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Raspberry Pi 3 Based Self Troubleshooting Guide

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Abstract : Given that not everyone has the knowledge to do small repairs oneself, not to mention the costs, we have suggested a Troubleshooting Guide for the most common washing machine issues to get it back to working. This concept focuses on offering a step-by-step manual to correct the operational faults[1]. This makes the self-troubleshooting manual for the appliances/vehicles a true necessity. This self-help manual includes a raspberry pi 3 that is installed on the device to achieve continuous operation monitoring[2,3]. The data of the consumer product is gathered by a barcode scanner in addition to the Android camera using the Raspberry Pi as the processor chip, and is then directed to a messaging app where the user can communicate about the capabilities of the item. To achieve them in real time, Open CV and Web sockets are used. Any user can talk with your Raspberry Pi Chatbot once the Raspberry Pi has been integrated with the bot[4]. The Raspberry Pi directs the user and finds the precise answer to the issue in accordance with the supplied inquiries. Following the chatbot's video streaming instructions, which are accurate since they are supported by augmented reality, will allow the user to fix that specific issue. As soon as the issue has been identified and fixed, the usual monitoring functions will resume. The Raspberry Pi assists the user in finding a technician by sending a prompt message to the selected washing machine maker in the event that the mistake cannot be identified and fixed and a technician is needed. The main goal of this project is to create a manual that will enable users to repair their gadgets without the assistance of specialists[5,9]. The suggested model is more reliable, more easily usable, and less expensive.

KEYWORDS - Raspberry pi 3, Camera module, Augmented reality, QR code scanner, Telegram bot.

I.INTRODUCTION

Due to a lack of information and direction, users who need help debugging mistakes in their vehicles, appliances, etc. have trouble troubleshooting even the slightest problems on their own [11]. Instead, they hire technicians to solve the defects whom are'nt readily available and also have to reward a good handsome for even simple repairing process[6,7]. They require a helptool, to find the defects,methods to resolve the defects and help user be aware of the functionaries and know when exactly to contact technicians. By doing so ,many customers will be able to take things in their own hands and solve it.

The methods for recognising and scanning bar codes in video streams have been investigated in this work. Using bar codes is required due to the extremely high volume of supplies, territorial dispersion of connected organisations and businesses, lack of accurate and timely information on the delivery of goods to the buyer, and insufficient information on the product's properties on packaging and accompanying documentation[8]

II. SYSTEM ARCHITECTURE

A. Proposed Idea

The existent practice for troubleshooting is providing a user manual with written instructions to solve any issues, there isn't any continous monitoring of the appliance,which makes it hard to interpret when the issue started and how much it has complexed . The consumers end up solely relying on technicians to fix it [10,13] ,which is neither cost nor time effective.

The proposed system comprises of:

1. . RASPBERRY PI BAR CODE DETECTION AND SCANNER SYSTEM

The methods for recognising and scanning bar codes in video streams have been investigated in this work. The method for reading information from linear bar codes is described in the study[12,14]. The study provides a detailed explanation of the precise process for barcode detection using a neural network and panoramic photography, which can capture images from up to 180 degrees and then be scanned and stored in a database [16, 17].

This method allowed the application to accurately identify the model and kind of the washing machine being used by scanning the barcode that was placed on top of the appliance.

2. THE EDUCATIONAL DOMAIN'S AUTOMATED CONVERSATION SYSTEM, CHATBOT

Researchers have introduced the chat bot to increase responsiveness. They have seen the curious individual as a student and a learner. But because of the labour shortage and time zone differences, it is always impossible to respond to their questions. So they created a mechanism for automatic dialogue[15,17].

To promptly address consumer inquiries and keep them happy, a chat bot was integrated into the system.

3. INDUSTRIAL AUGMENTED REALITY REQUIREMENTS FOR A WORKER SUPPORT SYSTEM FOR AR MAINTENANCE:

They have concentrated on supporting maintenance with AR applications in this article. By examining three different manufacturing sites, they were able to compile the user, technical, environmental, and regulatory requirements for an AR maintenance worker assistance system[18].

The study provides an explanation of the application of augmented reality in industry and about its dynamic database. The system includes the feature to help the user understand the instructions and solve the issue accurately.

III. HARDWARE ARCHITECTURE

A.Raspberry pi 3 model B+ :

A low-cost Linux and ARM-based computer on a small circuit board used to interface sensors and process their information to the user with minimal time [19].

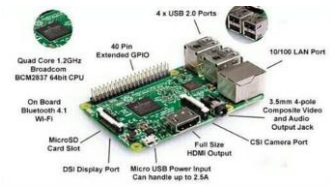

Fig 1.1 Raspberry pi 3 model B+

B. MCP3008 IC:

10 bit 8-channel Analog -to -digital converter (ADC) that allows the analog signal from sensors to digital form in Raspberry pi [20].

