FLOATING OBJECTS COLLECTION USING ROBOTIC ARM

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Abstract -*This project stress on style and fabrication of the watercourse waste improvement machine. The work has done gazing this scenario of our national rivers that square measure dump with large integer liters of biodegradable pollution and loaded with pollutants, toxicant materials, debris etc. the most aim of the project is to cut back the person power, time consumption for improvement the watercourse. During this project we've got automatic the operation of watercourse improvement with facilitate of robotic arm arrangement.*

Key Words: Raspberry pi (B+ model), Ultrasonic sensor, Infrared sensor, Robotic arm, Web cam, Open CV, Python, H-bridge, DC motor.

1. INTRODUCTION

The motive of the project is to automatize the stream improvement method in evacuation, to cut back the spreading of diseases to human. Usually the evacuation water overflows that makes unhealthy environmental conditions that gives platform to become a breeding place for mosquitoes. Per the study takes place at 2014, nearly 1300 manual scavengers' dies because of the health disorders. The rationale behind this is often that the evacuation consists of additional virulent gases like alkane that ends up in higher death rate of the manual scavengers, conjointly the improper disposal of evacuation wastes causes degrades of our surroundings.

Without taking the risks for human life or limb, robots will replace humans in some venturous duty service. Robots will add all kinds of impure environments, chemical additionally as nuclear. They will add environments therefore venturous that AN unprotected human would quickly die.

Smart Bin during this model aims at expeditiously separating domestic wastes in order that it'd be simple for the municipality individuals to segregate them on a large-scale basis. The wastes square measure classified primarily into 2 levels as perishable and non-biodegradable. These 2 main categories square measure any classified into 2 classes counting on their re-usability.

2. PROBLEM STATEMENT

India is holy country & throughout uncountable competition like ganesh visarjan, Navratri Hindu deity puja & principally Siahnsth kumbhmela there's uncountable pollution of Godavari watercourse at Nashik. The pollution is very necessary downside in rivers, ponds and water bodies close to Godavari watercourse at Nashik. Thanks to increase in pollution within the type to waste trash.it is hampering the lifetime of aquatic animal and create their life in peril. Similarly, typically the aquatic animal tends to grub surface waste trash considering it as a food; that ultimately cause the death of animals. Thanks to contaminated water several skin diseases to human kind are as observed.

3. METHODOLOGY

Initially The IR sensors can sense the arrival of waste and therefore the signals are going to be given to the robotic arm through pi then the arm gripper is employed so as to select the waste particles and place it during a sensible bin.

The smart bin used to segregate the waste immediately when the waste is placed into the bin then, the web cam run live waste detection and obtain the image. First information sets of the various waste materials area unit created. Then mistreatment PYTHON, the options area unit detected from the data sets mistreatment Feature Extraction algorithms. The detected options area unit keep during a bag of Variable. The variable is trained mistreatment PYTHON.

The Raspberry Pi is employed to manage the robotic arm, segregate the waste mistreatment previous info.

The design is aim to classify the waste into 2 varieties they're

• Biodegradable waste

• Non-biodegradable waste

The bio degradable waste is classed into

• Paper waste

• Vegetable waste

The Non-Bio degradable waste classified into

• Plastic waste

• metallic waste.

The ultraviolet radiation devices can show North American nation the assorted levels of garbage within the dustbins weight sensor gets activated to send its output ahead once its intensity level is crossed. These details area unit any given of the RASPBERRY PI (MODEL B+) and so it offers the

small print to the transmitter module (Wi-Fi module). At the receiver section a mobile French telephone is required to be connected to the Wi-Fi router so the detail of the rubbish bin is displayed on to the hypertext markup language page in application of our mobile French telephone.

4. SYSTEM DESIGN

HARDWARE DESIGN

Raspberry pi 3 model B+:

The Raspberry Pi three Model B+ contains a good vary of enhancements and options which will profit the designers, developers, and even engineers WHO area unit wanting to integrate Pi systems into their merchandise. Here area unit a number of the new Pi's specs:

• Quad core 64-bit processor clocked at one.4GHz

• 1GB LPDDR2 SRAM

• Dual-band two.4GHz and 5GHz wireless computer network

• Bluetooth four.2 / BLE

• Higher speed local area network up to 300Mbps

• Power-over-Ethernet capability (via a separate writer HAT It is a tiny low board PC, introduced by Raspberry Pi foundation in ordinal March 2018 and is that the most up-to-date version of the Pi boards. It is a changed sort of its forerunner Raspberry Pi three B that was introduced in 2016 and came with C.P.U., GPU, USP ports and I/O pins. each versions area unit virtually same in terms of practicality and technical specifications; but, there area unit some exceptions within the B+ model because it comes with USB boot, network boot, and Power over local area network choice that don't seem to be gift within the B model.

