ENGINEERING IN ADVANCED RESEARCH SCIENCE AND TECHNOLOGY

ISSN 2278-2566
Vol.02, Issue.03
November -2018
Pages: 670-680

RELIABLE AND ACCURATE TARGET DETECTION SYSTEM USING IOT

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ABSTRACT:

Detection of targets using low power embedded devices has important applications in border security and surveillance. Vision is the most advanced of our senses, so it is not surprising that images contribute important role in human perception. This is analogous to machine vision such as shape recognition application which is important field nowadays. Human vision seems to make use of many sources of information to detect and recognize an object in a scene. The study of shapes is a recurring theme in computer vision. The aim is to make a smart surveillance system which can be monitored by owner remotely. As it is connected with the system with IOT, system will send the notifications when an intrusion is detected inside the room. It is required to develop and implement and affordable low cost web-camera based surveillance system for remote security monitoring.

INTRODUCTION:

People are witnessing the dawn of a new era of Internet of Things (IoT; also known as Internet of Objects). Embedded systems invade the daily life of people as they are used within all kinds of devices such as entertainment, communication and transportation. The existing project (Yi Gu1, Myoungjin Kim1, Yun Cui1, Hanku Lee [2]) the surveillance camera are used to monitor the security in homes and in order to expand the usability, they have proposed the UPnP-based home surveillance camera system (USCS), which employs UPnP technology to search, control, and manage IP based cameras. . In this paper a new system that integrates the UPnP control module into the Open Service Gateway Initiative (OSGi) framework to access UPnP services for a remote network is proposed. This new system showed improved searching, management, discovery, and manipulation of IP-based cameras in a home network compared to a conventional system. This project describes the use of low cost single – board computer Raspberry Pi with wireless internet. This work is focused on developing a surveillance system that detects stranger and to response speedily by capturing and relaying images to admin office based wireless module and thus activate the alert system both at intruder location and office admin. The adopted system of surveillance is based on a networked single board computer, raspberry pi, motion section and videoing system which presents the idea of monitoring a particular place in a remote area. The system can be administrated by a remote user from any workstation. The usage of RFID increases the overall cost of the project and thus reducing the number of application the project is used for. The new technology is less expensive and longer life of remote battery powered units. The project aims to develop a surveillance embedded system which captures and hosting, real time intruder images and arises of alerting alarms. The proposed system has potential benefits for various security applications such as, but not limited to, securing remote area, estate departments, warehouses and surrounding fence. The proposed solution offers efficient stand alone, flexibility to upgrade and cheap development and installation as well as cost effective surveillance solution. The overall objective of this project is to determine the feasibility of utilizing IOT approach to design a robust Surveillance system, to design and construct a reliable and cost effective surveillance management system based SBC that can be deployed efficiently in remote scattered location and small residential complexes, to investigate the performance of the surveillance system based SBC using Raspberry platform. Human vision seems to make use of many sources of information to detect and recognize an object in a scene. At the lowest level of object recognition, researchers agree that edge and region information are utilized to extract a "perceptual unit" in the scene. Some of the possible invariant features are recognized and additional signal properties (texture or appearance) are sent to help in making the decision as to whether a point

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belongs to an object or not. Object can know by components. This is the primary way of classifying objects by identifying their components and the relational properties among these components. The other features like texture, size or colour can be used to distinguish the close similar objects wherever. The features of the objects based on the basic geometrical shapes such as line, rectangle, Square, circle, scale of the object and other required parameters. The main aim of this paper is to design a low cost device for detecting multiple objects for industrial purpose and for visually impaired persons. An in-house object detection system for visually impaired, low vision personnel is require to support the user to act independently. The output of such system can be directed in the form of sound via speaker. This will help to deal with objects come as hindrances in front of target user. It aims to develop system with minimum infrastructure and cost so that it is feasible to embed into low cost devices. The possible shape of the query image is not matching with shapes of objects in the available database (training), the remaining several operation of object detection: segmentation, cleaning, normalization, detection will not perform. The minimum operation to detect the possible shape of the object is performed. Sensor networks for detection of targets such as people and vehicles are of great relevance in defense and security applications. In such networks, use of non-image sensors, such as acoustic and seismic sensors, are of interest in part because of their power efficiency compared to image sensors. Various studies have been focused on development and enhancement of acoustic and seismic signal processing algorithms for high target detection accuracy. For large-scale deployment of such networks, it is critical to provide methods for their cost- and energy-efficient realization, while providing high detection accuracy and low false alarm rate. In support of these objectives, a significant body of research has focused on the development of novel algorithms for fusion, target detection, and classification from acoustic and seismic signals (e.g., see [1], [2], [3]). In this paper, we develop design optimization methods that are complementary to this body of prior algorithm-oriented work. In particular, we focus on system design and implementation issues that are important for delivering the accuracy offered by relevant fusion/detection algorithms along with energy-efficient and resource-constrained execution capability on low cost sensor node platforms.

