

Real Time Vision based Vehicle Entry Management System

Submitted in partial fulfilment of the requirements for the award of
Bachelor of Engineering degree in Electronics and Communication Engineering

by

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SCHOOL OF ELECTRICAL AND ELECTRONICS

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

Accredited with Grade "A" by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

MARCH - 2021



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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **NANDIGAM KOTI KRISHNA PHANINDRA** (Reg.No.37130277) and **NATUKULA VENU GOPAL** (Reg.No. 37130280) who carried out the project entitled "**Real Time Vision based Vehicle Entry Management System**" under my supervision from **November 2020** to **March 2021**.

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DECLARATION

We **NANDIGAM KOTI KRISHNA PHANINDRA (Reg.No.37130277)** and **NATUKULA VENU GOPAL (Reg.No.37130280)** hereby declare that the Project Report entitled “**Real Time Vision based Vehicle Entry Management System**” done by us under the guidance of **Mr. Immanuel Rajkumar** is submitted in partial fulfilment of the requirements for the award of Bachelor of Engineering degree in ELECTRONICS AND COMMUNICATION ENGINEERING.

DATE:

PLACE:

SIGNATURE OF THE CANDIDATE

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2. 

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ABSTRACT

With machine learning algorithms like KNN, SVM/SOM, recognizing digits is considered as one of the unsolvable tasks due to its distinctiveness in the style of writing. In this paper, we providing a hybrid machine learning for vehicle identification and alert system. Traditional machine learning approaches are not full fill the desired accuracy and detection rate and not providing the any alert mechanism for this reason we are providing a hybrid classifier for the number plate detection and character extraction and verification for improving the best accuracy.

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CHAPTER-1

INTRODUCTION

1.1 INTRODUCTION:

Suppose you must make changes to a written record, such as a novel, magazine publication, or contract. You have to rewrite the entire volume for hours and you have to be careful not to make any mistakes. Instead, you should use the Optical Character Recognition (OCR) tool to scan the written text and digitize the entire article.

OCR is a great solution to transform from human to human, but it is less so when it comes to more structured reports such as shapes that can be made with computers.

Human communication is usually as open a subject as you are reading now. These reports are called structured data and although they are great for human-to-human communication, computers are impossible to understand. OCR converts structured data into machine-readable data, allowing humans to view and use it more easily.

Organizations and policy makers have created many systems that manipulate text into virtually undoubted labels to understand the text on computers. The OCR setting converts it into machine-readable text, which is only the first step. Most texts are incomprehensible to machines, so they cannot follow them. Current Knowledge Capture Systems based on in-depth learning are increasing OCR production, transforming them into key respect groups and machine adoption tables.

Optical character recognition, or OCR, has made great strides as a widely read field. Many advanced formulas have been developed that can be used for OCR purposes, but extracting text from images containing tables is a challenging task while preserving the table structure. Here we show how to divide input images into particles that have similar information with and without borders and how to reconstruct the isometric information while preserving the isometric information using the most effective and flexible isometric design. The resulting display optimization can be used to speed up the time-consuming task of digitizing large quantities of regular data. A similar

engineering approach to improving the performance of common OCR applications is possible when dealing with large quantities of data.

1.2 CURRENT SYSTEM:

Optical Character Recognition (OCR) is a method of converting images of typed or typed or written text into machine-readable format. Change, set up / find and scale from OCR's underlying drivers. This is accomplished by literally examining the material image with letters, then verifying the filtered image, and finally describing the object image in character codes such as ASCII.

1.3 REVIEWS:

Learning and managing training materials in different tones requires a lot of time and effort.

In addition, more work is required on image processing, as this is the most important aspect of the OCR display.

Effort Despite many attempts, OCR does not guarantee 100% accuracy and surprisingly, after OCR, we must use AI to identify or physically correct an undiscovered character.

CHAPTER-2

LITERATURE SURVEY

2.1 INTRODUCTION:

The Optical Character Recognition (OCR) model, which uses neural organization (NN) for filtered and handwritten letters, has been developed and shown to be effective. It uses a variety of equations, each unique in its own way. As a result, this model uses many advanced methods to explore personality and, as a result, it does research on the implementation of various equations. Optical Character Recognition is the process of distinguishing, sorting, and perceiving specific characters based on their personal material or image. This is especially useful for more experienced libraries or registered installations. A receipt framework first creates a database and then digitizes it before storing it in the system. Remember various external variables to avoid crashing the system. Due to huge improvements in shape, size, scale and position, the accuracy of HCR has been pushed to 90%. Different researches are often done for Arabic dialects and the reading style is completely different. As a result, filmmaking and recognition play an important role in character recognition. When taking a photo with the camera, the producer can usually select the material, do some manufacturing procedures, and then try to separate the tested volume. The highlights of the report are divided into two categories: undeniable and weak. Shortness, distance, bulge and aspect ratio are all used in low-level extraction. On the other hand, triangular positions, straight lines, etc. are important when collecting important scores. These methods can be implemented as different processes based on the consistency of different planning activities. The proposed structure will focus on the nervous system, which will take advantage of the information index preparation and give useful results. To perceive personality, this approach uses a visual device. To earn effective returns, the pre-owned system uses a limited number of highly accurate accounts. The data is first sent to the detail sheet. In addition, these information streams are advertised about the company before the final unit of production is received. Expect actual returns as a result of this forward transfer.

True control is often removed from the underlying data, resulting in an error signal based on the backscattering technique, in which the errors recur. Loads change

frequently and nerve control has recently improved as a result of experience. These bodies pass through an orbital arrangement, which promotes the cognition layer to transfer the paradigm to the next neuron, which is embedded in the hidden layer. Thus, the final yield is determined by the age of the crop layer. This reaction is repeated several times and once the company has determined which combinations are suitable for a particular data set, it can be tested on additional test inputs. Externally tested individuals find it difficult to distinguish different features such as accuracy, course of action, focus, practicality and diversity when searching for certified or written materials. A smart structure has been used to allow outside staff to address such issues more effectively and healthily. In this case, the person uses an auxiliary device that relies on the camera to search the entire information area. The corresponding frame uses a specific camera to capture the customer's input, which is then processed through a digitization cycle. The filtered log is often made of a material called OCR, which completes the work. The new window will have a computer application that allows the user or recipient to see what is written on the screen. Usually, the weak person composes something and if the screen reader thinks it is wrong, they click delete to delete it.

The main disadvantage with this system is that it can only read content and not images. As a result, the screen reader helps with character recognition and it is an audio device that many people find difficult and complicated. Thus, OCR was developed using Neural OCR with an open computer focus to correct and overcome problems and outcomes from the previous system. The most important thing is to read the file and get acquainted with the content. After that, the image is captured by the webcam and then dealt with. The latter is displayed with the help of the speaker, which encourages the user to read the content. The entire loop starts with the photo capture, which is done by the inbuilt sensor. To ensure that the image is clear, special care must be taken. After pre-treatment, it uses a variety of curve detection techniques such as slope detection, lubrication and turbulence removal. This ring track marker checks to see if it stops at 15 degrees, ensuring that there is a bending distance Nct which can be used for further processing. [Two]

2.2 LITERATURE SURVEY IN BRIEF:

Author & Year	Classifier	Features	Accuracy
R. M.Bozinovic , S. N. Srihari . (1989)	Word formation using letter hypothesis	Contour tracing, event construction, letter hypothesis and word hypothesis	77% For dictionary of 130 words 66-training 64-different test set For cursive
H. Bunke , M. Roth , E. G. SchukatTalamazzini . (1995)	HMM	Location, curvature of edge and percentage of pixels lying on the edge	98% For dictionary of 150 words 2250-training 750-testing On ruled paper For cursive
Nafiz Arica (1998)	HMM	medians of black runnames on the bank checks, 19 in vertical ,horizontal distinct characters segmented and diagonal scan manually, 20 samples for each lines for getting directional skeleton	65% 240 cursive words for class used for HMM training, 300- testing
A. Gupta, M. Srivastava , C. Mahant	NN+ SVM	Fourier Descriptors	62.93% on test data 26 word lexicon 260 words each 10 times 26-testing For cursive

Table 2.1 Literature survey

2.3 REFERENCES:

- [1] G. Takacs, I. Pitas, B. N. Kotsis, and D. Tikk, "Scalable collective filtering methods for broad recommender systems," *Journal of machine learning science*, vol. 10, no. Mar, 2009, pp. 623–656.
- [2] "Matrix factorization methods for recommender systems," by Y. Koren, R. Bell, and C. Volinsky, *Computer*, vol. 42, no. 8, 2009.

