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Automated Fuel Station with Fake Currency Detection

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Abstract: This paper proposes an automated fuel system using currency detection, which aims at safe and secure fuel delivery, ensuring that the customer gets the equivalent amount of fuel for what he or she is paying, hence successfully eliminating any sorts of malpractices that might occur at a various fuel stations. This system is working on digital image processing and automation technology.

Keywords: *Automated, Currency Detection, Fuel station, Raspberry Pi, Digital image processing.*

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I. INTRODUCTION

In current days the petrol stations are operating manually. These petrol pumps are time consuming and require more manpower. To place petrol stations in distant area it is very costly to provide excellent facility to the consumers. All these problems are solved by the use of automatic fuel pump which requires less time for operation and it is effective.

Consumers want more choices, more speed and more security with automation. The aim of the system is to control the operation of fuelling and give out the customer the amount he demands. We will use Raspberry Pi for this purpose.

II. EXISTING SYSTEM

In present time, fuel stations are distributing fuel to customers using human power. They are providing services immensely depending upon the loyalty of the person or staff working there. This distribution system has a lot of disadvantages such as theft of the fuel, illegal fuel selling, wastage of manpower and forging of currency.

III. PROPOSED SYSTEM

Nowadays, customers are more vigilant towards malpractices and are keen to have a solution for these. In this paper, we are proposing a system which is semi-automatic with user interference. This system is having an automatic fuel unit and currency detection unit for security purposes. In this system, we are using Raspberry Pi as central unit to monitor currency detection unit and fuel dispensing. For currency detection, we are using digital image processing technique. In this proposed system, we are going to pre-process the image of currency given by user and then will apply some basic functions of image processing so that we can extract the features needed for currency detection.
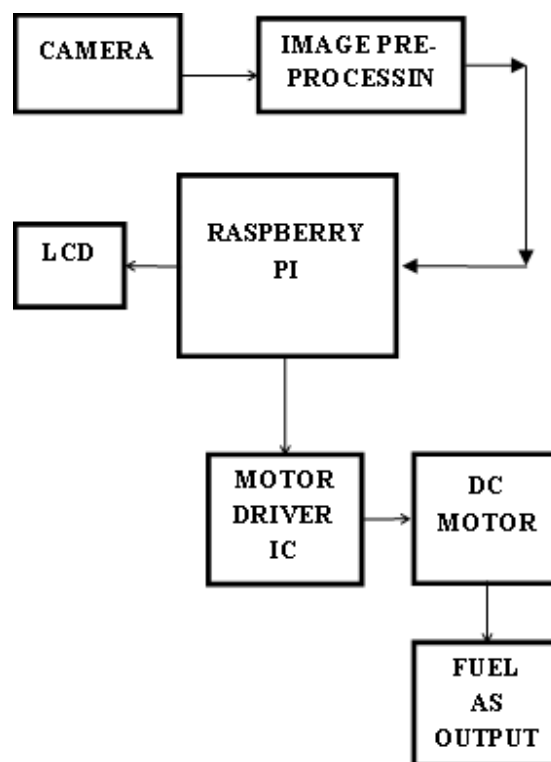
IV. BLOCK DIAGRAM

Fig. 1: Block Diagram

V. KEY COMPONENTS

A. *Raspberry Pi*

- The Raspberry pi is a single computer board. Raspberry pi will enable the web camera and it will start capturing the images. Web camera can be easily configured to raspberry pi

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and controlling code for web camera is written and stored in processor.

- Key Benefits

    ✓ Low cost
    ✓   Faster processing
    ✓ Added connectivity

Fig. 2: Raspberry Pi 3 model

B. *Raspberry Pi Camera*

- The Raspberry Pi Camera module can click still images on getting triggering pulses. We are using camera to capture images of currency given by user at fuel station.

- The module used in the system will be a 5 megapixel fixed focus camera which can also be used for recording high definition.

