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Design and Development of Wireless Controlled Surveillance Robot using Iot

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Abstract: ***The aim of the project is to provide a new or modified system in the area of surveillance which is very mandatory in many areas around the world. It can be used in all the areas where surveillance comes into a major aspect. Thus the project functions as a very efficient way for surveillance by providing a video output to the controller and avoiding obstacles automatically. The software used here is Arduino compatible C and the hardware used is SPDuino ATmega 328 board and Ethernet board.***

Keywords: surveillance, avoiding obstacles.

I. INTRODUCTION

Surveillance is very much mandatory in today's rushing world. A sense of protection is achieved through surveillance. Thus, it is a very tedious process for a person to cover the entire area under surveillance. Hence the idea of automation plays a major role. The robots are very useful in this operation. This also reduces labor cost and covers a large area with a comparatively lesser time. This wireless controlled robot is very efficient in this process. The output is achieved with ease by the controller. The components used are very much useful for performing the surveillance operation. The SPduino ATmega328 controller board is a microcontroller board based on the ATmega328P (datasheet). Servo shield is used to power the PWM chip and determines the I2C logic level and the PWM signal logic level. The IR Sensor is used to sense any kind of obstacle on the robot's way. The Ethernet board used here is very essential for the Arduino board to be connected to the internet. The wireless camera that we have used is used to transmit the video signals to the user at the control end for better efficiency in controlling. The Servo motor used is used for fixing the camera as it provides the motion in both the X and Y direction. The servo motor controller is used for controlling the servo motor and the command for direction flows through this to the servo motor.

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The advantage in this project is that we have used the concept of IOT (Internet of Things). Because of this it can be controlled even with a smartphone connected to the same network as the robot. This is achieved as said by the Ethernet board which connects the Arduino board to the internet. Due to these advantages one can take control of the robot from any distance and can receive the data from the robot instantly. As the size of the robot is small it can be operated with ease in a very narrow and crooked pathways and places that humans cannot enter and also avoids the obstacles automatically as human errors are unpredictable and the robot can be saved from damage. Even though there are many techniques in surveillance, as the use of smartphones is major among the people around the world, this technique will be successful in the area of surveillance.

II. LITERATURE SURVEY

An overview of our proposed work involved the following list of survey papers discussed. Surveillance robot, by prof. Vivek Agarwal, IIT Bombay (April 2009) inferred that their robot was free to roam in a given environment and transmit back real time data (video) to the ground station. The disadvantage in their project was that the RF link in place is very slow with a band rate of2400 bps however the required band rate for IFPS is 19200 bps and the idea of IoT was not used. The research article on intelligent surveillance robot with obstacle avoidance capabilities using neural network, by Widodo Budiharto, (May 2015) uses face detection cameras and also uses the obstacle avoiding techniques but does not use the concept of IoT. In both the cases the main board for control used was raspberry pi. In both the articles no very long distance control is possible and hence we have proposed using IoT in our robot.

III. PROPOSED SYSYTEM

A. COMPONENTS USED

The IOT based surveillance robot is very efficient among the others. The Arduino board serves its base purpose in our project. The control program is fed to it and it is used for the basic control operation of the robot.

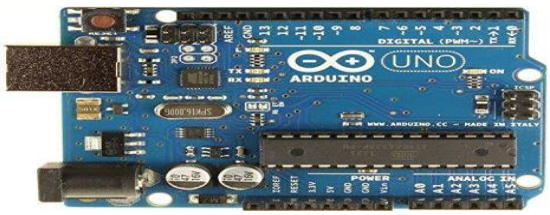

Fig.3.(a). Arduino Board

The IR Sensor here acts as an obstacle detector by producing a signal when the obstacle is detected within the range. The signal produced is the reason why robot comes back to a certain position and stops.

Fig.3.(b). IR Sensor

The Ethernet board is used here to connect the Arduino board to the internet which paves way for the concept IOT to be implemented.

Fig.3.(c). Ethernet Board

The wireless camera provides the realtime video output to any video output device so that the user can monitor the circumstances.