H-BRIDGE
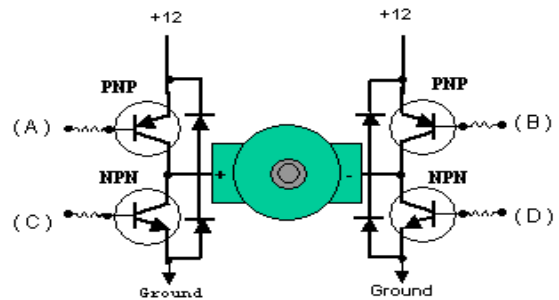
It is associate electronic circuit that switches the polarity of a voltage applied to a load. Hook the motor up during this fashion and also the circuit turns the motor in reverse after you apply a logical one (+12Volts) to purpose B. Apply a logical zero, that is typically a ground, causes the motor to prevent spinning.

DC Motors :

Electric motors area unit everywhere! In your house, nearly each mechanical movement that you just see around you is caused by associate degree AC (alternating current) or DC (direct current) motor. Let's begin by gazing the arrange of a straightforward two-pole DC electric motor. A straightforward motor has six elements, as shown within the diagram below:

¬ Armature or rotor

¬ Commutator

¬ Brushes

¬ Axle

¬ Field magnet

¬ DC power provide of some type an

¬electric motor is all concerning magnets and magnetism:

A motor uses magnets to form motion. If you have got ever vie with magnets you recognize concerning the elemental law of all magnets: Opposites attract and likes repel. thus if you have got 2 bar magnets with their ends marked "north"

and "south," then the north finish of 1 magnet can attract the south finish of the opposite. On the opposite hand, the north finish of 1 magnet can repel the north finish of the opposite (and equally, south can repel south). Within an electrical motor, these attracting and distasteful forces produce movement motion.

ULTRASONIC SENSOR:

The HC-SR04 supersonic device uses measuring device to see distance to Associate in Nursing object like buggy or dolphins do. It offers wonderful vary accuracy Associate in Nursingd stable readings in an easy-to-use package. It operation isn't littered with daylight or black material like Sharp rangefinders square measure (although acoustically soft materials like textile are often troublesome to detect). Similar in performance to the SRF005 however with the low-price of a pointy infrared device.

Power offer: 5V DC
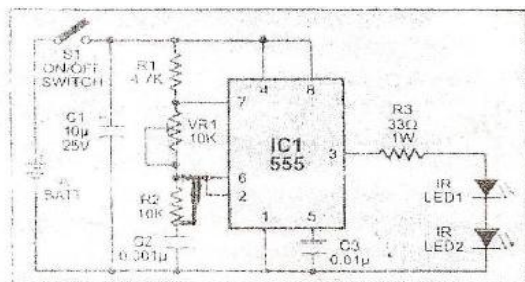
Quiescent Current: <2mA

Effectual Angle: <15°

Ranging Distance: 2cm – five hundred cm/1" - 16ft

Resolution: zero.3 cm

Application:

• Applications go occasions;

• Activity the space between objects:

• Programmable automobile obstacle avoidance:

• Mechanism obstacle avoidance:

• teaching apparatus;

• Security, industrial management.

IR SENSOR:

The IR transmitter half consists of Associate in Nursing below red lightweight emitting diode that may capable of causation modulated information at intervals below red band.

To match the receiver frequency the into is modulated at thirty eight.7 rate by configuring 555 timer at a stable mode of operation, that generates frequency exploitation the elements

R2 and C2 as shown in on top of fig.

This frequency will be varied over a protracted vary simply by variable the planned R1 and C1.
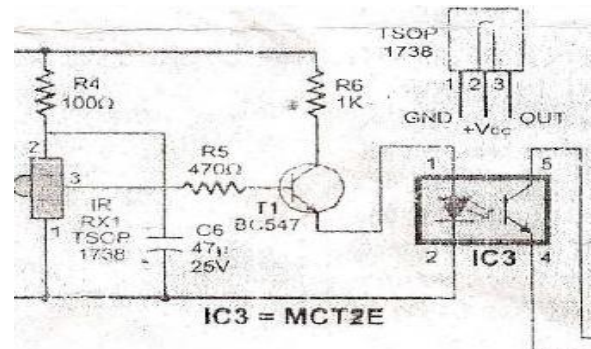
Basically an IR device is employed for police work AN obstacle, there area unit some area unit as wherever valuable things are placed, AN IR transmitter and receiver is placed there, AN infrared path is established and if someone comes into that path the buzzer gets on which supplies out an extended beep equally hearth a fireplace a hearth} device is employed to notice fire.

