IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

System to Detect Theft Events using Raspberry PI

Mrs. Smita Anil Takalkar[1], Anmey Awale[2], Jalindar Yewale[3]
Assistant Professor, Department of Electronics and Telecommunication[1]
Students, Department of Electronics and Telecommunication[2,3]
AISSMS College of Engineering, Pune, Maharashtra, India

Abstract: *Image classification is the process of identifying and deciding what the image is by analysing the numerical properties of the different features of an image and then organising these data into categories. Image classification consists of training and intelligence. The various steps related to this are pre-processing of image, detecting ROI, extraction of features, neural network etc. Image classification is core for computer vision and has numerous practical applications. Some are for scanning of baggage and recognition of palm vein. The method of image processing and artificial intelligence can be used to experiment with the gadgets in a luggage and to suggest whether the item is risky or not. Thus the results from our experiment can be used for a wide variety of applications.*

Keywords: Anti theft device, Raspberry Pi, Convolutional Neural Network (CNN), Machine Learning

I. INTRODUCTION

Theft is one of the most common and oldest criminal behaviours and it is increasing day by day. Due to the increased rate of theft the people have suffered in fear and loss. On the way to stop this increasing theft internationally, there is a need for a robbery deterrent device that is handy in use, quite unfastened from fake alarms and does not require common user motion to arm and disarm the gadget. So, to meet all such necessities, we are able to grow a tool that would be able to detect theft in any stores or residential regions and alarm the owner along with the options to act against the theft situations.The project is aimed at evaluating the performance of an operating system on an embedded system. Before delving into its implementation, a creation is needed to the elements worried inside the project. Right here, we endorse our system. In the proposed system we use image processing, CNN algorithm, feature extraction to detect an anomaly in video input. Different approaches are used in this work for theft classification and detection purposes but all have deep learning and CNN architecture behind them because of their state of the art performance. Training from scratch took a lot of time so the Transfer learning approach and pre-trained models were used. Different datasets were made for classification and detection of theft. Different datasets were used keeping in mind the classification and detection problem as both have a separate requirement for performing the tasks to achieve high accuracy, mean average precision as well as frame per second for the real time implementation. To recognize object category and detection allow us to first briefly recognize item recognition as both the aforementioned kinds come under the umbrella of this and combined type and localization make detection viable for any type of detection hassle giving magnificence call as well as the place where our preferred object is in the body.

Problem Statement- Theft is one of the most common and oldest criminal behaviours and it is increasing day by day. With a purpose to prevent this growing theft the world over, there may be a want for a theft detection gadget that is handy in use, pretty unfastened from fake alarms and does no longer require common user movement to arm and disarm the device. So, to meet all such requirements, we will be creating a device that would be able to detect theft in any shops or ATMs and alarm the owner.

Objective- Security against theft is a major concern in our today's changing and evolving world. People need more security for their valuable items. Jewellery shops or any protected areas are equipped with security cameras but not with a smart anti-theft system, which can take care of the security of their property even in their absence. This project aims at room security. Shop or room security systems are important nowadays. The complete constructing protection device or civilian home safety machine is pricey. Most security systems available in the market these days are complex, and installation of the system will cost every other amount of cash to be invested with the intention to have an amazing security machine. This

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

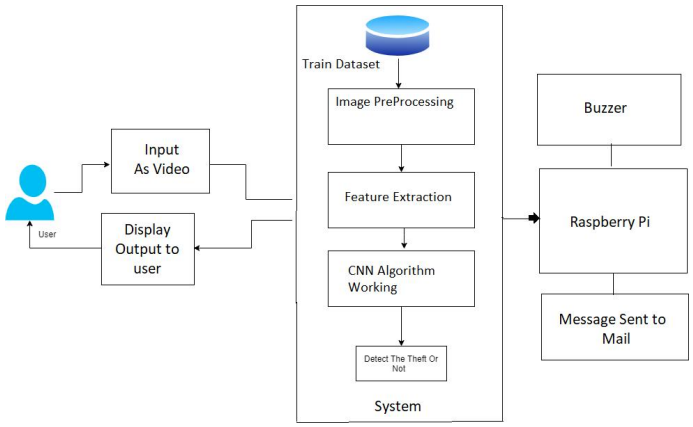
project additionally ambitions to expand Graphical user Interface (GUI) in order to be used by the consumer to manage and manage the gadget.