Fig 1.2 MCP3008 IC

C.Switched Mode Power Supply(SMPS):

This is an electronic power supply that incorporates a switching regulator to convert electrical power efficiently and used to regulate the supply voltage in accordance to the necessity .

Fig. 1.3 Switched Mode Power Supply

D.Pi Camera REV 1.3:

The Pi camera module is a portable light weight camera that supports Raspberry Pi, and is utilized to scan the Authentication code and display AR on object detection.

Fig. 1.4 Pi Camera

E.Industrial Sensor:

Sensors are used to identify the level of water in the drum and temperature maintaining in the machine and is used to measure Water levels for the continuous monitoring.

Fig. 1.5 Industrial Sensor

IV.CIRCUIT DIAGRAM

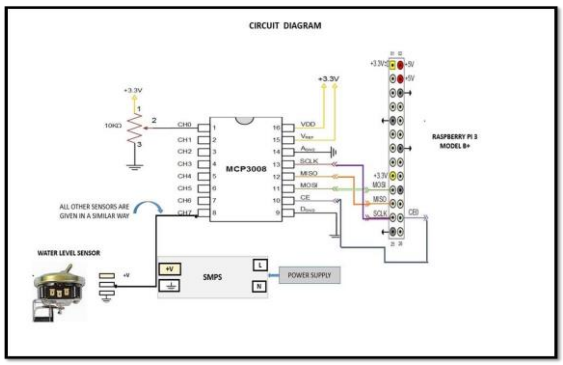

Fig. 1.6 Circuit Diagram

V.HARDWARE IMPLEMENTATION

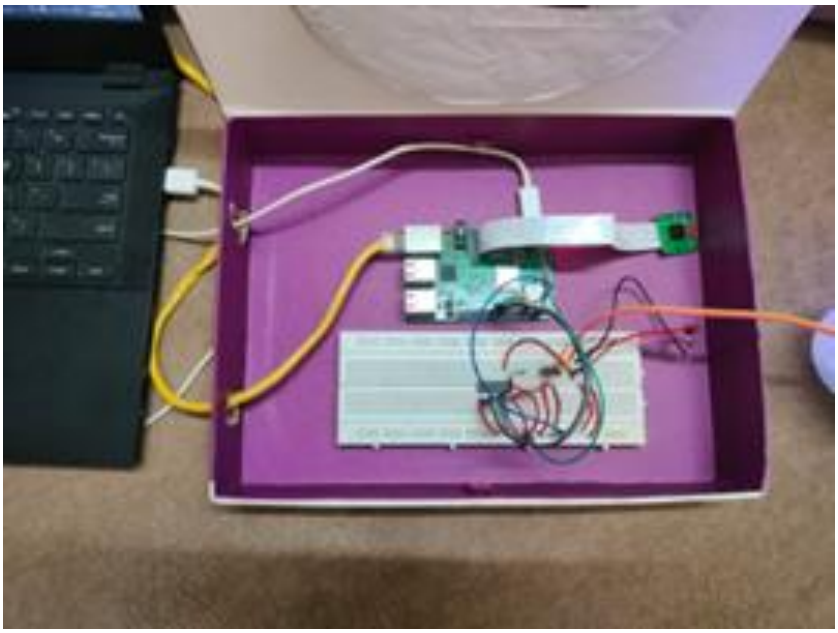

Fig. 1.7 Hardware Implementation

VI.SOFTWARE IMPLEMENTATION

Telegram API is a cloud-based instant messaging and voice over IP service. End users can exchange video,pictures ,audio,texts or files of any sort via messaging.Wamp server & SQL DB reports the officials on a brand new problem from the machine through SQL DB. Raspbian is a computer operating system for Raspberry Pi. Raspbian uses PIXEL [21], as its main desktop environment .Open CV,Three.js and Websockets are packages from Raspbian Jessie OS (Raspian Stretch,Noobs) used for Image Processing (Scanning code) and Displaying in 3D coordinates(AR).

Fig. 1.8 Interfacing

VII.FUTURE ENHANCEMENTS

In the time ahead, the Guide application could be expanded to support all the models of diurnal electrical appliances ,making it a broadly integrated device,facilitating self trouble shooting . In order to achieve accuracy in the solution and to effectively add new problems to the database without duplicating existing ones, the deep learning network can make the database more dynamic.

VIII.RESULTS & CONCLUSION

This configuration places an emphasis on customer satisfaction by locating the flaw, using the error-detecting code, and allowing the device to fix the problem on its own, in accordance with the intended set values. It makes sure that the device is monitored well, both in terms of energy and safety.The interphased augmented reality provides video streamer ,which adds to an advancement,in the support of troubleshooting. It offers a visually appealing method of streaming videos and photographs, which might be quite useful to all customers. As a result, with these impending technological breakthroughs, troubleshooting generally gets more simpler.

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