WEB CAM:

While developing a prototype model for automatic counting and sorting of colored objects rolling over a conveyor belt, images have been captured using INTEX IT-105WC, USB web camera having 1/7" CMOS sensor, 8.0 mega pixels capacity. Images are captured at a data rate of 30 frames per second. Further processing is carried out using functions available in image acquisition toolbox of MATLAB.
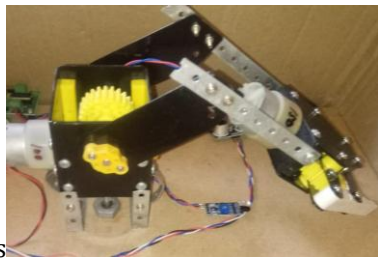
ROBOTIC ARM:

Robotic arm works same as a human arm. Here it uses three different edge effector.

1. Gripper

2. Lifter

3. Rotator

All of these are controlled using dc motors.

We have used the basic pic and place robotic arm to pick up the waste materials. The gripper can extend as wide as possible, the arm can also bend up and down flexibility, it can also rotate 180 degrees.

Software Requirement:

Open CV:

It is a library of programming1functions chiefly geared toward real-time1computer vision. It's developed by Intel research facility and later on supported by1Willow Garage and currently maintained by itseez. It's written in C++ and its primary interface is additionally in C++. Its binding is in Python, Java, MATLAB. Open CV runs on a spread of platform i.e. Windows, Linux, Mac OS, open BSD in desktop and automaton, IOS and Blackberry in mobile. It's utilized in numerous purpose for automatic face recognition, gesture recognition, object identification, mobile AI, segmentation etc. it's a mixture of Open CV C++ API and Python language. In our project we have a tendency to area unit victimization Open CV version a pair of Open CV is employed to gesture management to open a camera and capture the image. It's conjointly utilized in the image to text and voice conversion technique.
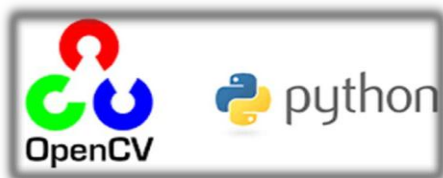
Python:

Open CV could be a library of programming functions in the main geared toward period laptop vision. It's a standard structure, which suggests that the package includes many shared or static libraries. We have a tendency to area unit mistreatment image process module that features linear and non-linear image filtering, geometrical image transformations (resize, affine and perspective deformation, and generic table-based remapping), color house conversion, histograms, and so on. Our project includes libraries like Viola-Jones or Haar classifier, LBPH (Lower Binary Pattern histogram) face recognizer, bar graph of oriented gradients (HOG).

3.3 Open CV-Python

Python could be a general artificial language started by Guido van Rossum, that became very fashionable briefly time in the main owing to its simplicity and code readability. It permits the computer user to specific his concepts in fewer lines of code while not reducing any readability.