LITERATURE SURVEY:

Jayanta Singh, Shalu Gupta in the year 2013 proposed a study on speedy object detection using shapes. This study proposes a low cost device for visually impaired persons to detect objects. object detection uses the dynamic clustering and scaling of training images and testing images. Algorithms of training and testing process are proposed. The shape and scale of the query image is not matching with shapes of objects in the available database (training), the remaining several operation of object detection: segmentation, cleaning, normalization, detection etc will not perform. The main drawback of this study is that algorithms and parameters are needed with lot of image processing algorithms to be done and real time monitoring is not taken into study. Nidhall Abbadi and Lamis Saadi in the year 2013 proposed a study on automatic detection and recognize of different shapes in an image. This paper introduces a new approach for recognizing two dimensional shapes in an image, and also recognizes the shapes type. The algorithm recognizes all the known shapes basis on segmenting images into regions corresponding to individual objects and then determine the shape factor which is use to recognize the shape type. Algorithm tested with many images with different shapes and recognizes all. The main drawback of this paper uses colour converting algorithms which increases the computation time. Carl Martin Ivasak in the year 2014 undergone an overview of raspberry pi based system for visual object detection and tracking. This study is to form a foundation of knowledge regarding embedded systems, the basics of real-time image processing and visual detection of objects, upon which it is possible to add deeper layers of complexity and conduct further research with which to formulate projects ranging from inexpensive and small real-time systems for simple object detection or facial recognition to more complex systems such as self-learning robots and intelligent machines with the capability of visual feedback. The main drawback of this study includes many image processing steps such as segmentation, filtering, edge detection which increases the computation of object detection. Various algorithms have been proposed that are relevant to person-and-vehicle detection (PVD) using energy-efficient sensing modalities, including acoustic and seismic modalities. For example, Dibazar et al. develop neural networks that operate on seismic signals from footsteps and vehicles [3]. Damarla and Kaplan develop a decision-level fusion architecture for tracking groups of people using acoustic and seismic signal processing [2]. Ben Salem et al. present an adaptive target detection system that employs mobile devices as sensor node platforms, and applies different acoustic signal processing techniques for different signal-to-noise ratio conditions, and energy consumption constraints [5]. Our work in this paper differs from these prior works in that we simultaneously handle (1) multiple sensing modalities (acoustic and seismic); (2) both decision and feature level fusion for improved accuracy; and (3) design optimization for energy- and resource-constrained embedded

