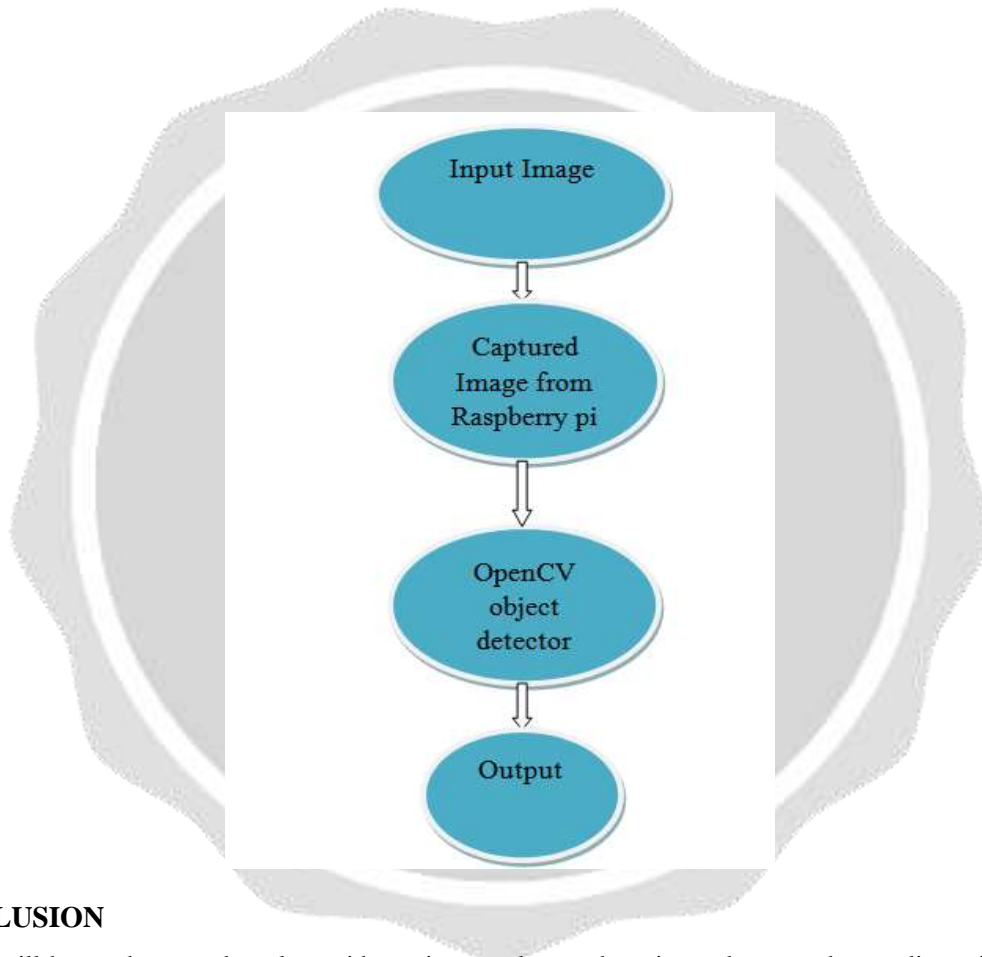
4. CONCLUSION

This robot will be used as an obstacle avoidance in any places where it can be moved according with the image processing algorithm. It will be moved with left and right directions to avoid the obstacles in front of it.

5. FUTURE ENHANCEMENT

Thus, it can be used in future vehicles with artificial intelligence are built in it. It follows an automatic traffic signals to avoid the traffics.

6. REFERENCES

[1]. https://www.raspberrypi.org/
[2]. https://opencv.org/
[3]. Object Recognition and Obstacle Avoidance Robot

Karthi Balasubramanian, Arunkumar R, Jinu Jayachandran, Vishnu Jayapal, Bibin A Chundatt, Joshua D Freeman
Department of Electronics and Communication Engineering, Amrita School of Engineering Amrita
Vishwavidyapeetham, India. 978-1-4244-2723-9/09/$25.00 c   2009 IEEE

[4]. Control of an Obstacle Avoidance Robot

Jagannathan Kanniah, Lim Yuen Siong, and Okullo Obella Thomas E.C. Department, Singapore Polytechnic 0-7803-1223-C/c33/SS.00 0 1993 IEEE

BIOGRAPHIES

	ANITHA B Student, Department of computer science Engineering, Anand Institute of Higher Technology, Chennai, Tamil Nadu.
	Mrs. AMSAVALLI K Assistant Professor, Department of computer science Engineering, Anand Institute of Higher Technology, Chennai, Tamil Nadu.