Compared to different languages like C/C++, Python is slower. However, another vital feature of Python is that it is simply extended with C/C++. This feature helps United States of America to write down computationally intensive codes in C/C++ and build a Python wrapper for it in order that we are able to use these wrappers as Python modules. This provides United States of America 2 advantages: 1st, our code is as quick as original C/C++ code (since it's the particular C++ code operating in background) and second, it's terribly simple to code in Python. This is often however Open CV-Python works; it's a Python wrapper around original C++ implementation. And also the support of NumPy makes the task easier. NumPy could be an extremely optimized library for numerical operations. It offers a MATLAB-style syntax. All the Open CV array structures area unit born-again to-and-from NumPy arrays. Therefore no matter operations you'll waste NumPy, you'll mix it with Open CV, that will increase range of weapons in your arsenal. Besides that, many different libraries like Scipy, Matplotlib that supports Numpy is used with this. Therefore Open CV-Python is associate acceptable tool for quick prototyping of laptop vision issues.
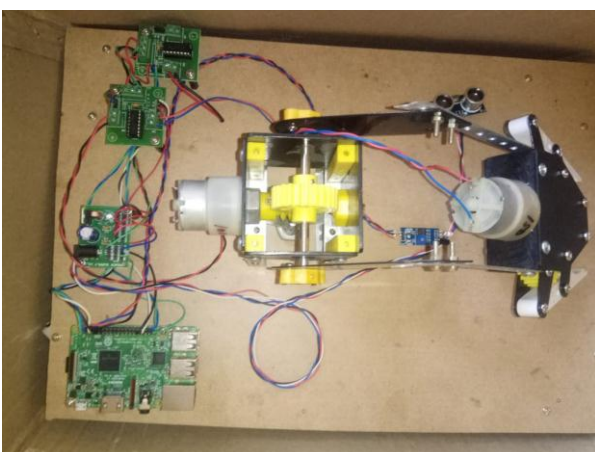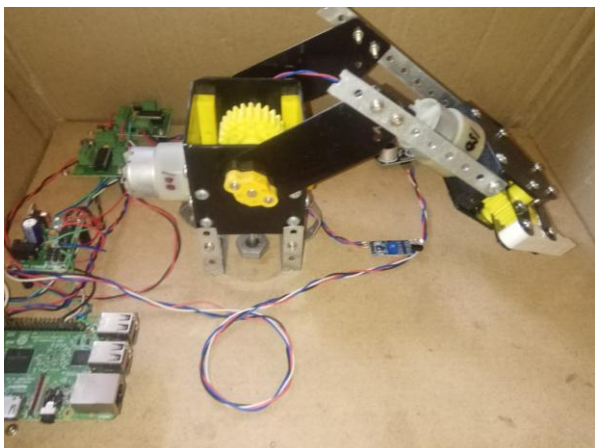
FLOWCHART:
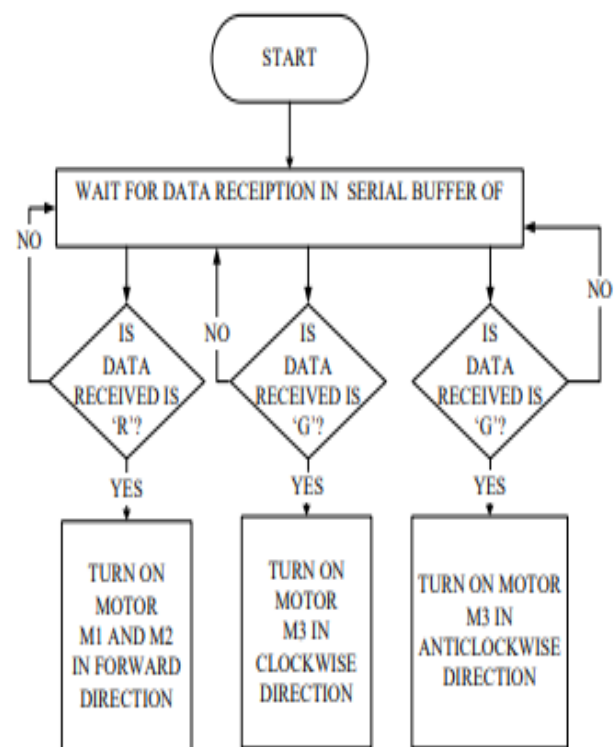
BLOCKDIAGRAM :
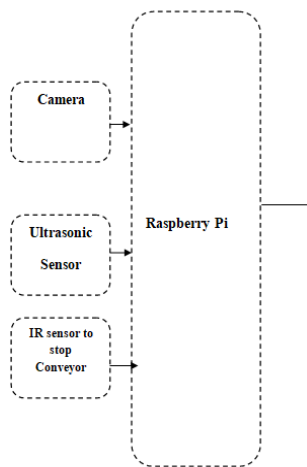
6. RESULTS AND DISCUSSIONS

The result of the system is shown below

7. APPLICATIONS blessings and downsides

APPLICATION:

➢ Industries

➢ Automobile Sectors

➢Agriculture Sector

➢Coffee Bean Separation Units

➢It is applicable to scale back pollution in rivers & ponds.

➢It is helpful to get rid of the sediments gift in natatorium to stay it clean.

➢This is enforced within the emptying and garbage cleanup systems.

ADVANTAGES :

1. it's a non-conventional watercourse cleanup system.

2. Its initial & maintenance price is low.

3. Ability employee not needed to drive the system

4. Setting friendly system.

5. Straightforward in in operation.

DISADVANTAGES:

1. This machine cannot carry significant weight materials.

2. Arms cannot face up to moderator currents.

3. Machine could get broken throughout floods due due to collision with significant objects.

8. EXPECTED OUTCOMES:

By the highest of this project we tend to area unit ready to see the next changes

ROBOTIC ARM TO ASSEMBLE THE FOLATING OBJECTS

• Clean water bodies and provides smart water for irrigation and usage.

• Reduces the spreading of diseases to human. It conjointly improves the amount of your time and sensory quality of food merchandise.

• Improves the generation of aquatic animals.

• Reduces the soil pollution by preventing the flow of plastic into cultivating lands.

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