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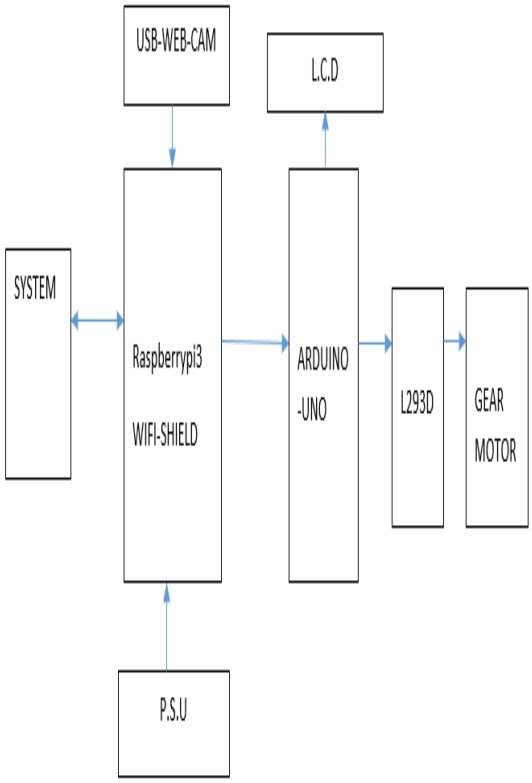
implementation An embedded home surveillance system which assesses the implementation of a cost effective alerting system based on small motion detection was presented by Padmashree A. Shake and Sumedha S. Borde. They worked on implementing cheap in price, low power consumption; well utilize resources and efficient surveillance system using a set of various sensors. Their system helps to monitor the household activities in real time from anywhere and based on microcontroller which is considered nowadays as a limited resource and an open source solution compared to SBC[3]. D. Jeevanand worked on designing of a networked video capture system using Raspberry Pi. The proposed system works on capturing video and distributing with networked systems besides alerting the administration person via SMS alarm as required by the client. Their system was designed to work in a real-time situations and based on Raspberry Pi SBC.

PROPOSED ARCHITECTURE:



WIFI-Shielded Raspberry-pi is selected to upload the values to internet. IOT enhancement is included for broadcasting system. This implementation yields fast, accurate and secured transmission to multiple users.

RASPBERRY PI

Image of Raspberry-B+:

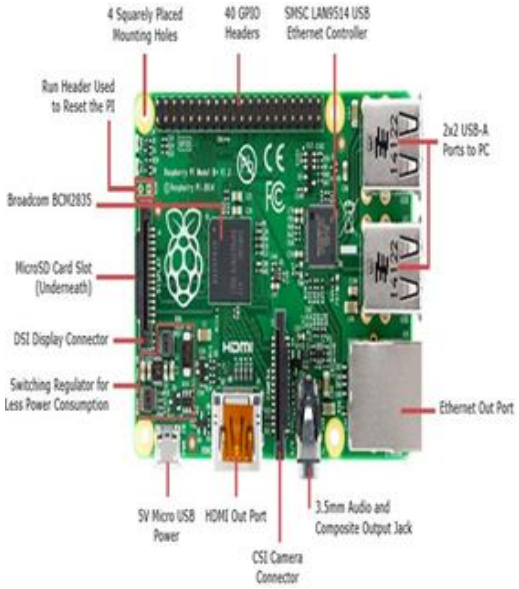
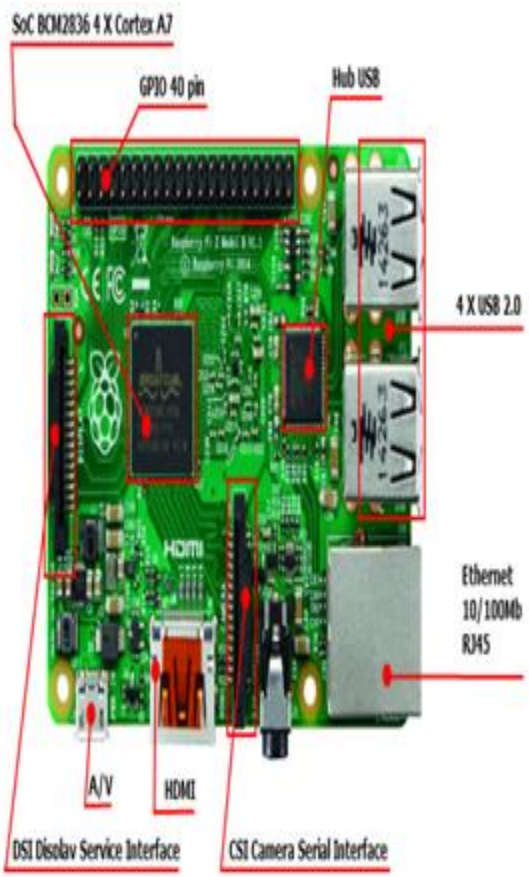


Image of Raspberry-2:



GPIO Pin Diagrams for Raspberry pi-2 and Raspberry pi-B+

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RASPBERRY PI CAMERA INTERFACING

This workshop guides you through setting up the Raspberry Pi camera module, taking pictures and video using the Python picamera module, connecting a physical button with the GPIO pins and programming it to control the camera.