[3] “Inferring networks with substitutable and interchangeable products,” in Proceedings of the 21st ACM SIGKDD International Conference on Information Discovery and Data Mining, by J. McAuley, R. Pandey, and J. Leskovec. 785–794 in ACM, 2015.

[4] J. Bobadilla, F. Ortega, A. Hernando, and A. Gutiérrez, “Recommender systems survey,” Knowledge-based systems, vol. 46, no. 1, pp. 109-132, 2013.

CHAPTER-3

AIM AND SCOPE OF THE PRESENT INVESTIGATION

3.1 PROPOSED SYSTEM:

This proposed technology will only be used in densely populated and remote areas to identify vehicles violating traffic regulations, and employer information can be retrieved using this tire. It is difficult for a police officer to determine a permit for the number of cars violating speeding car regulations. As a result, it is important to develop such a system as a solution to changing traffic problems. INPR systems are already available, but their purpose is not yet fully realized. Infrared lighting is widely used to take pictures in frames. For number plate identification, various protocols have been proposed.

To classify Indian number plate, we propose a simple method based on close bit. The 'gap' here is really a measure of how well the characters compare. We carefully study the effects and weight plans of different numbers of neighbors and announce the results. The lethal error rate of the test set at the knowledge base is 1.5 percent - 2.0 percent, which is equivalent to most modern versions if a pair of close neighbors cast their ballots.

3.2 IMPLEMENTATION:

3.2.1 Image Acquisition:

The first step is to obtain an image of the contribution to the draft. Images are captured in RGB format. In addition, images are made for plate extraction. Framework data collection includes some subtle skills such as detailed vehicle data, sign images and other basic facts.

3.2.2 Image Partitioning:

The captured image contains noise and other unwanted elements. Having noise distorts the nature of the image. Finish flicker removal from image. Image preprocessing involves splitting an image, grazing an RGB image, adding precise image strokes, generating an image, and finally applying KNN computation for

character recognition. Image splitting is a basic and important premise in which the image is divided into parts with identical credits. The split image creates a pixel-sized cover for each article in the image. To identify letters we divide the rules into single, individually identifiable letters. This is important because poor segregation can lead to misidentification. The extracted RGB image is then converted to a grayscale image. Convert a three-channel (RGB) image to a single channel (grayscale or duplex image), and then apply a separate edge to the resulting image.

Here, the edge is used to divide the image into two parts, where all the attributes below the maximum rating are dark and all the attributes above are bright. Threshold is a process that makes it easy to check the pixels of an image. Use it to select areas of interest on the image, ignoring uninteresting areas.

3.3 SUGGESTED ALGORITHM:

For sorting, OCR is used. It is often used for regression and classification. This is a non-parametric assessment, i.e. it does not rely on general data to make a decision. It is also known as a slow student account because it immediately wins from data storage, not from the planning group. Continues on set data within accepted hours. The KNN calculation basically saves the data set during the planning period, and when new information is received, it is placed in a category somewhat similar to the new information. In the following developments, the method of calculation is described:

Step 1: Determine the value of K neighbors.

Step 2: K. Neighbors to determine the distance between the Euclidean.

Stage 3: Rate your nearest K neighbors based on Euclidean distance.

Step 4: Include the details you focused on in these k neighbors.

Step 5: Set class-centered knowledge where the number of neighbors is most intense.

Step 6: We have prepared our template. By calculating the Euclidean distance we find the nearest neighbors. To estimate the $(X_2 - X_1)^2 + (Y_2 - Y_1)^2$ Euclidean distance (Y2-Y1) KNN, follow these two steps:

S Set the KNN equation to the training model Test the result of the test Check the accuracy of the result (confusing network) Another Visualize the test group result to request another role, the system will find the closest k neighbors.

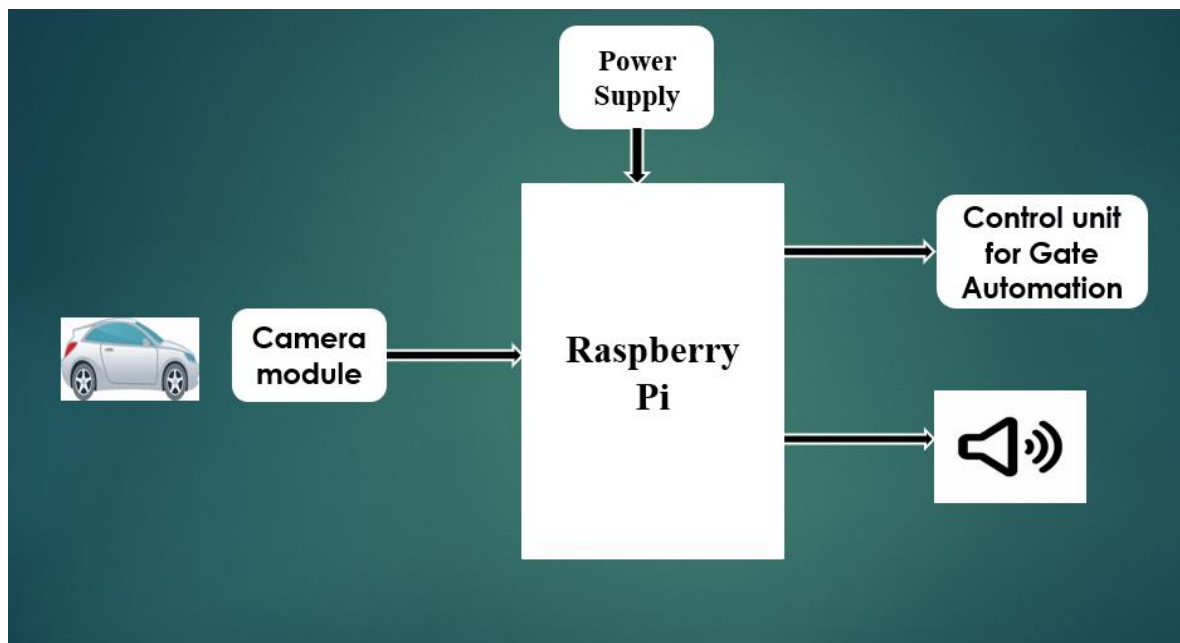


Fig:3.1 Block Diagram of Proposed System

This is often achieved by calculating the Euclidean distance between the test and reference points, setting the distances in ascending order, and then thinking about the smallest Euclidean distance. This equation is often redirected for different estimates of K. We choose K that minimizes the number of errors while maintaining the measurement accuracy needed to make predictions when displaying details you have not seen before. The KNN equation takes into account the similarities between the current status / information and the public case and places the new case in the same category as the accessible taxonomies. The KNN account saves all available data and sets up another data point based on its proximity. This means that when a new substance emerges, it is usually quickly executed as a useful group classification using the KNN equation.

CHAPTER-4

METHODS AND ALGORITHMS USED

4.1 SYSTEM REQUIREMENTS:

➤ **HARDWARE REQUIREMENTS:**

- Hard Disk: 120 GB.
- System: Pentium Dual Core.
- Input Devices: Keyboard, Mouse
- Monitor: 15" LED
- Ram

➤ **SOFTWARE REQUIREMENTS:**

- Coding Language: PYTHON.
- Operating framework: Windows 7.

4.2 PYTHON:

- Python is a great open source, object-based language of programming, developed by Guido van Rösom in the mid-191990s. The name Monty Python was inspired.
- Python is compatible with a wide range of Unix distributions, Mac and Windows 2000 and later.



Fig 4.1 Icon of Python

[Prefer a video? We have one for you.](#)

4.2.1 PYTHON PROGRAM

Python programmes consist of modules

- Statements include articulations
- Explanations are provided in modules
- Expressions make objects and interactions

Eg: `print("Hello World")`

4.2.2 FEATURES OF PYTHON

Open source: Python is only a free software for open sources which can be used by everyone without paying.

Simple to learn: Clear and simple grammar, no sort sentences, programmed memory the board, big level knowledge types and tasks, plan to read (more English like punctuation) and compose (more lightweight coding compared to C, Java, and C++) fast.

