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Tracking and Shooting Robot

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Abstract—
The Tracking and Shooting Robot is an autonomous bot that tracks the objects based on its color and targets the object using a gun prototype. The project is primarily concerned with the deployment of two different tasks, i.e Tracking the object and aiming the tracked object once it comes to rest.

Keywords— open CV; Robotics; Artificial Intelligence; Gun Prototype; Tracking

I. INTRODUCTION

Robots are used successfully in many areas today, particularly in industrial production, military operations, deep sea drilling, and space exploration. Everything around us is becoming automatic, autonomous and smart because of these artificial giants. These advantages of the present day technology can solve the extreme version problems of the mankind. It is very difficult for the humans to keep track of the things in the extreme fields (like excess heat, humid and cold conditions etc). For example it is very difficult for the humans to keep track of the animals in the rainforests and jungles manually. By the enforcement of this project we want to replace the human authority with an autonomous robot. We want to employ this robot in the extreme weather conditions where the normal beings cannot work or are unable to work efficiently. For example if we consider a company that manufactures the automobile spares. The company manufactures many different kinds of spares which vary in shape, colour and dimension. In such a big manufacturing unit, thousands of spares are produced every hour and when these spares passes through the quality check to examine for any wear and tear in the spares. The human eyes can detect the drastic and large damages but not the minute defects in such a less time and hence the quality of the auto spares decrease and loses its quality and trust among the public. But if we replace the human activity with this robot and initially we create a database of the original and exact spare then the robot can track and detect the perfect spares and rejects the defected ones

II. SYSTEM ARCHITECTURE

The system architecture of this proposed system consists of 5 blocks.

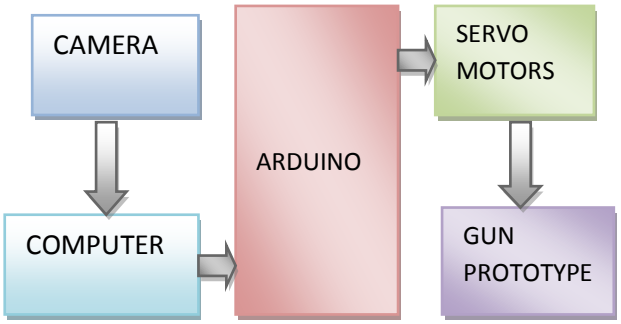

Figure-1:Block Diagram

A camera is used to capture real time video streaming and it will be sent to the PC for image processing. PC will use open CV software to detect the objects of a predefined color and to implement algorithm to detect the rotation required by servo motors to target the object. PC and Arduino are interfaced using USB-UART Bridge. Arduino will control the rotation of servomotors so that they move according to the object movement. Gun prototype will shoot the object once the servos rotate according to the instructions by Arduino.

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III. IMPLEMENTATION

HARDWARE:

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.

Atmel ATmega328 microcontroller operating at 5 V with 2Kb of RAM, 32 Kb of flash memory for storing programs and 1 Kb of EEPROM for storing parameters. The clock speed is 16 MHz, which translates to about executing about 300,000 lines of C source code per second.

Figure-2:ARDUINO

Components in the project are connected as shown in figure.

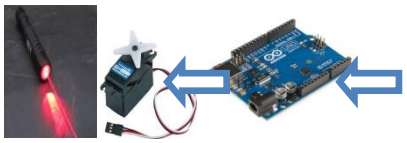

Figure-3:PROJECT SETUP

The wire used to connect PC/laptop and Arduino will acts as USB-UART Bridge it will enable the PC/Laptop to send serial data to Arduino.Two Servo motors are connected to the Arduino at digital pins 9,10.gun prototype is attached to the vertical servo motor and it is connected to the Arduino at GND,13 pins.

SOFTWARE:

The Arduino integrated development environment (IDE) is a cross-platform application written in Java, and derives from the IDE for the Processing programming language and the Wiring projects. Arduino programs are written in C or C++. The Arduino IDE uses the GNU toolchain and AVR Libc to compile programs, and uses avrdude to upload programs to the board. Object detection and tracking is done using openCV with Visual Studio 2012, and the web server interface was designed using HTML and PHP.