Connecting the camera

Locate the camera port next to

1. the ethernet port

2. Lift the tab on the top

3. Place the strip in the connector (blue side facing the ethernetport)

4. While holding the strip in place, push down the tab

Activate the camera

1. Connect a USB cable to the power

2. Login with username **pi** and password **raspberry**

3. At the command prompt enter **sudo raspi-config**

4. At the menu, navigate to **Enable Camera**

5. Select **Enable**

6. Select **Finish**

7. Select **Yes** to reboot

Test the camera

1. Login again with username **pi** and password **raspberry**

2. At the command prompt enter **raspistill -o image.jpg**

3. On the screen you should see a preview appear for a fewseconds, and then change briefly while the image is captured.

4. Press the button and try to take a selfie

ARDUINO:

The Arduino Software (IDE) allows you to write programs and upload them to your board. In the Arduino Software page you will find two options:

1. If you have a reliable Internet connection, you should use the online IDE (Arduino Web Editor). It will allow you to save your sketches in the cloud, having them available from any device and backed up. You will always have the most up-to-date version of the IDE without the need to install updates or community generated libraries.

2. If you would rather work offline, you should use the latest version of the desktop IDE. Code online on the Arduino Web EditorTo use the online IDE simply follow these instructions. Remember that boards work out-of-the-box on the Web Editor, no need to install anything. Install the Arduino Desktop IDE

To get step-by-step instructions select one of the following link accordingly to your operating system.

Windows

- Mac OS X
- Linux
- Portable IDE (Windows and Linux)

Liquid Crystal Display

The LCD is used for the purpose of displaying the words which we are given in the program code. This code will be executed on microcontroller chip. By following the instructions in code the LCD display the related words. Fig. shows the LCD display.

Introduction

Fig. : LCD Display

The LCD display consists of two lines, 20 characters per line that is interfaced with the PIC16F73.The protocol (handshaking) for the display is as shown in Fig. The display contains two internal byte-wide registers, one for commands (RS=0) and the second for characters to be displayed (RS=1). It also contains a user-programmed RAM area (the character RAM) that can be programmed to generate any desired character that can be formed using a dot matrix. To distinguish between these two data areas, the hex command byte 80 will be used to signify that the display RAM address 00h will be chosen Port1 is used to furnish the command or data type, and ports 3.2 to 3.4 furnish register select and read/write levels.

THEORY

A liquid crystal is a material (normally organic for LCDs) that will flow like a liquid but whose molecular structure has some properties

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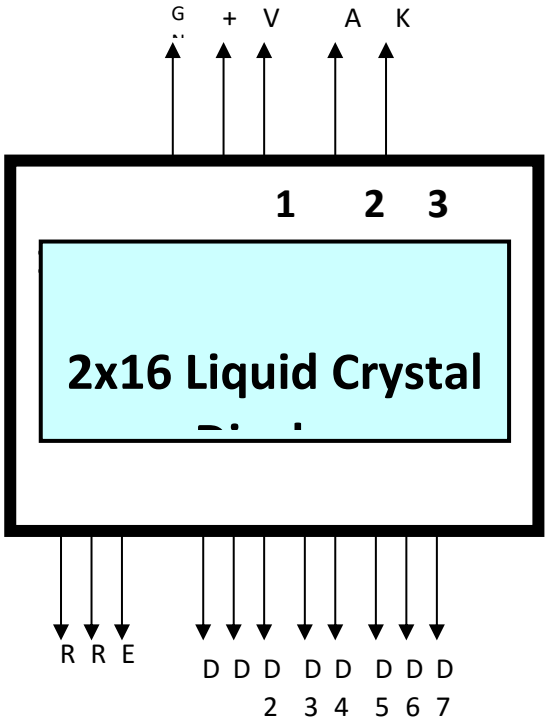
normally associated with solids. The Liquid Crystal Display (LCD) is a low power device. The power requirement is typically in the order of microwatts for the LCD. However, an LCD requires an external or internal light source. It is limited to a temperature range of about 0°C to 60°C and lifetime is an area of concern, because LCDs can chemically degrade.