Language: high-level

Language: high-level

Language: Long \sUndeniable level language (closer to human) is the same as that of the machine (e. g. assembly languages) as a higher level of thinking (for example

assembly languages). A high-level language of low growth, like C, C++, Perl, and Java, Python is an example.

Important level dialects are robust, which ensures they can be stumbled through all big machinery and programming levels with little or no source code alteration.

Object-Oriented: You get a brief (order line) from Python and work with the interpreter to write and monitor your work directly. Python gives you an intuitive experience. In numerical programming, this is advantageous.

Python programmes are deciphered, source code is taken as data and collected by statement and executed immediately (to multifaceted byte code). The need to bind or integrate is not valid.

Python is sometimes known as "stick" and can work in a mixed language environment. The Python translator has been effectively upgraded, and it now has the potential to implement additional intrinsic functionality or modules written in C/C++/Java language.

Bibliothèques: Information bases, online administrations, organisation, statistical sets, immersive user interfaces, 3D illustrations, among others are several examples.

Assists: Support from a Python user group on the internet

4.2.3 PYTHON INTERPRETER • Type Python programs in intuitive mode, and the translator shows the results:

- In the order line of your terminal, enter python.
- The >>> photo will show after a short post.
- The diagram above denotes the origin of a Python translator's order line.
- Contributions are tested by a Python interpreter. (For example, >>> 4*(6-2) returns 16)

4.2.4 HISTORY

The British sketch comedy series Monty Python's Flying Circus was influenced by Python. It appeared in BBC from 1969 to 1974 and was produced by Monty Python, the comic group.

Guido van Rossum of the Netherlands' National Institute for Mathematical and Computer Sciences created Python in the mid-1990s.

Python was developed in 1991 as a free replacement for the ABC (All Basic Code) programming language. Guido remains Python's chief creator due to the fact that it requires numerous commitments from a varied client local field.

Around 1991 and 2001, a few renditions were delivered, with the most recent stable delivery being 3.2. In 2001 the Python Software Foundation (PSF), as a non-profit organisation, was established to own intellectual property associated with Python. A PSF financing member is Zope Corporation.

Python patches are almost all free and open source. The details of Python's release versions and licensing arrangement can be found [here](#).

4.2.5 PYTHON ENVIRONMENT

AIX	AROS	AS/400 (OS/400)	BeOS
<u>MorphOS</u>	MS-DOS	OS/2	OS/390 and z/OS
Palm OS	PlayStation and PSP	Psion	QNX
RISC OS	Series 60	Solaris	VMS
Windows CE or Pocket PC	HP-UX	Linux	

Table 4.1 Python Environment

4.2.6 MAJOR USES OF PYTHON

- Graphical User Interfaces (Tkinter, gtk, Qt).
- System utilities (framework administrator devices, order line programs).
- Embedded scripting.
- Web Development.
- Access to and scheduling the database.
- Internet scripting.
- Rapid prototyping and development.
- Game programming.
- Distributed programming

4.2.7 ORGANISATIONS USING PYTHON(SECTOR WISE) Yahoo Maps, Yahoo Groups, Google, Zope Corporation, Ultraseek, Linux Weekly News, Elastic Hosts Cloud Servers, Elastic Host supposition, Shopzilla, Mojam.com, Moja Two websites where you can stream movies digitally are Movieplayer.it and Multiplayer.it. Battlefield 2, Crystal Space, Star Trek Bridge Commander, The Temple of Elemental Evil, Vampire: The Masquerade: Bloodlines, Civilization 4, QuArK, and other games Vampire: The Masquerade: Bloodlines, The (Quake Army Knife)

Industrial Light and Magic, Walt Disney feature animations, industrial light and magic, Walt Disney feature animations, Walt Disney Robo Fog, Caligari, Blender 3D, Jasc Software, Paint Shop Pro, Walt Disney feature animations and other features of the company. SALLATIONS, Inc. (Abn AMRO Bank, Treasury Systems, Belloc Credit Union National Weather Service, Radar Remote Sensing Mr. Ciranova, Productivity Design Tools, Object Domain, HKS, Inc. (ABAQUS/CAE), HKS, Inc. MCI Worldcom, Inc., Nokia, Red Hat, Pardus, SGI, MCI Worldcom, Inc. Nokia, MCI, MCI Worldcom, Inc...

Planning of IT Certification Exam, Classroom Tool, Irvine, Pennsylvania State University, Smeal College of Business, University of California, New Zealand Digital Library, Smeal College, University of California, Irvine, Smeal College of Business, Smeal College of Business, Smeal Collège of the University of California Digital Library, Irvine, The Pennsylvania state university, Irvine

4.3 RASPBERRY PI:

Raspberry Pi (/pa/) is a line of small computers developed with Broadcom in the UK by the Raspberry Pi Foundation.

(15) The original project Raspberry Pi is intended in schools and developing countries for demonstrating basic digital programming. [16][17][18][19][20][21][22][23] Formalized paraphrase [Later, the first version became much more well-known than anticipated,[19] marketing for applications such as mechanical technology outside of its targeted market. It is now commonly used in a number of spaces, such as climate monitoring, due to its flexibility, measured performance, and open plan[20].

The Raspberry Pi Foundation created a new division named Raspberry Pi Trading after the introduction of the next type of board and names Eben Upton CEO in charge of technology development.

[21] Paraphrase official. The institution has been renamed an educational foundation for the promotion of fundamental education in information technology in schools and farming countries.

The Raspberry Pi is distinctive compared to other famous British computers.

[22] The report was published. Official paraphrase More than 30,000,000 sheets were published by December 2019.

[23] In Pencoed, Wales the majority of Pis are being manufactured at a Sony plant.

[24], with other Japanese and Chinese products produced.

[Day 25] [Day 25]

Generation of generations (section 4.3.1) Different ages were shipped from the Raspberry Pis. Raspberry Pi SBCs have an ARM-capable central processing unit (CPU) and a GPU (GPU) with an integrated Broadcom chip system. Raspberry Pi Pico feature an RP2040 on the ARM chip system with coordinated central processing units (CPU) with an ARM-capable function (CPU) (CPU).

The original (Raspberry Pi Model B), together with the least complex and cheaper Model A, was delivered in February 2012. In 2014, the Raspberry Pi Foundation released the updated Raspberry Pi Model B+. These preliminary sheets include ARM11, the visa estimate and the standard structure factor. A year ago, improved models A+ and B+ were launched. [Explanation is needed more in detail] In April 2014, a "Figure Module" was shipped to inserted applications.

In February 2015, the Raspberry Pi 2 was released with a 900 MHz 32-bit ARM Cortex A7 processor and 1 GB of RAM. Subsequent models used the ARM Cortex-A53 cpu with a 1.2GHz 64bit quad centre. [Twenty-sixth]

A smaller Raspberry Pi Zero and fewer I/O//O/GPIO capabilities was shipped in November for \$5. A raspberry Pi Zero was available in November 2014. A zero version with WiFi and Bluetooth capabilities for Raspberry Pi Zero W was released on February 28, 2017 for US\$ 10. (27th) - (27th) [page 28] [page 28] Official paraphrase

The Zero W version with a previously sold GPIO header was released on 12 January 2018, the Raspberry Pi Zero WH. [Note 29] Further information ARM Cortex-A53 processor of 1.2 GHz, 802.11n Wi-Fi, Bluetooth, and USB boot features were introduced in February 2016 in the Raspberry Pi3 B model. [Page 30] [Page 30]. On Pi Day 2018, a faster 1.4 GHz processor, and a two-band 2.4/5 GHz dual 802.11ac (100 Mb/s) or 3 times faster GIG Ethernet (a performance of around 300 Mbps due to an internal USB 2.0 association) were launched on the Raspberry Pi 3 Model B+. (31st) (31st) Highlight is also the power over Ethernet (PoE), the USB boot and the organisational boot (a SD card is not, at this point required). Raspberry Pi 4 Model B was released in June 2019[2] and consists of an ARM Cortex-A72 1.5 GHz Quad Core Prozessor, an onboard 802.11ac WI-FI, a 5-gigabit Bluetooth, a 2 USB 2.0 ports, 2 USB 3.0 ports, and a 2-gigabit (HDMI type D) double screen support with ports of up to 4K. If connected to a compatible electricity, Pi 4 can also be powered with a USB-C socket, which provides additional power to downstream peripherals. A Raspberry Pi 4 board design defect leads to an incorrect recognition of third party e-controlled USB connectivities, such as those on Apple MacBooks, that reject power provision. (32nd) (32nd) (33rd) Tom's hardware tested 14 different links and found that 11 of them worked perfectly to turn Raspberry Pi on and power them on. (3rd) (3rd) In version 1.2, released at the end of 2019, the error in the strategy of the board was fixed. (35th)



Fig. 4.2 Pi 400 Kit of Raspberry In November 2020, Raspberry Pi 400 was to arrive. It consists of a custom board taken from Raspberry Pi 4 and changed to a console. The Raspberry Pi 400's Broadcom BCM2711C0 processor can operate at 1.8 GHz thanks to an appropriate cooling arrangement comparable to the one in a Commodore 64, which is much faster than the Raspberry Pi 4. (The thirty-sixth) The LPDDR4 RAM is 4 GB on the console computer.