II. LITERATURE SURVEY

1. Paper Name: Weapon Detection in Real-Time CCTV Videos Using Deep Learning- This work focuses on providing a secure place using CCTV footage as a source to detect harmful weapons by applying the open-source deep learning algorithms. We have implemented binary Classification assuming pistol class as the reference class and relevant The confusion object inclusion concept is introduced to reduce false positives and false negatives.ISSN: 2169-3536
2. Paper Name;-Detection of Electricity Theft in Customer Consumption Using Outlier Detection Algorithms- This work focuses on the feasibility of applying outliers detection algorithms for enhancing the security of AMI through the detection of electricity theft. The paper looks into the performances of various existing outlier detection algorithms on a real dataset (consumer energy usage). The results show the feasibility of using outlier's algorithms in the security of AMI and also the effectiveness of the use of these methods in the electricity consumption datasets for theft detection. ISBN: 978-1-5386-5762-1
3. Paper Name: - SMS Based Load Flow Monitoring and Analysis for Theft Location Detection in Rural Distribution Systems- In this paper An attempt has been made to identify the theft locations within a low voltage distributed network from a central control room with the help of sms containing the energy consumption information of individual household energy metres. The algorithm is intelligent enough to detect the partially done theft at any location.
4. Paper Name: Design and Development of An Efficient Power Theft Detection and Prevention System through Consumer Load Profiling- In this paper a novel solution to detect and then prevent electricity theft is proposed . The theft detection algorithm is able to detect electricity thefts at both the consumer line (metre tampering) and at the distribution line (Hooking) with the help of consumer load profiling. Once a theft is detected, the prevention algorithm firstly disconnects all legal consumers and then a high voltage pulse is sent at the distribution line which will make all illegal consumers in-operational
5. Paper Name: Suspicious Object Detection and Robbery Event Analysis- This paper proposes a novel method to detect suspicious objects from videos for robbery event analysis. First of all, a background subtraction using a minimum filter is used for detecting foreground objects from videos. Then, a novel kernel-based tracking method is proposed for tracking each moving object and obtaining its trajectory.
6. Paper Name: A Novel Power Theft Detection Algorithm for Low Voltage Distribution Network- This paper proposes an effective method for detection of power theft at low voltage consumer end. The proposed method is designed to reliably detect hooking in service line cable and bypassing of electric energy metres.
7. Paper Name: AI Based Automatic Robbery/Theft Detection using Smart Surveillance in Banks- This paper proposes a CCTV based theft detection along with tracking of thieves. System uses image processing to detect theft and motion of thieves in CCTV footage, without the use of sensors.

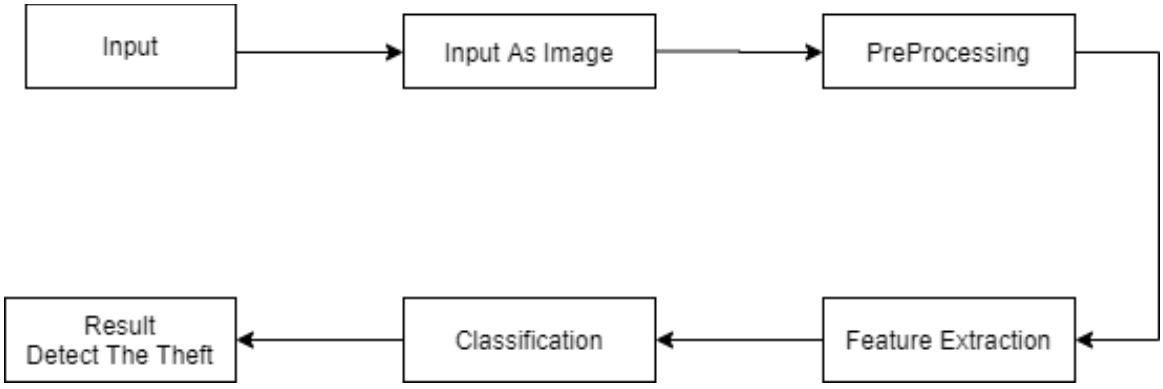
III. METHODOLOGY

Proposed Method



IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

Data Flow Diagram- In Data Flow Diagram, we Show that flow of data in our system in DFD0 we show that base DFD in which rectangles present input as well as output and circle show our system, In DFD1 we show actual input and actual output of system input of our system is text or image and output is rumour detected likewise in DFD 2 we present operation of user as well as admin.



IV. SYSTEM SPECIFICATION

Software Information

Python: Is an interpreted, high-level and fashionable-purpose programming language. Created by Guido van Rossum and first released in 1991, Python's design philosophy emphasises code with its notable use of significant whitespace. Its language constructs and object-oriented approach goal to assist programmers write clean, logical code for small and big-scale tasks.

Used Version - Python 3.9.