There are two major types of LCDs which are:

1. Dynamic-scattering LCDs and
2. Field-effect LCDs

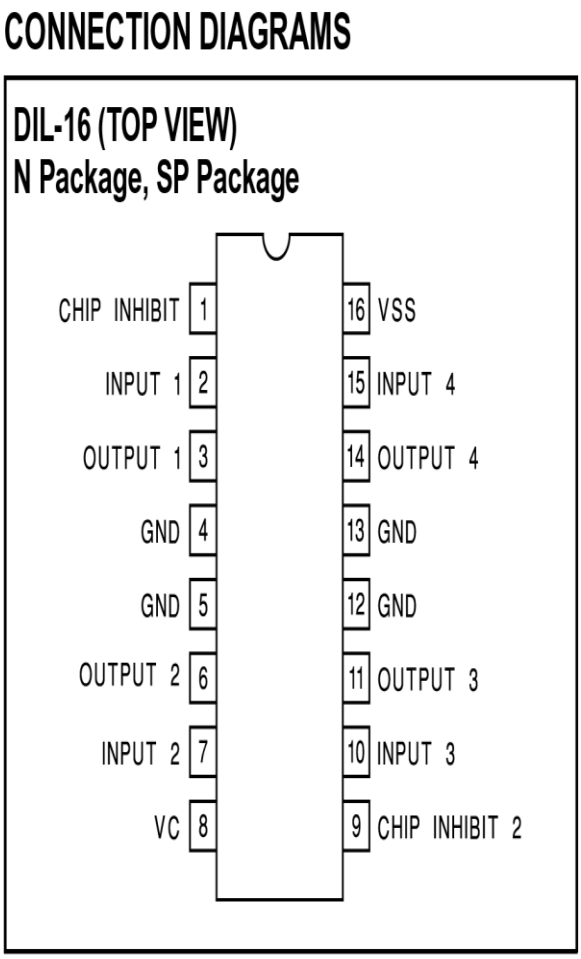
The turn-on and turn-off time is an important consideration in all displays. The response time of LCDs is in the range of 100 to 300ms.The lifetime of LCDs is steadily increasing beyond 10,000+hours limit. Since the color generated by LCD units is dependent on the source of illumination, there is a wide range of color choice.

Pin Diagram



MOTOR DRIVER

The l293 is an integrated circuit motor driver that can be used for simultaneous, bi-directional control of two small motors. small means small. the l293 is limited to 600 ma, but in reality can only handle much small currents unless you have done some serious heat sinking to keep the case temperature down. unsure about whether the l293 will work with your motor? hook up the circuit and run your motor while keeping your finger on the chip. if it gets too hot to touch, you can't use it with your motor. (note to me2011 students: the l293 should be ok for your small motor but is not ok for your gear motor.) the l293 comes in a standard 16-pin, dual-in line integrated circuit package. there is an l293 and an l293d part number. pick the "d" version because it has built in flyback diodes to minimize inductive voltage spikes. the l293d can be purchased for somewhere between $2 and $3 (quantity one) from (pn 511-l293d) or (pn 296-9518-5-nd). for complete information, consult the unitrode l293 data sheet a more recent, improved specification, pin-for-pin compatible chip is recommended for new designs: the ti sn754410ne motor driver. available from mouser.com, mouser part number 595-sn754410ne, the pinout for the l293 in the 16-pin package is shown below in top view. pin 1 is at the top left when the notch in the package faces up. note that the names for pin functions may be slightly different than what is shown in the following diagrams.



The following schematic shows how to connect the L293 to your motor and the Stamp. Each motor takes 3 Stamp pins. If you are only using one motor, leave pins 9, 10, 11, 12, 13, 14, and 15 empty.

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RESULT:

CONCLUSION:

Identifying objects via filtering of colours (pixel HSV values) is only one of many different methods that can be used for such a system. Colour-based object detection using colours is definitely an effective method, especially when dealing with objects that generally have no constant distinguishable features or corners. The realization of communication via UDP is, while currently basic in terms of security and usage, successfully implemented in the source code. The experimental results show that the proposed system is effective to detect the colour target and the spot with the high success rate, the low target detection error and the small displacement between the camera and the pointer.

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