The Raspberry Pi Pico was published on a retail price of \$4 in January 2021.

The number '37' The Raspberry Pi RP2040 was the company's first board focused on a single microcontroller chip, and it was built in the United Kingdom. [38] a a The Pico has 2 megabytes of glimmer memory and 264 kilobytes of RAM. It can be programmed in Micro Python, Circuit Python, or C. The RP2040 Silicon Platform has been used to produce Raspberry Pi Pico Accessories and a number of other sheets in collaboration with Adafruit, Pomeronic, Arduino, and Sparkfun. (40) It is designed for actual computing, equivalent to an Arduino concept instead of serving as a universally useful PC (like the others in the reach).

Famil y	Mod el	Form Factor	Ethern et	Wirele ss	GPI O	Releas ed	Discontin ued
Raspber ry Pi	B	Standar d [a]	Yes	No	26-pin	2012	Yes
	A		No			2013	No
	B+		Yes		40-pin	2014	
	A+	Compact [b]	No			2014	
Raspber ry Pi 2	B	Standar d [a]	Yes	No		2015	
Raspber ry Pi Zero	Zero	Zero [c]	No	No		2015	
	W/WH			Yes		2017	
Raspber ry Pi 3	B	Standar d [a]	Yes	Yes		2016	
	A+	Compact [b]	No			2018	
	B+	Standar d [a]	Yes			2018	

Famil y	Mod el	Form Factor	Ethern et	Wirele ss	GPI O	Releas ed	Discontin ued
Raspber ry Pi 4	B (1 <u>GiB</u>)	Standar d ^[a]	Yes (<u>Gigabit Ethernet</u>)	Yes		2019 ^[41]	March 2020 ^[1]
	B (2 <u>GiB</u>)						
	B (4 <u>GiB</u>)						
	B (8 <u>GiB</u>)					2020	
	400 (4 <u>GiB</u>)	Keyboar d					
Raspber ry Pi Pico	N/A	Pico (21 mm × 51 mm)	No	No	26-pin	2021	

Table 4.2 History of Raspberrypi

4.3.1 HARDWARE

Many aspects of the Raspberry Pi hardware have changed over time, including the form of focal processing unit, memory limit, organizing support, and fringe gadget support.

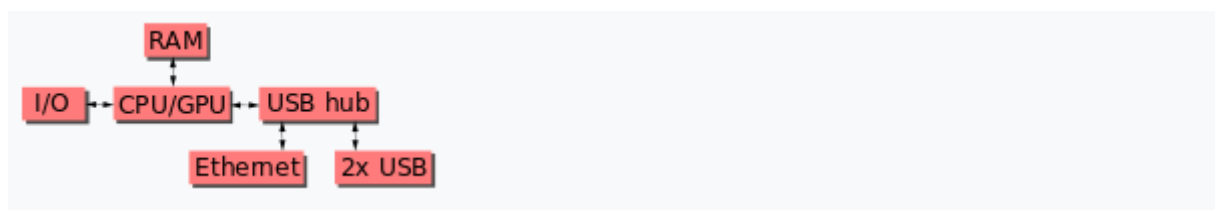


Fig. 4.3 Raspberry Pi Hardware Block diagram

The models B, B +, An, and A + are shown in this square diagram | The above models are similar, but the main Ethernet and USB modules are missing. A second USB port and an Ethernet port are provided inside. The USB port is attached directly to the SoC framework on the versions A, A + and Zero. The USB / Ethernet chip has a pin step with five USB ports, of which four can be accessed, whereas the Pi 1 Model B has only two ports. The USB port of Upper Zero is still connected to the SOS, so it is a Micro USB (OTG) port now. In contrast to the other top versions, the 40-pin GPIO connector at the top zero with soldering gaps in the pin regions is overlooked. The one responsible for it is Zero WH.

Unregulated device access memory (RAM) ranges from 256 MB to 1 GB and is available in four phases with up to 8 GB. The speeds of the processor range between 700 MHz and 1.4 GHz up to 3 B+ or 1.5 GHz. Internal memory varies from random access memory (RAM) of 256 MB to 1 GB, with up to 8 GB of RAM in the top four. The operating environment and programme memory are stored by stable digital (SD) cards with a micro SDHC architecture. One of the first examples was SDHC. One to five USB outlets can be found in the mats. Video outputs from HDMI and composite camera and a 3.5mm socket are supported. The output of GPIO PINs that regularly support I2C conferences is lower. The Pi3, Pi4, and Pi Zero W are available with Wi-Fi 802.11n and Bluetooth, while the B 8p8c is available with Ethernet.

[42]**Processor**



Fig. 4.4 Processor

A quad-core ARM Cortex-A7 processor with a clock speed of 900MHz powers the Raspberry Pi 2B.

The Raspberry Pi was equipped with the early Broadcom BCM 2835 SoC, the ARM1176JZF- S 700MHz Processor, Videocore IV GPU, [44] and RAM. The 16KB

Level 1 (L1) and 128KB Level 2 (L2) stores are subject to this requirement. The GPU is the main owner for Level 2 backup. It is noticeable that just the edge of the soC is packaging under the RAM chip. The ARM1176JZ(F)-S is the same CPU used in iPhones [45], but the clock speed and GPU integration are faster.

The V1.1 variant of Raspberry Pi used the Broadcom BCM2836 SoC, which had an ARM Cortex-A7 prozessor with a 2.900MHz, 32-bit ARM quad-core and an L2 cave 256KB of mutuality.

. Unlocked (actually) at 900MHz CPU clock speed. At this point, there are no plans to expand the BCM2836 SoC in 2016.

The BCM2837 SoC 1.2GHz six-cycle Broadcom has a quad-core ARM Cortex-A53 Processor and a 512KB reciprocal L2 Backup on the Raspberry Pi 3 Model B. Both A + and B + versions of the 1.4 GHz processor are used. [48] The transactions and the transactions are not available.

The Raspberry Pi 4 has 1 MB of common L2 cache and is operated on the Broadcom BCM2711 SoC with a 1.5GHz 64-bit ARM Cortex-A72 quad-core processor.

[51]

Book's Page 51 ARM Generic Interrupt Controller(GIC)2.0 standard, including devices which permit interrupted propagation using ARM virtualization, complies with the interrupt controller in the soC, as opposed to previous implementations using a dedicated virtualization interrupt controller. Capacity is a word for how much anything can contain. Book's page 52 [Additional No. 53].

The Raspberry Pi Zero and Zero W are using the BCM2835 SoC Broadcom same as the original Raspberry Pi, in spites of the 1GHz highest CPU clock speed.

Professor [54]. In the Raspberry Pi pico the RP2040, which works at 133MHz.

Workout

When running normally at 700MHz on an early raspberry, it generated a certified gallery equal to approximately 0.041 GFLOPS.

Prof. [55]

[None.] [None.] [None.] [None. It seems to be a Pentium II with 300MHz from 1997-99, based on the CPU. The GPU can handle 1Gbps models at 24GFLOPS, 1.5Gbps models at 1.5Gbps, and popular playback at 1.5Gbps. Since 2001, the Raspberry Pi's graphics features have been comparable to those of the Xbox.

The Raspberry Pi 2V 1.1 has a quad-core Cortex-A7 processor running at 900 MHz and 1GB of RAM. It was filmed in four and a half times the amount of time as the first model. It seems to be identical to the GPU version. [46] a On the Raspberry Pi, the 2V1.1 is ten times quicker than the 1 Model B + in parallel benchmarks. (57) On the Raspberry Pi 3 and Raspberry 1 screens, the quad-core ARM Cortex-A53 CPU is shown several times. [There are none. [No. 58] Raspberry 3 was found to be 80 percent quicker than Raspberry 2 in parallel operations. [There are none. [page 59]

The quad-core ARM Cortex-A72 CPU outperforms the Raspberry Pi 4 and Raspberry Pi 3 by a factor of ten.