Anaconda: Anaconda is a free and open-source distribution of the Python and R programming languages for scientific computing (data science, machine learning applications, large-scale data processing, predictive analytics, etc.), that aims to simplify package management and deployment. The distribution includes information-technology packages suitable for windows, Linux, and macOS. It is developed and maintained by Anaconda, Inc., which was founded by Peter Wang and Travis Oliphant in 2012. As an Anaconda, Inc. product, it is also known as Anaconda Distribution or Anaconda Individual Edition, while other products from the company are Anaconda Team Edition and Anaconda Enterprise Edition, both of which are not free.

Integrated development environment (IDE) Used - SPYDER.

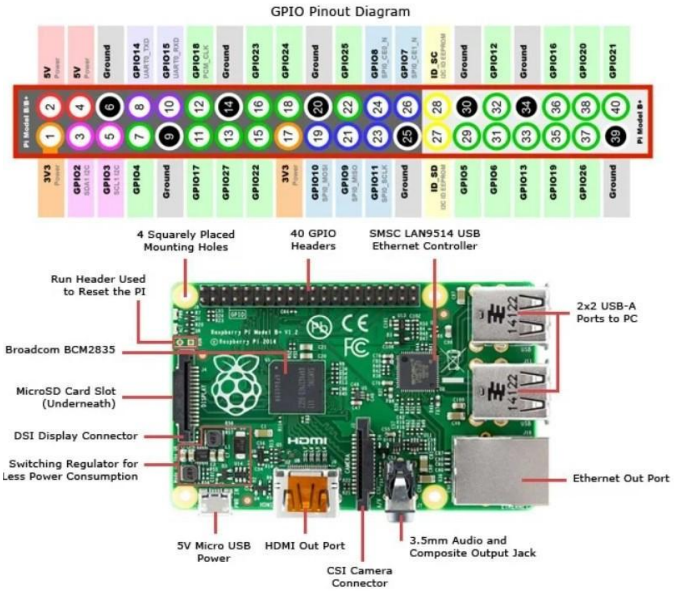
Hardware Information

Raspberry pi: Raspberry Pi is a chain of small unmarried-board computers (SBCs) developed inside the United Kingdom by using the Raspberry Pi basis in association with Broadcom. It's miles widely used in lots of areas, along with for climate monitoring, because of its low value, modularity, and open design. It's commonly used by laptop and electronic hobbyists, because of its adoption of HDMI and USB devices.

Specification-

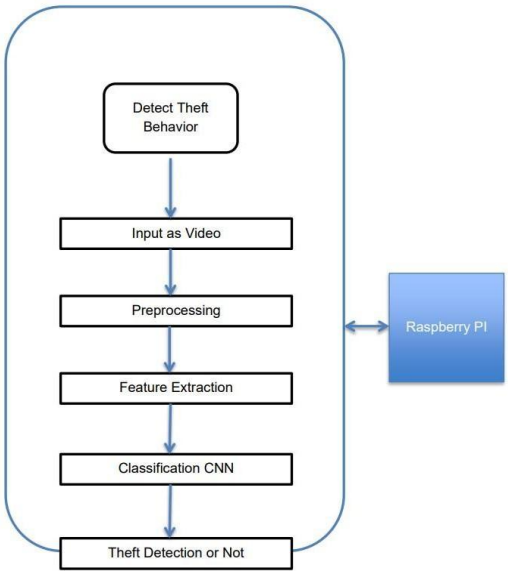
- Broadcom BCM2711, Quad core 64-bit SoC @ 1.5GHz.
- 8GB LPDDR4-3200 SDRAM (depending on model)
- 2.4 GHz and 5.0 GHz IEEE 802.11ac wireless, Bluetooth 5.0, BLE.
- Gigabit Ethernet.
- 2 USB 3.0 ports; 2 USB 2.0 ports

