River Cleaning Ro-boat!

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***Abstract*: This project emphasis on design and fabricationof the river waste cleaning machine. The work has been done by looking at the current situation of our national rivers which are dumped with crore liters of sewage and loaded with pollutants, toxic materials, debris etc. The government of India has taken charge to clean rivers and invest huge capital in many river cleaning projects like "Namami Gange", "armada Bachao" and many major and medium projects in various cities like Ahmedabad, Varanasi etc. By taking this into consideration, this machine has designed to clean river water surfaces. Nowadays almost all the manufacturing process is being atomized in order to deliver the products at a faster rate. Automation plays an important role in mass production. In this project we have fabricated the remote operated river cleaning machine. The main aim of the project is to reduce the manpower, time consumption for cleaning the river. In this project we have automated the operation of river cleaning with help of a motor and chain drive arrangement. Some needs of automation are described below. Here using RF transmitter and receiver are to control the cleaning machine. Automation can be achieved through computers, hydraulics, pneumatics, robotics, etc., of these sources, pneumatics form an attractive medium for low cost automation.**

***Index Terms*: camera module, CNN, raspberry pi 4, keras, 30V, 1000V DC motors, conveyor belt.**

Introduction

Nowadays, the environment problems arise in many towns in India. These problems come along by developing activities such as construction of houses, offices, and other business areas. The Environment problems occur due to several reasons; they are the low budget allocation on environment management and public awareness in protecting the environment. The environmental issue which comes up from year to year and still cannot be solved is about garbage and waste from various places dispose into rivers. Those garbages can clog water flow, induce the water become dirty, smelly, and often overflow so then give effect floods. Garbage is the major problem not only in cities but also in rural areas of India. It is a major source of pollution. Indian cities alone generate more than 100 million tons of solid waste a year. In 2000, India's Supreme Court directed all Indian cities to implement a comprehensive waste-management programme that would include household collection of segregated waste, recycling and composting. These directions have simply been ignored. No major city runs a comprehensive programme of the kind envisioned by the Supreme Court. It is not wrong to say that India is on the verge of garbage crisis even though 9000crore rupees are allotted for the Swachh Bharat Abhiyan. The use of this project will be made in rivers, ponds,lakes and other water bodies to clean the surface. Similarly, there are lots of problems of water pollution under Godavari River, Nasik which affect the acoustic, human life & beauty of Godavari River. This graph shows the increasing amount of water pollution in Indian rivers.

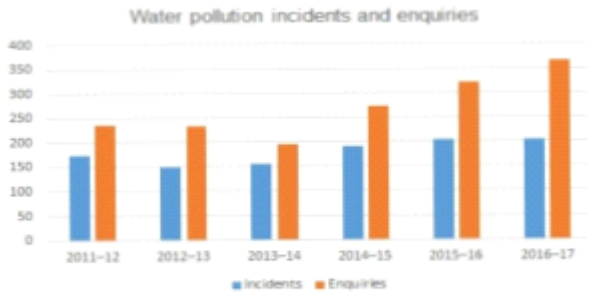


Fig. 1 . Water pollution in india till 2017

Waste water is defined as the flow of used water from homes, business industries, commercial activities and institutions which are subjected to the treatment plants by a carefully designed and engineered network of pipes.The biggest impact of cleaning the chemical wastes can cause respiratory diseases and it plays a challenging issue for the municipality officers.

Ease of Use

Proposed System The project consists of a motor operated water wheel to run the project. It has four DC Motor of 12V, 7.6 Ampere. The device which is running the project is a conveyor belt coupled with a collecting plate. The project consists of two main shafts balancing and hoisting. The components are rest-on frames that serve as the main body of the project. The steel pipe with pressurized air generates a pressure head to run the project on water surface. The fabricated storage tank is used to store the waste fulfilling the purpose of the project. In this project the main aim of this machine is to lift the waste debris from the water surface and dispose of

it in the tray. Here we are fabricating the remote operated river cleaning machine. The Collecting plate and chain drives are rotating continuously by the motor. The collecting plate is coupled between the two chain drives to collect the waste materials from the river. The collected wastages are thrown on the collecting tray with the help of conveyor. Our project is having a propeller which is used to drive the machine on the river. The propeller is run with the help of two PMDC motors.

Fig.2 Components used for making model

Figure 3 shows the architecture of Convolution neural network, here for digit recognition, and each plane is Feature map, i.e. a set of units whose weights are constrained to be identical.