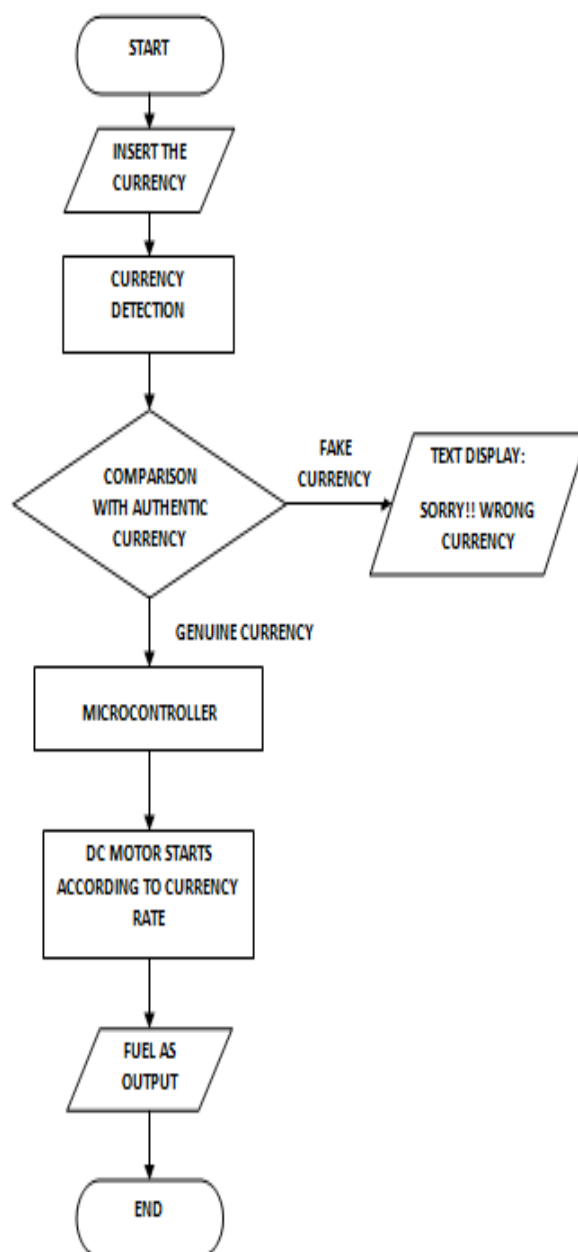Fig. 3: Raspberry Pi Camera Module

VI. FLOW CHART

Fig 4: Flow Chart

A.*Implementation*

Firstly, we will start with currency detection.
In this, currency is given by user as per his requirement. That currency will act as input to our camera which will capture its image and store it. Then that captured image will be pre-processed by using processes like resizing, cropping and etc. then image processing is done like noise removal, edge detection, segmentation, histogram equalization, etc. in MATLAB software.

By performing all these processes on image, we get currency features extracted like, identification mark, intaglio printing, watermark, RBI strip, etc. These features are then used for comparison with authentic image. If most of features are compared and found same, then currency is genuine,

175

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otherwise forged. If forged currency is there, error message will be displayed on screen.

And if currency is found genuine, microcontroller will on the dc motor and some pre-determined fuel will be given as output according to the currency rate successfully.

VII. APPLICATIONS

- Similar setup can be used for any kind of commercial fluids and gases.
- This setup can be used in emergency cases and for emergency vehicles.

VIII. ADVANTAGES AND DISADVANTAGES

A. Advantages

- 24x7 availability of fuel and other commodities.
- Time and cost efficient.
- No human error.
- No malpractices are allowed.
- Quality of fuel can be maintained.

B. Disadvantages

- Continuous electricity consumption.
- Frequent upgrading is needed.

IX. CONCLUSION

In this proposed system, we are trying to develop a prototype of automatic fuel station with currency detection which can be available for 24x7. In this proposed system, we are trying to minimize the human interference and to develop more convenient and efficient design for fuel filling with accuracy.

ACKNOWLEDGEMENT

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