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252



V. DETAILED WORKING

Flowchart-



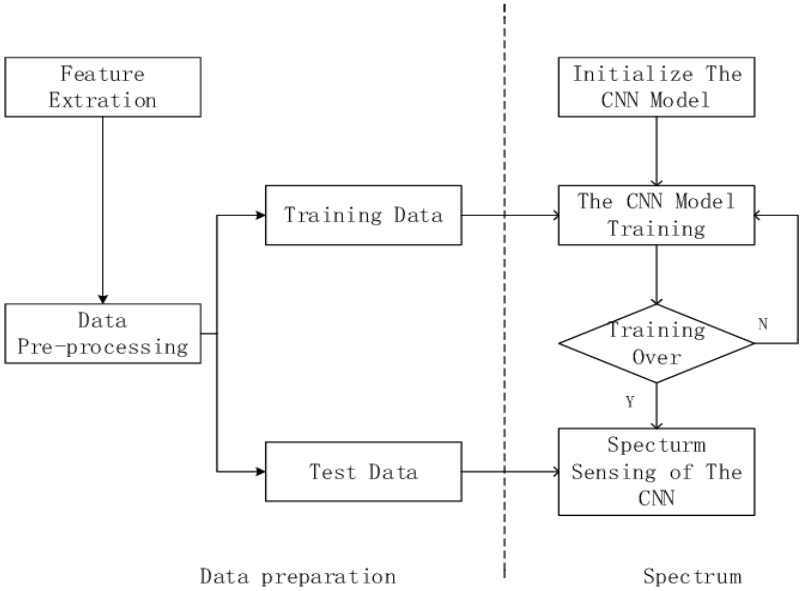
Preprocessing- Pre-processing in which the input image data converts it into meaningful floating-point tensors for feeding into Convolutional Neural Networks. Just for the knowledge that tensors are used to store data, they can be assumed as multidimensional arrays.A tensor representing a sixty four X 64 photograph having 3 channels can have its dimensions (64, sixty four, 3). Currently, the data is stored on a drive as JPEG files, So allow's see the steps taken to obtain it. Read the picture files (stored in the data folder). Decode the JPEG content material to RGB grids of pixels with channels. Convert

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

those into floating factor tensors for input to neural nets. Rescale the pixel values (between zero and 255) to the [0, 1] c programming language (as education neural networks with this range gets efficient).

Feature Extraction- When performing deep learning feature extraction, we treat the pretrained network as an arbitrary feature extractor, allowing the input image to propagate forward, stopping at a pre-specified layer. Doing so, we can still utilise the robust, discriminative features learned by the CNN. We can also use them to recognize classes the CNN was never trained on! Feature extraction is a part of the dimensionality reduction process, in which an initial set of the raw data is divided and reduced to more manageable groups. These features are easy to procedure, but still capable of describing the real information set with accuracy and originality.

Classification CNN- As in any other neural network, the input of a CNN, in this case an image, is passed through a series of filters in order to obtain a labelled output that can then be classified. The specificity of a CNN lies in its filtering layers, which include at least one convolutional.

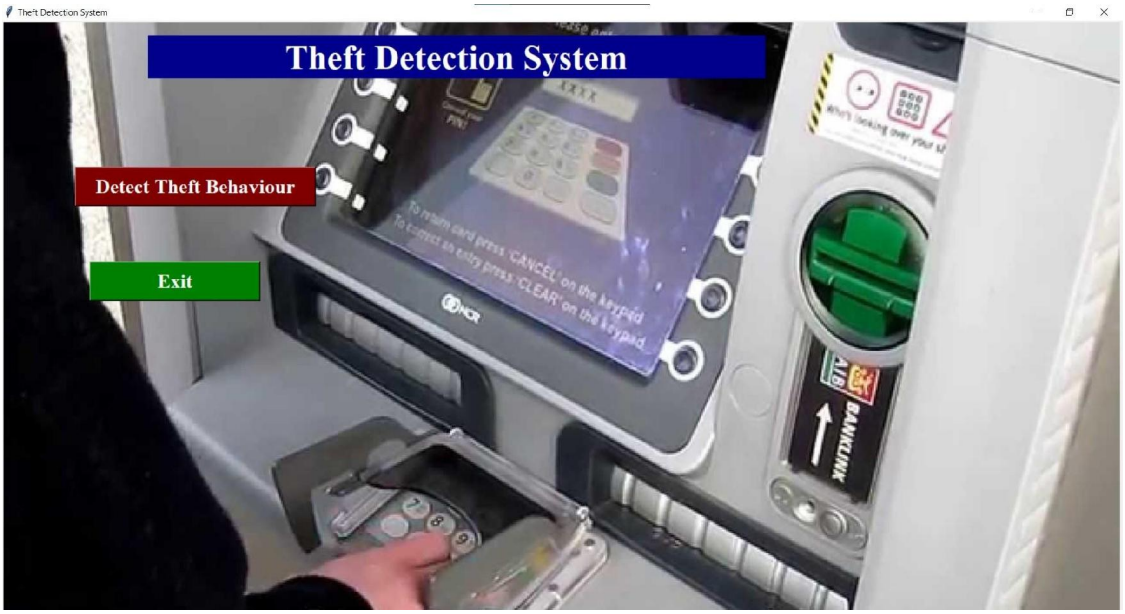



```
import tkinter as tk
from PIL import Image , ImageTk
import csv
from datetime import date
import time
import numpy as np
import cv2
from tkinter.filedialog import askopenfilename
import os
import shutil
#from skimage import measure
#import Train_FDD_cnn as TrainM


#====================================================================
root = tk.Tk()
root.state('zoomed')

root.title("Theft Detection System")

current_path = str(os.path.dirname(os.path.realpath('__file__')))

basepath=current_path  + "/"

#====================================================================
#====================================================================

image2 = Image.open('a2.jpg')
image2 = image2.resize((1530, 900), Image.ANTIALIAS)

background_image = ImageTk.PhotoImage(image2)

background_label = tk.Label(root, image=background_image)

background_label.image = background_image

background_label.place(x=0, y=0)  # , relwidth=1, relheight=1)
#
label_l1 = tk.Label(root, text="Theft Detection System",font=("Times New Roman",
```

```
def create_folder(FolderN):

    dst=os.getcwd() + "/" + FolderN        # destination to save the images

    if not os.path.exists(dst):
        os.makedirs(dst)
    else:
        shutil.rmtree(dst, ignore_errors=True)
        os.makedirs(dst)


def CLOSE():
    root.destroy()
#####================================================================

def update_label(str_T):
    # clear_img()
    result_label = tk.Label(root, text=str_T, width=50, font=("bold", 25),bg='cya
    result_label.place(x=400, y=400)

def train_model():

    update_label("Model Training Start.............")

    start = time.time()

    X=TrainM.main()

    end = time.time()

    ET="Execution Time: {0:.4} seconds \n".format(end-start)

    msg="Model Training Completed.."+'\n'+ X + '\n'+ ET

    update_label(msg)
```