IV. ALGORITHM & FLOWCHART

ALGORITHM:

Step – 1: Initialize Arduino,PC,UART Module.
Step – 2:Be idle
Step – 3: If yellow color object is present
No: go to Step-2
Yes: go to step 4
Step – 4: send how much servo motor should rotate to Arduino
Step – 5:Arduino rotates servo motors accordingly
Step – 6:Laser will be set on for 2 seconds
Step – 7: Go to Step-3.

FLOWCHART:

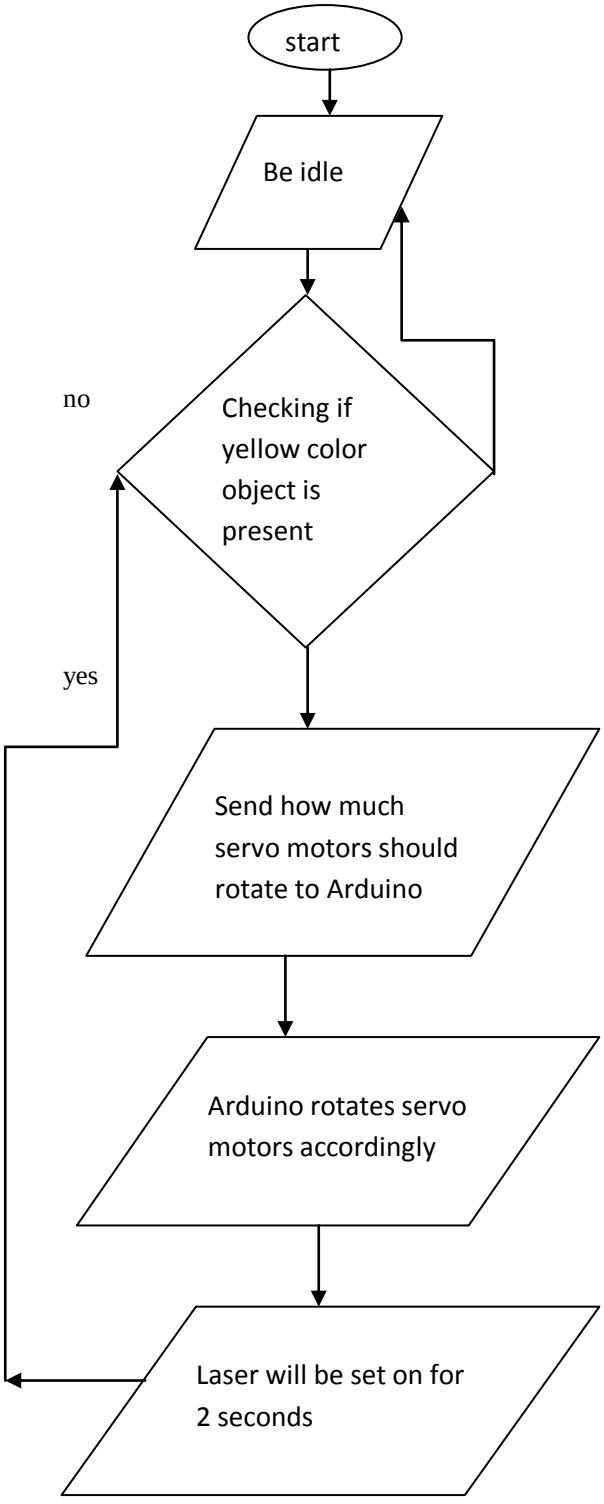

Figure – 4: Flow Chart

V. RESULTS

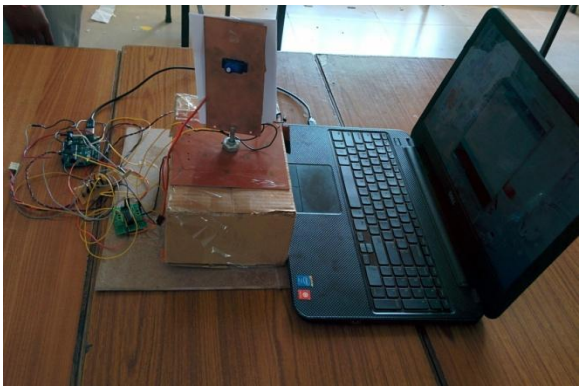

Figure – 5: Robotic Tracking Assembly

Figure – 6: Servo Motor Assembly

Figure – 7: Arduino Mechanical Setup

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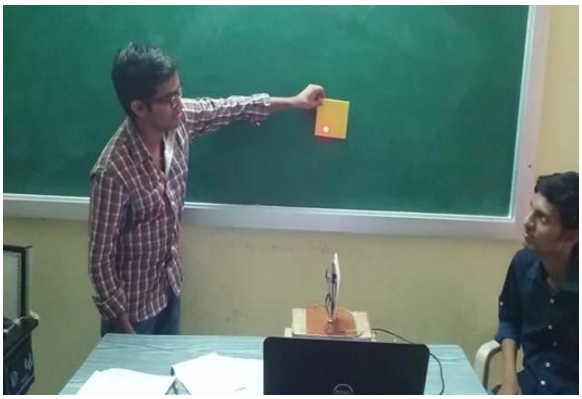

Figure – 8: Tracking Yellow Color Object

Figure – 9: Tracking Yellow Color Object 2

Figure – 10: Tracking Yellow Color Object 3

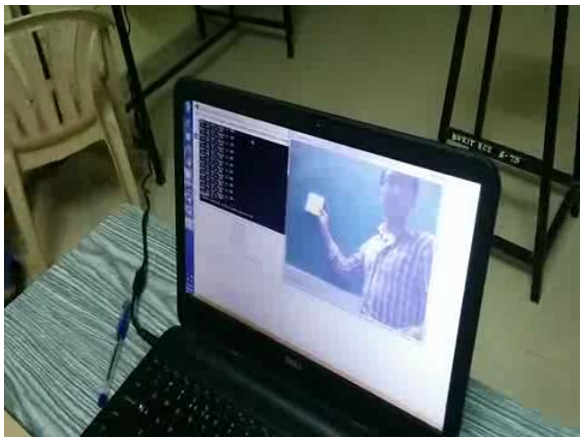

Figure – 11: Coordinates of Yellow Colored Object

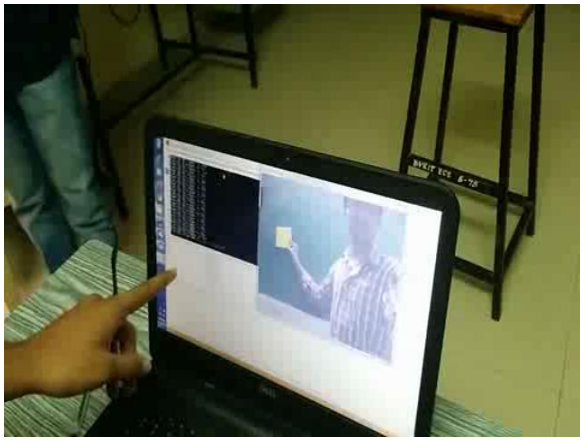

Figure – 12: Coordinates of Yellow Colored Object

VI. CONCLUSION