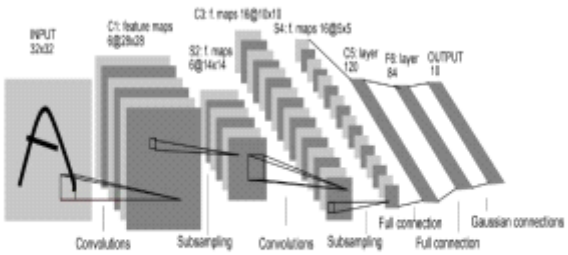
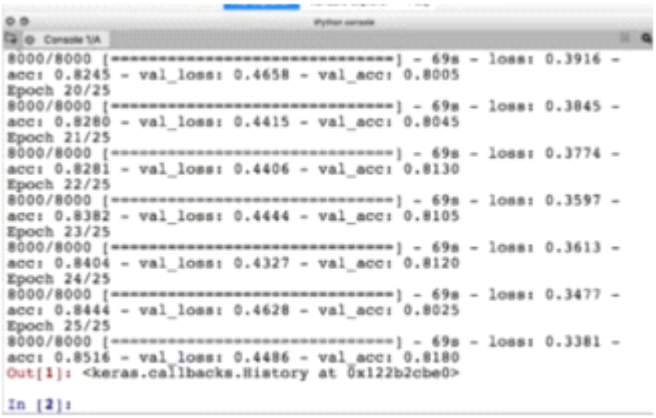


Fig.3 Architecture of CNN for digit recognition

Methodology

In this project we use a deep learning algorithm which is convolution neural networks (CNN). The algorithm consists of around 200 positive images of fish and 200 negative images of garbage for classification. We train this dataset around 25 epoch using keras.Keras is the main library for Deep Learning and of course it contains some tricks and tools to import some images in a very efficient way. We divide the data set into training set and test set. In this case the image will be the image of Fish or Garbage. Now convert it into a pixel image that is 0 and 1 pixels. Convolution step consists of applying several feature detectors on this input image. The second step is pooling. It consists of reducing the size of feature maps. In this step just reduce the complexity of the model without reducing the performance. After that we take all feature maps and put them into a single vector called flattening. Use this input vector as the input layer. Then using a rectifier activation function creates a fully connected layer and add all the layers in a convolutional neural network. Now fit CNN to image using image augmentation which is provided by keras. Image augmentation is the technique that allows you to get good performance results with a small amount of images. .After that using the raspberry pi and pi camera web streaming on conveyor belt which classify there is garbage or fish if there is fish then conveyor belt rotates towards water and dump the fish in water otherwise conveyor belt continuously rotates towards garbage collector. For movement we use blue dot android application which connects with raspberry pi using Bluetooth.

Results



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8000/8000 [==============================] - 69s - loss: 0.3916 -
acc: 0.8245 - val_loss: 0.4658 - val_acc: 0.8005
Epoch 20/25
8000/8000 [==============================] - 69s - loss: 0.3845 -
acc: 0.8280 - val_loss: 0.4415 - val_acc: 0.8045
Epoch 21/25
8000/8000 [==============================] - 69s - loss: 0.3774 -
acc: 0.8281 - val_loss: 0.4406 - val_acc: 0.8130
Epoch 22/25
8000/8000 [==============================] - 69s - loss: 0.3597 -
acc: 0.8382 - val_loss: 0.4444 - val_acc: 0.8105
Epoch 23/25
8000/8000 [==============================] - 69s - loss: 0.3613 -
acc: 0.8404 - val_loss: 0.4327 - val_acc: 0.8120
Epoch 24/25
8000/8000 [==============================] - 69s - loss: 0.3477 -
acc: 0.8444 - val_loss: 0.4628 - val_acc: 0.8025
Epoch 25/25
8000/8000 [==============================] - 69s - loss: 0.3381 -
acc: 0.8516 - val_loss: 0.4486 - val_acc: 0.8180
Out[1]: <keras.callbacks.History at 0x122b2cbe0>

In [2]:
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Fig4. Screenshot of result

Acknowledgment

The Garbage and recycling pickup work is physically demanding and it exposes workers to many occupational hazards. This project is designed to fulfil the task of collecting garbage from certain places. To build an automatic trash RO-BOAT! This project is fabricated on the basis of literature and research on different journals and paper relevantly available and fabricated in accordance so it can provide flexibility in operation. This project “River Cleaning Ro-boat” is designed with the hope that it is very much economical and helpful to river and Pond cleaning. On the basis of its design and estimating cost and availability it is very useful for society

References

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