[twice]

Overclocking is a concept that describes a method.

The on-chip frames of most raspberry pies can be overclocked to 800MHz and some to 1000MHz. According to research, the Raspberry Pi 2 can be overclocked to 1500MHz under special circumstances (ignoring all safety features and overvoltage restrictions). When demanding the "sudorasp-configured" running portion of the Raspian Linux distribution, you should be able to make overclocking decisions without terminating the warranty. [number 60] Overclocking is immediately turned off until the processor temperature exceeds 85 degrees Celsius (185 degrees Fahrenheit); however, it is possible to miss the overvoltage and overclocking settings (cancel warranty). To protect the chip from actual overheating, a correctly measured heating basin is needed.

With newer firmware models, you can choose from five ("super") overlock features that, when allowed, attempt to optimize SoC without reducing download time. This is accomplished by keeping track of the chip's core temperature and CPU load, as well

In their early prototypes, the Model N and B Raspberry Pi papers only have 256 megabytes of non-linear access memory (RAM). As a consequence, Early Beta B allocates 128MB to the GPU thus leaving the CPU with just 128MB. [63] [63] [63] [63] For the arrival of the On and B styles, three separate divisions are probable. Among N and B, there are 256 Mibs. The CPU splitter's default size is 192 MB, which is sufficient for standalone 1080p video encoding or simple triple handling. Measurements. It is not ideal for any film or 3D since it is just 224 MB for Linux and has a spare frame of 1080p. 128GB is set aside for intense 3D processing, perhaps with video encoding thrown in for good measure. [64] a The Nokia 701 was used in our experiments for 128GB Broadcom Videocore IV. [65] a Prof. Dr.

The newest 512 MiB RAM modell B was released on 15 October 2012 and included standard memory partition records of 256 MiB and 384 MiB and 496 MiB (arm256 begin.elf, arm384 start.elf, arm496 start.elf, start.elf) The CPU has 256 MB, 128 MB, 16 MB of memory RAM and 16 MB of videos RAM. However, a new experiment proposal was submitted by the Foundation about a week ago. The mystical object reads a new config.txt segment (gpu mem = xx) and passes essentially the RAM scale (16 to 256 MB in eight MiB projects) to the GPU, bypassing traditional decomposure and tyre technique. The Elf works in the same way as the 256 and 512 MB RAM Raspberry Pi models. [66]

1GB RAM has Raspberry Pi 2.

There's 1GB of RAM in the Raspberry Pi 3 B and B + model, and 512MB in the A + model.

[67] [68]

[Page 68] [Page 68] [Page 69] [Page 69] [Page 70] [Page 70] [P [69] [P [69]] a There are no RAM on the Raspberry Pi Zero and 512MB of RAM on the Zero W.

Raspberry Pi 4 has 2 gigaoocks of memory, 4 or 8 gigaoocks. [70] The report [70]. a In June 2019, the 1GB model was broadcast, but in March 2020,[1], the 8GB model was released in May 2020. [The third]

Computer network regulation

Due to the lack of Ethernet hardware in the models A, A+ and Zero, the USB Ethernet or the Wi-Fi adapters provided by an external customer are usually connected to the company. On models B and B +, the Ethernet port is supported by the latent USB Ethernet connector, SMSC LAN9514 chip. Firmware not official (version 72). The top three also feature a 10/100 Mbps Ethernet interface. Dual-band Raspberry Pi 3B+ is also used with IEEE 802.11b /g/n / AC WiFi, Bluetooth 4.2, and Gigabit Ethernet. (limited to 300Mbps by USB 2.0 and SOS transfer). The Raspberry Pi has a 4-gigabit Ethernet network (transfer speed is unlimited as Ethernet is not connected via USB stick).

When attached to another machine with a USB link, the Raspberry Pi Zero, RPi1A, RPi3A + [73] and RPi4 can be used as a USB interface or "USB stick." It may be set up in a variety of forms, such as a serial adapter or a computer that seems to be an Ethernet device. [Page 74] It was restored to the main Raspian distribution in May 2016 after initial programming changes. [Page 74] [Page 75] [Page 76] [P

Raspberry Pi models with the latest chipset are powered by a high volume USB storage unit, such as a flash drive. With less than 1.2 adaptations, early Raspberry, nothing on Raspberry, Pico on Raspberry, 2A models on Raspberry, 2B models on Raspberry can not endorse booting from USB mass storage. [Section 75]

Peripherals



Fig. 4.5 The Model 2B boards incorporate four USB ports for connecting peripherals.

A USB PC controller and mouse can be used with Raspberry Pi as it is pre-configured to act as a headless PC. [75] [76]. Depending on the gadget drivers installed in the

Core Business System, they can also be used for USB storage and MIDI adapters, as well as virtually any other component/gadget (many of which are included as a matter of course).

Various screws and connections on the exterior of the Raspberry Pi may be used to link it to various peripherals.

[77] [77]

Video

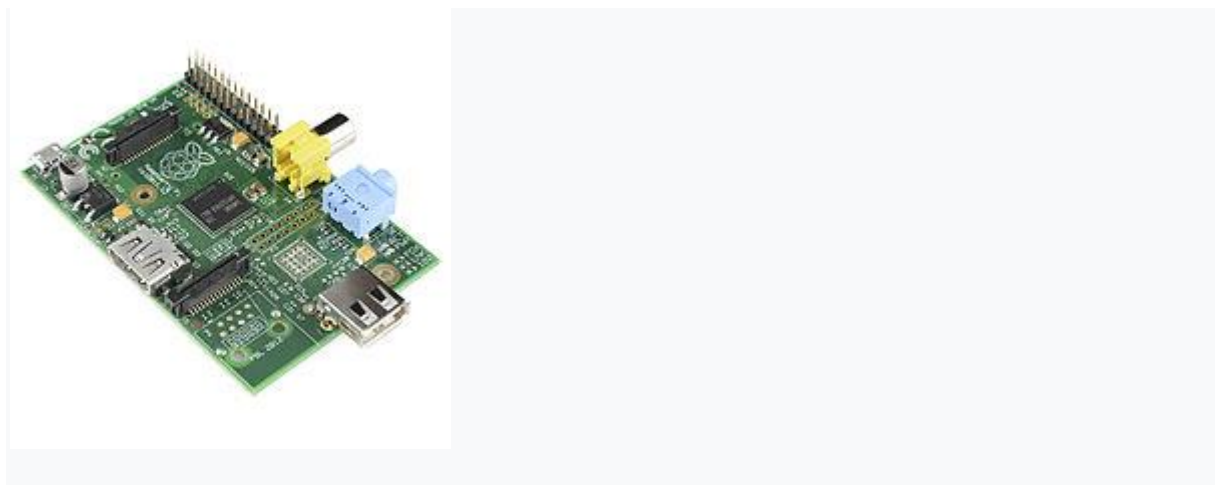


Figure 4.6: The first Raspberry Pi had both an HDMI port and a standard RCA composite video port. (Model A1).

Video sequencers, such as traditional NTSC or PAL targets for CRT TV, produce current standard TV targets, such as HD and Full HD, as well as sequential screen targets. Without using dedicated overclocking, you may accomplish the following objectives: 1280 720 720p HDTV; 1280 768 WXGA difference; 1280800 WXGA difference; 12801024 SXGA; 1366768 WXGA change; 14001050 SXGA +; 16001200 UXGA; 16801050 WXGA +; 19201080 1080p HDTV; 19201200 WUXGA +; [paragraph 78]

Higher goals, up to 20481152 [79], are feasible.

[80] or 38402160 at 15 Hz (very low frame rate to convince video).

[Page 81] Allowing higher goals does not imply that the GPU would be able to decipher video designs created on these targets. In particular, the Raspberry Pi is popular for

its ability to combat H.265 (at such a high resolution) and is often used for very high targets (although most simple settings reach full HD maintenance functionality).

Whilst the H.265 hardware is missing for Raspberry Pi 3, it can decrypt H.265 encrypted records more efficiently than its predecessors.