We have successfully implemented an autonomous robot that tracks and targets the object on the color basis. We have tested and took a lot of observations within our limited resources and found the results to be efficient. We have not only detected a single color object but also the multicolor objects.

ACKNOWLEDGEMENT

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REFERENCES

[1]R. C. Gonzales, R. E. Woods, *Digital Image Processing*, Reading, MA: Addison-Wesley, 1995.

[2] R.C. Gonzalez and R. E, Woods(2008), Digital Image Processing, Pearson Education, 3rd Edition. | [4] BeagleBoard-xM Rev C System Reference Manual(2010),http://beagleboard.org, Revision 1.0.

[3] G. Bradski and A. Kaehler(2008), Learning OpenCV, OReilly Publications.

[4] Babu R. V., Sures S. and Makur A.(2010) Online adaptive radial basis function network for robust object tracking. Computer Vision and Image Understanding, 114(3):297–310.

[5] S K Teoh, VooiVoon Yap, Chit Siang and Soh Patrick Sebastian.(2012), "Implementation and Optimization of Human Tracking System using ARM Embedded Platform." 2012 4th International Conference on Intelligent and Advanced Systems (ICIAS2012), IEEE, 353-356

[6] Exploring Arduino: Tools and Techniques for Engineering Wizardry by Jeremy Blum (2013).