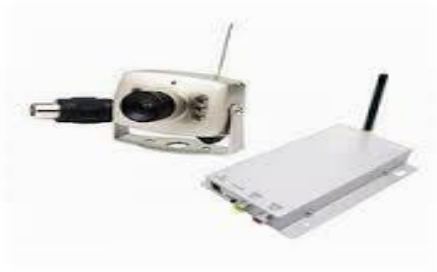

Fig.3.(d). Wireless Camera

The servo motor here acts as the support for the camera which provides the movement both in X and Y axis direction.

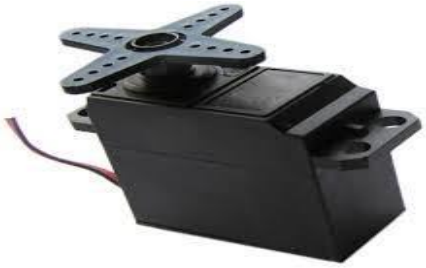

Fig.3.(e). Servo Motor

B. ALGORITHM AND TECHNIQUES

The algorithm used for achieving the fluency in working of the model is as given below.

1. Start the process
2. Initialize the ports for the motors, servo motors, sensors and Wi-Fi module.
3. Declare the ports for the motors, servo motors, sensors and Wi-Fi module.
4. Declare the input variable as ‘a’
5. If the sensors are high, backward movement is obtained for a certain distance.
6. If the sensors are low, the cases are triggered.
7. If the a==w, then forward movement is obtained
8. If the a==a, then leftward movement is obtained
9. If the a==d, then rightward movement is obtained
10. If the a==s, then backward movement is obtained
11. If the a==h, then camera is tilted up
12. If the a==j, then camera is tilted down
13. If the a==k, then camera is tilted left
14. If the a==l, then camera is tilted right
15. Dump the camera output to the server

The above algorithm is for the process flow of the operation carried out in the working model which was designed and fabricated. It consists of steps for the process to achieve the movement of the surveillance robot, the camera angle, and the transmittance and control through IOT.

This one serves better than the existing models as it can be controlled from any point of the globe as it uses the functionalities of IOT.

This idea as said above is believed to overcome the disadvantages of other models in existence.

The working model pictures have been attested in the following column for better visual perception.

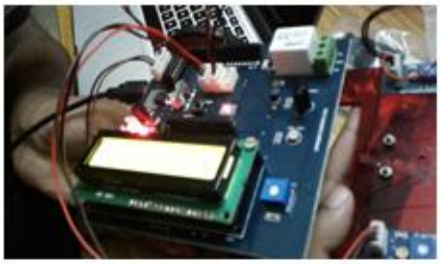

Fig. 3(a). Panel Diagram

Fig. 3(b). Working Environment

Fig. 3(c). Display Unit

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IV. RESULT AND ANALYSIS

The above pictures serve evident to the working of the model and its functionality. The following outcomes were obtained as an output of the fabrication. The models movement was executed as designed. The video output was available to the operator and the control was made in a remote distance. The terrains on which the robot would perform were constrained to some factors.

V.CONCLUSION

Thus this design and the execution of the model of the surveillance robot, controlled through IOT, will be considered as a extending leap in the area of surveillance. This will enhance the quality of the service provided in the area not accessible by the human beings. Thus this will ensure to provide success to all the areas involving surveillance. This robot can find its purpose in many fields, especially in areas of military operations, for the surveillance of foes' activities and the necessary preparations to handle it and providing the proper response to the situation. Future plans inclusive of reducing the size even more and providing the flexibility to access all kinds of terrains. This will increase the reliability and the accuracy of the data produced even more than the present model.

REFERENCES

1. Surveillance Robot, by Prof. Vivek Agarwal, IIT Bombay (APRIL 2009).
2. Intelligent Surveillance Robot with Obstacle Avoidance Capabilities Using Neural Network, by Widodo Budiharto, (MAY 2015).

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I. Leando, received his B.E degree (2014) in electronics and communication engineering and M.E degree (2018) in mechatronics engineering from Thiagarajar College of Engineering, Madurai. After completing B.E, he worked as an RF design engineer in TTSL, Madurai for a period of one year. He is currently working as an Assistant Professor in the department of mechatronics engineering in Rajalakshmi engineering college, Chennai. His area of interest is in sensors and automation..