[Page 83] [Page 83] [Page 84] [Page 84] [Page 85] [Page 85] [P The Raspberry Pi 3 GPU is operated at 300MHz or 400MHz, making it different from when it was operating at 250MHz. [Section 84] [Section 84]

The Raspberry Pi has a clear connector that can be used for the older type TV screens (CRT) and better computers with 575i and 380i mixed video signals - an RCA or a 3.5mm phono connector depending on the models.

PAL-B/ G/ H/ I/ D, PAL-M, PAL-N, NTSC, NTSC-J secure TV signal standards

(85) The time limit has expired.

The Network Time-on-PC-Start Protocol is used to assess the organization's length (NTP). Another machine in a community network that supports a real memory clock, or an Internet NTP operator that obtains time data from the National Institute of Standards and Technology's atomic clock, may be the source of time data (NIST). If the corporation does not have union access, the cycle should be manually arranged or configured to ensure that no time passes until the business closes. While it can be much quicker than real time, the length remains constant (later saved documents also have timestamps). For systems with a constant clock, several small additional low voltage loads with continuous clocks are available. [86] [86] [86] [86] [86] [86] [86] [86] [86] (177)

Since the RP2040 microcontroller has a fixed clock built in, it cannot be tuned without a customer or associate office chip.

4.3.2 CONNECTORS:

Fig 4.7 Connectors :

Pi Zero

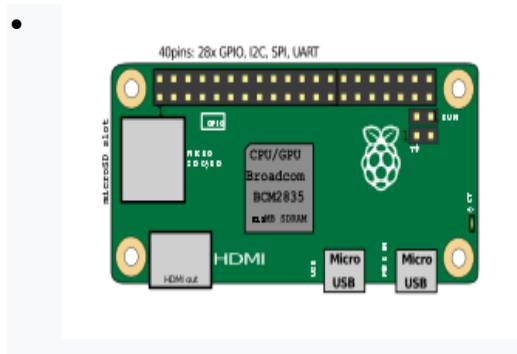


Fig 4.7.a Location of connectors and main ICs

Model A

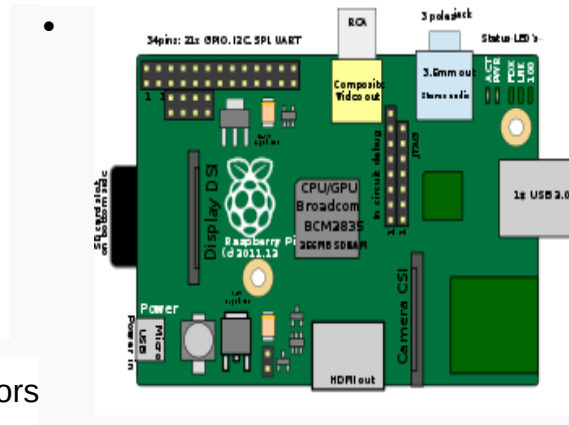


Fig. 4.7.b Location of connectors and main ICs on Raspberry Pi 1 Model A

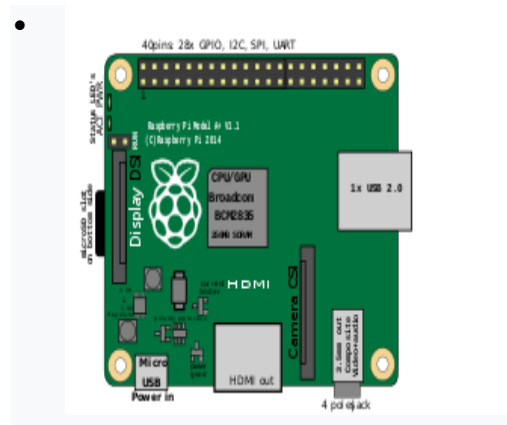


Fig. 4.7.c Location of connectors and main ICs on Raspberry Pi Model A+ revision 1.1

4.4 SYSTEM TESTING:

The test methodologies are as follows:

- Integration Testing.
- Unit Testing.
- Output Testing.
- User Acceptance Testing.
- Validation Testing.

4.4.1 Unit Testing:

The unit focuses on the research module, the smallest software engineering unit, as a control effort. To ensure optimal coverage and optimal fault detection, the unit tester displays specific directions in the unit control system. This test checks whether each unit as a whole is working properly. As a result, the name "Unit Test" was used. Each unit is evaluated independently and the unit interfaces are examined in accordance with the design specifications. Both critical therapies are tested to see if they provide the desired effects. Both error management methods are often embedded in their stages.

4.4.2 Assessing Integrity: The inclusion test program addresses concerns about dual issues of implementation and validation. After merging the cargo, a series of high-demand tests took place. The main goal of this research interaction is to take separately tested modules and place them in a strategy-based programming framework.

The types of integration test are as follows:

1. Mix from top to bottom

This approach takes a step-by-step approach to coping with program structure progression. The modules are coordinated starting with the simple software device and progressing to the step-by-step control system. The key program unit's child units are incorporated into the architecture in one of two ways: breadth first or extension first.

In this process, the product is evaluated from the theoretical unit downwards, with an actual seed being substituted as the research progresses.

2. Incorporation from the bottom up

This approach begins by running and checking the program at the lowest level of the application ladder, with modules. Since the modules are merged from the ground up, the processing needed to get them to a certain level is already in place, eliminating the need for visits. For the primary mixing method, the following effects can be considered:

Low-level units are grouped together into groups that perform a specific programming task.

To increase knowledge of the test condition and productivity, the driver (i.e. test control software) is configured.

The party was tested.

Drivers are eliminated and classes merge as the curriculum moves up.

Particle views evaluate each unit, then each unit is combined with a theoretical unit to be tested for its use.

4.4.3 Customer Acceptance Testing: Framework's customer acceptance is an important part of their success. The viability of the system is tested for customer acceptance by communicating with potential framework clients during construction and making improvements if necessary. The framework provided has a pleasant user interface that can be easily understood even by someone unfamiliar with the app.

4.4.4 Check Output: After the acceptance test, the yield of the proposed system is tested because the frame is not useful if it does not produce the required yield within the pre-defined specifications. Gaining the knowledge they need in terms of alignment tests the tire's ability to produce or display workable results. As a result, the yield design is taken twice: once the written design is on the screen and again on the screen.

4.4.5 Authentication certification:

Certification tests are performed in the fields listed below.

Text area: The content field can only contain a number of characters less than or equal to its height. In some tables, the content fields are alphanumeric, and in other tables they are alphanumeric. Often the wrong clip comes to light and sends the wrong message.

Field by number: Only numbers 0 to 9 are included in the number field. An error message appears while entering some characters. Selected modules are double-checked for stability and functionality. Each unit is kept up to date with real world data. Individually certified components combine to form a single device. Some software errors are removed from the yield. Testing is required to implement the details of true knowledge in the program. The test can be arranged in such a way that each requirement is tested separately.

Satisfactory testing is testing that produces errors for erroneous data and provides output that detects system errors.

Prepare test data:

The above research is done by collecting different types of test results. Preparation of test results is an important aspect of device research. After the test results are processed, the device under investigation is tested. When testing the system with test data, errors are detected and corrected using the above test methods and changes are recorded at a later date.

Data usage from live tests:

Direct search data is data that is removed from an organization's records. When a developer system is developed Inspectors often require clients to enter some data from their daily activities. At that point, the tire person uses this knowledge to verify the tire in any way. Many times, developers or prosecutors extract large amounts of direct data from documents and record it themselves.

Obtaining sufficient amounts of direct data for rigorous research can be challenging. Although practical data can explain how a device works with simple processing requirements, this data does not measure all variations or configurations that reach

the system, using assumes that the recorded direct data is actually distinctive. As a result of this bias against traditional principles, real testing of systems cannot be performed and conditions that lead to system failure can be ignored.

Synthetic test data: Only dummy test data is generated for test purposes and can be created to test a wide variety of arrangements and features. Finally, creating a utility program in the Data Structures section allows for quick verification of duplicate knowledge, verification of all network login and control methods.

The best search systems take advantage of dummy test data created by people who have not created projects. Typically, the loose community of analysts creates a research strategy based on framework data.

The "Virtual Private Network" package is approved after meeting all the requirements specified in the programming requirements.

4.4.6 Customer Training: With the development of the new system, customer training is required to demonstrate how to use the framework so that it can be better used for whomever it is designed for. As a result, it is clear to incoming clients how the company works on a daily basis. Its operation is efficiently affordable and since most of its users are people with a lot of experience with computers, it is very easy to use.