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

VI. RESULT



After Successfully running the program the Graphics User Interface opens through which you can select a certain video to Tested. This window helps users to select a particular video and check whether theft is present or not.
Step 1- The selected video stored in the database will be given to the program in Raspberry Pi Module
Step 2- The new window will open which will show video running in frames and simultaneously testing the frames for theft.
Step 3 - The window Label colour will change from Green to Red if theft is detected.

VII. CONCLUSION

The research work that will be carried out in this thesis would be mainly focused to design and develop efficient and convenient theft detection surveillance i.e. an System to detect theft using Raspberry Pi to solve security problems which will help to decrease theft activities. It as a result reduces the quantity of data that wishes to be reviewed. It will be applicable for offices, banks, ATMs, homes etc. After successfully implementing the project, it can be applied for smart home security systems which would be very much helpful in auto theft detection for security purposes.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

We thank the Department of Electronics and Telecommunication of AISSMS COE for extending support to conduct our experiments. We are specifically grateful to Mrs. S. A. Takalkar, for sharing valuable knowledge and wisdom with us.

REFERENCES

[1]. Rhowel Dellosa, "Development of an Anti-Theft Device using Motion Detection and Body Temperature", Asia Pacific Journal of Multidisciplinary Research, December 2014. P-ISSN 2350-7756 — E-ISSN 2350-8442
[2]. Xinyi Zhou, Wei Gong, WenLong Fu, Fengtong Du, "utility of Deep mastering in object Detection", international journal of progressive research in advanced Engineering (IJIRAE), June 2014.
[3]. Yong-Deuk Shin, Jae-Han Park, Ga-Ram Jang, Moon Hong Baeg, "Moving Objects Detection using Freely Moving Depth Sensing Camera", 21st International Conference on Pattern Recognition, November 2012.
[4]. Dixit Suraj Vasant, Babar Apeksha Arun, Meher Priya Shivaji,"Raspberry-Pi based totally Anti-robbery protection device with image comments", journal Of statistics, information, And research in Electronics and communication Engineering, October 2017. ISSN: 0975 – 6779
[5]. Rahane Madhuri, Pathak Mayuri, Wadekar Ashabai, greater Rupali, "examine of robbery Detection and monitoring the use of Raspberry Pi and PIR Sensor", worldwide magazine of latest trends in Engineering and technology (IJLTET), September 2015. ISSN: 2278- 621X
[6]. Rahul Raguram1, Jan-Michael Frahm1, and Marc Pollefeys, "A Comparative Analysis of RANSAC Techniques Leading to Adaptive Real-Time Random Sample Consensus", ECCV 2008, Part II, LNCS 5303.
[7]. Ashwini Patil, Shobha Mondhe, Tejashri Ahire, Gayatri Sonar, "Auto-Theft Detection using Raspberry Pi and Android App", International Journal of Research in Engineering Application Management (IJREAM), October 2016. ISSN: 2494-9150