4.4.7 Management: This category includes a wide variety of tasks, such as code changes and schedule errors. To minimize the need for long-term maintenance, we have more clearly defined client needs during framework development. This framework is designed to meet the needs of the needs. With technological advancement, it will be possible to integrate many features in the future depending on the needs. The coding and preparation is easy and transparent, which simplifies maintenance.

4.4.8 Design Strategy: Framework testing approach combines system testing and scheduling in a well-organized sequence of actions that lead to efficient

implementation of programming. Test planning, project preparation, research implementation and result data collection and analysis should be included in the experimental process. The Scripting Test Protocol provides low-level verification that ensures that a small portion of the source code is properly executed and that high-level tests verify major application capabilities against customer requirements.

Programming certification is an important part of programming quality assurance because it thoroughly examines the identification and coding strategy. Product testing discusses fine error. As a result, a series of tests will be performed on the proposed structure until customer approval is ready for testing.

4.4.9 White Box Testing:

The white box test is a type of software testing in which the program tester is aware of the internal program's performance, structure, and vocabulary, or at least its performance. Most of the reasons is this. It's used to test places that aren't reachable from the black box.

4.4.10 Black Square Test Detection: The test involves presenting the item without snapshot data of the unit's internal operations, its creation and its language. Disclosure checks can be performed in the same way as other types of tests using a valid source file such as a specific document or specification document such as certification or requirements study. This is a complex situation in which the search object is exposed. It is impossible to "see". Provides a wealth of test data and responds to yields without seeing how the object works.

4.5 ADDITIONAL TEST METHODS:

a. Customer Acceptance Testing: Customer acceptance is an important part of the success of every system. System Acceptance is tested for customer acceptance by staying in touch with framework clients received during construction and making improvements if necessary. The submitted system has an intuitive user interface that can be easily understood even by a person unfamiliar with the technology.

b. Output Check: After the acceptance test, the yield of the proposed system will be tested because the framework will not be useful if the required return is not given in the pre-defined design. Having the knowledge they need in relation to the organization

checks the ability of the framework to create or demonstrate workable results. As a result, the yield design is considered twice: once in video and then in written form.

c. Data Verification: In the following fields verification checks are conducted.

Text area: Only a number of characters below or equal to the height of the contents field can be included. In some tables, the content fields are alphanumeric, and in other tables they are alphanumeric. The aisle glows from the base and regularly sends an error alert.

Digital area: Only numbers 0 to 9 are used in the numeric field. An error message appears while entering some characters. Selected modules are double-checked for stability and functionality. Each unit is kept up to date with real world data. Individually certified components combine to form a single device. There may be some software distortion due to the yield by implementing the real knowledge data included in the software. The test can be arranged in such a way that each requirement is tested separately. Satisfactory testing is testing that produces errors for erroneous data and provides output that detects system errors.

Evaluation Data Preparation: The next test is done by moving between different types of test data. The test frame process requires a test data plan. After the test data is prepared, the system is put into research to test that data. When examining the structure with test results, errors are found and corrected using the above test steps and notes are often taken in less time.

Use of Live Test Data: Live Test Data is material that is collected entirely from the database of the enterprise. When a midway system is developed, software developers or examiners often require clients to enter a set of data from their day-to-day operations. A tire person can also use this knowledge to measure tire midway. In some cases, engineers or analysts remove large amounts of direct data from documents and record it themselves. Obtaining sufficient amounts of direct data for rigorous research can be challenging. Although practical data can explain how a device works with simple processing requirements, this data does not measure all variations or configurations that reach the system, using assumes that the recorded direct data is actually distinctive. As a result of this bias against traditional principles, real testing of systems cannot be performed and conditions that lead to system failure can be ignored.

Using computer-generated test data:

Artificial test data are generated for testing purposes only, as it is provided to test any format or combination of values. In other words, the data creation tool in the Information Systems section allows verification of login and control paths throughout the synthetic data program generated quickly by the application.

The most successful research systems take advantage of duplicate test data created by individuals other than project authors. Typically, an independent community of analysts develops a search strategy based on the specifics of the framework.

The "Virtual Private Network" group is approved after fulfilling all the specifications specified in the program requirements specifications.

Customer help

User training is required after the introduction of the new system Teaches users how the system works so that they can use it effectively for whomever the system is built for. The regular operation of the project will be explained to the potential clients for this reason. Its operation is easy to understand, and easy to operate, as the target customers are people with a strong understanding of computing.

Take care of the property

It includes a variety of tasks, including correcting codes and structural defects. We have more precisely defined user requirements to minimize the need for long-term maintenance during the construction phase of the device. This method is designed to meet the requirements depending on the specification. With the advancement of technology, it may be necessary to add more functions depending on the potential needs. The coding and architecture are simple and straightforward, which makes maintenance very easy.

Test strategy:

The Architecture Test Protocol is a series of fine structured steps that combine framework tests and strategic approaches to lead to successful implementation of programming. Test planning, project preparation, test execution and result data collection and analysis should be included in the experimental process. The

programming testing strategy consists of both low-level checks that verify that a small portion of the source code has been successfully implemented and high-level tests that verify the main application capabilities against the customer's requirements.

Programming certification is an important aspect of programming quality assurance because it thoroughly examines software design and coding. Product testing conducts an interesting infarction. Consequently, for planned implementation to qualify for user approval review, it must undergo a series of tests.

CHAPTER-5

RESULTS AND PERFORMANCE ANALYSIS

5.1 PRE-PROCESSING RESULTS

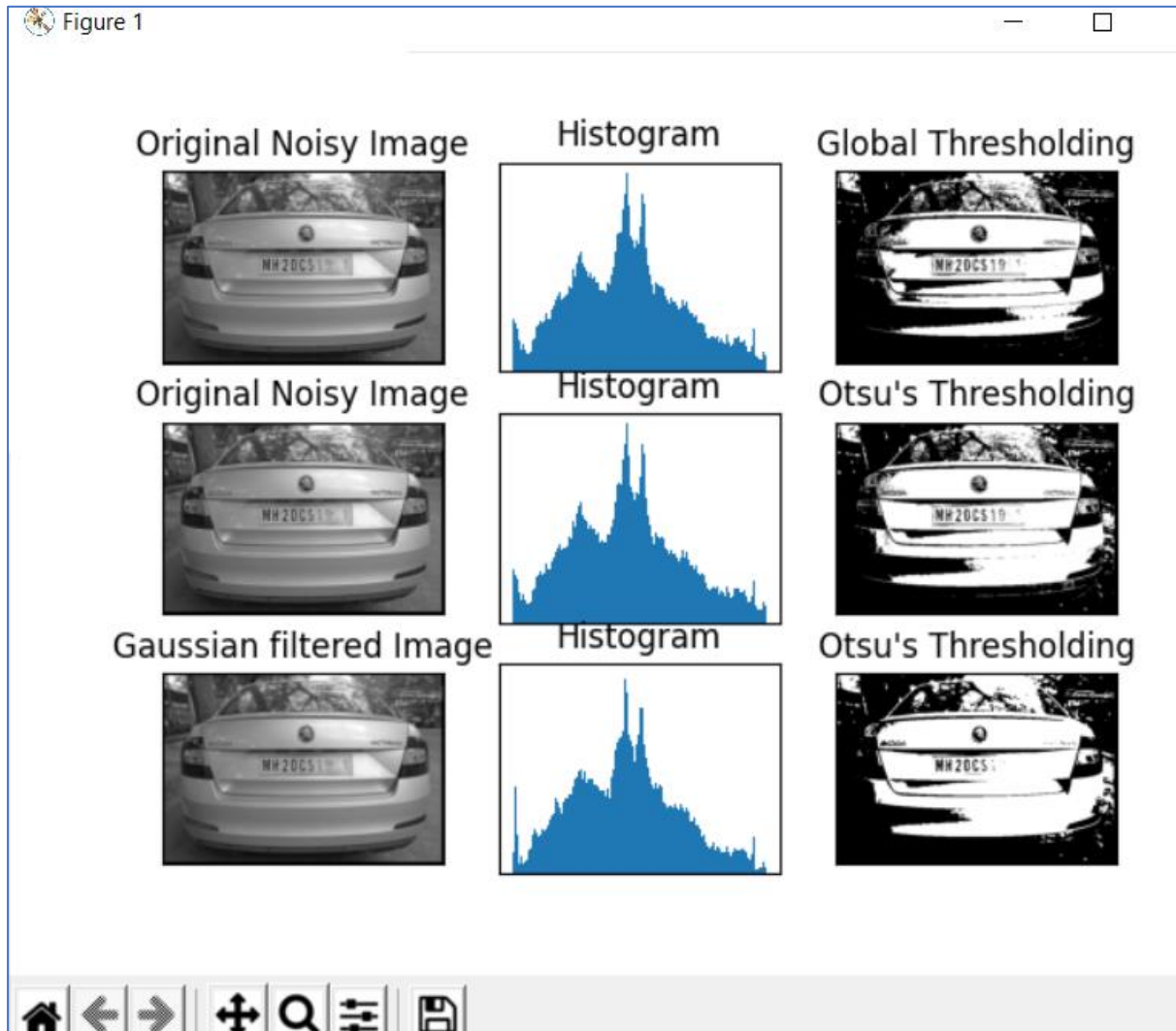


Fig: 5.1 Pre-processing techniques-Removal of noise

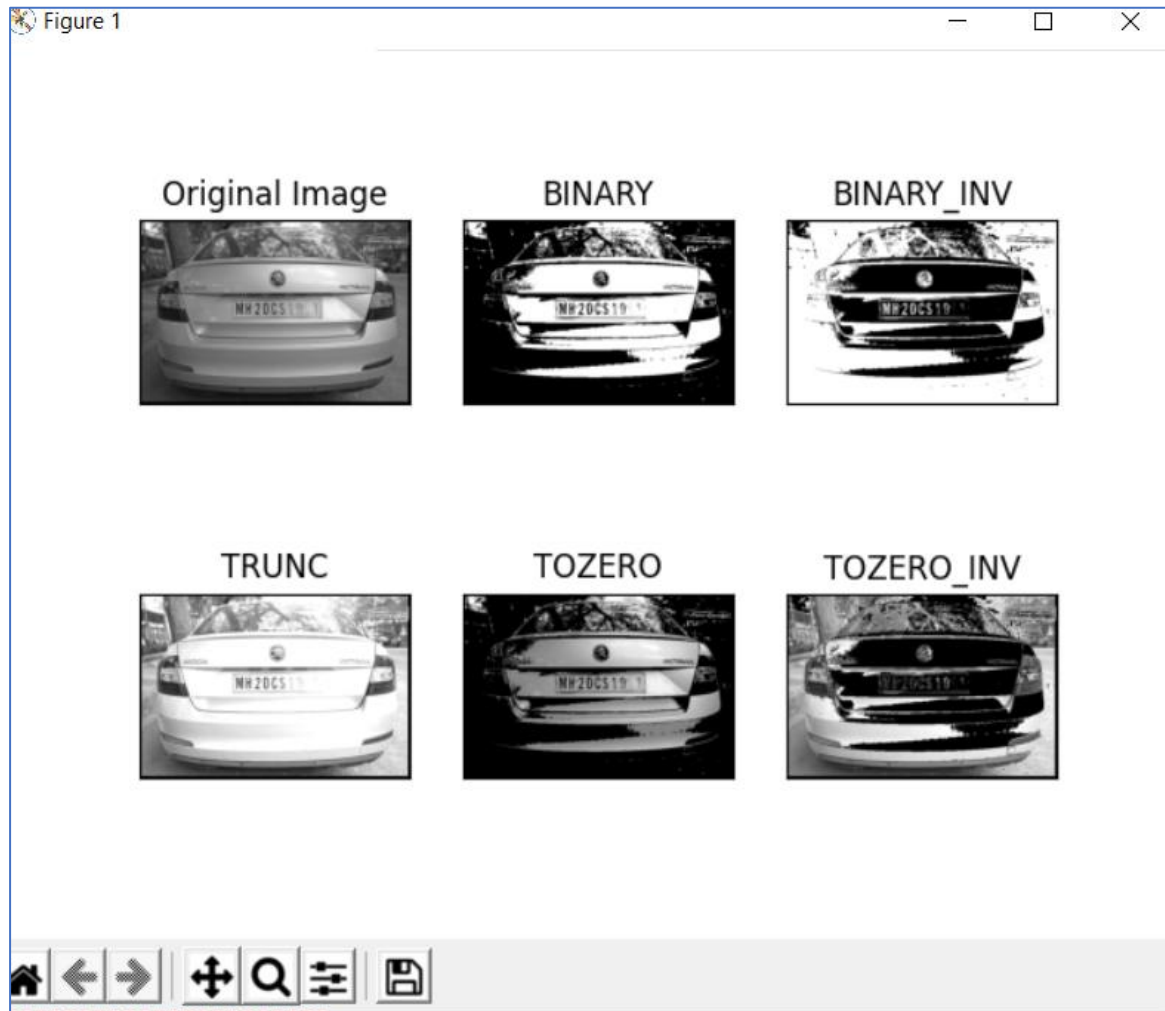


Fig: 5.2 Pre-processing techniques-Binary Image Conversion and Truncation

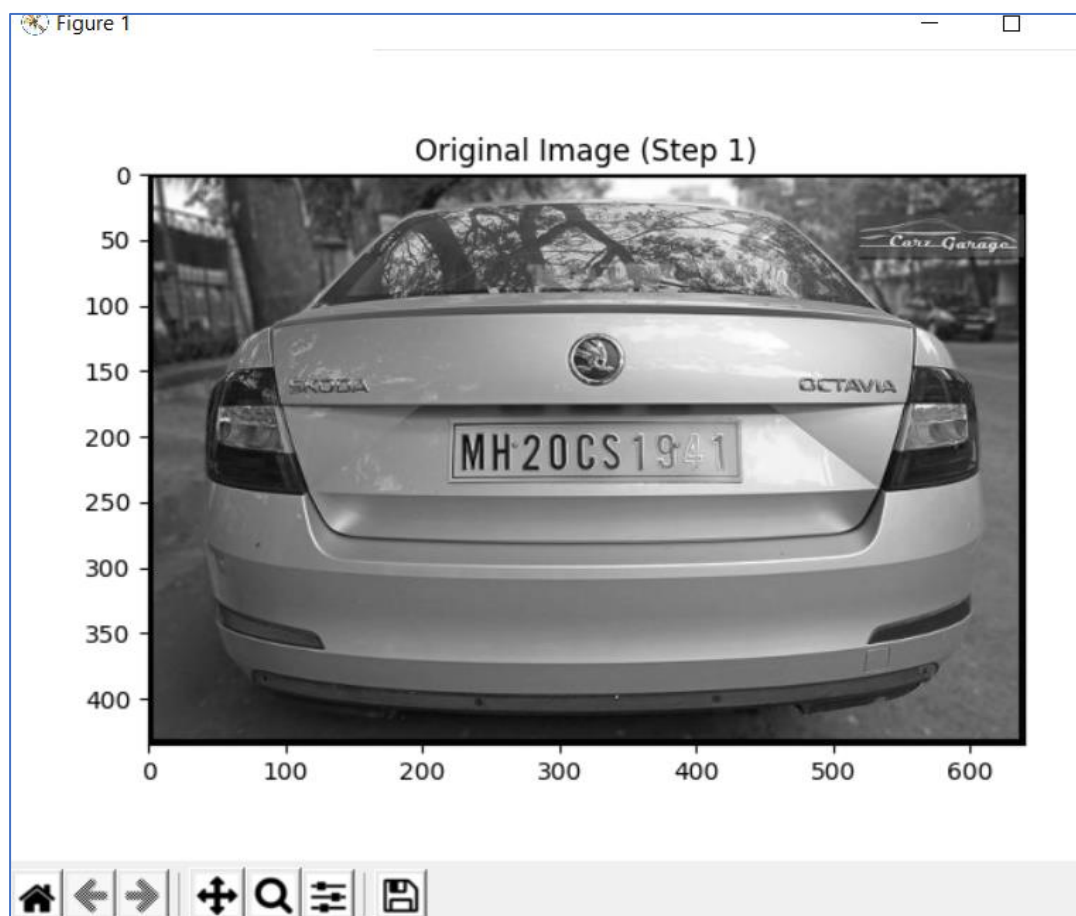


Fig: 5.3 Pre-processing techniques-Original Image



Fig: 5.4 Pre-processing techniques-Resulting Image

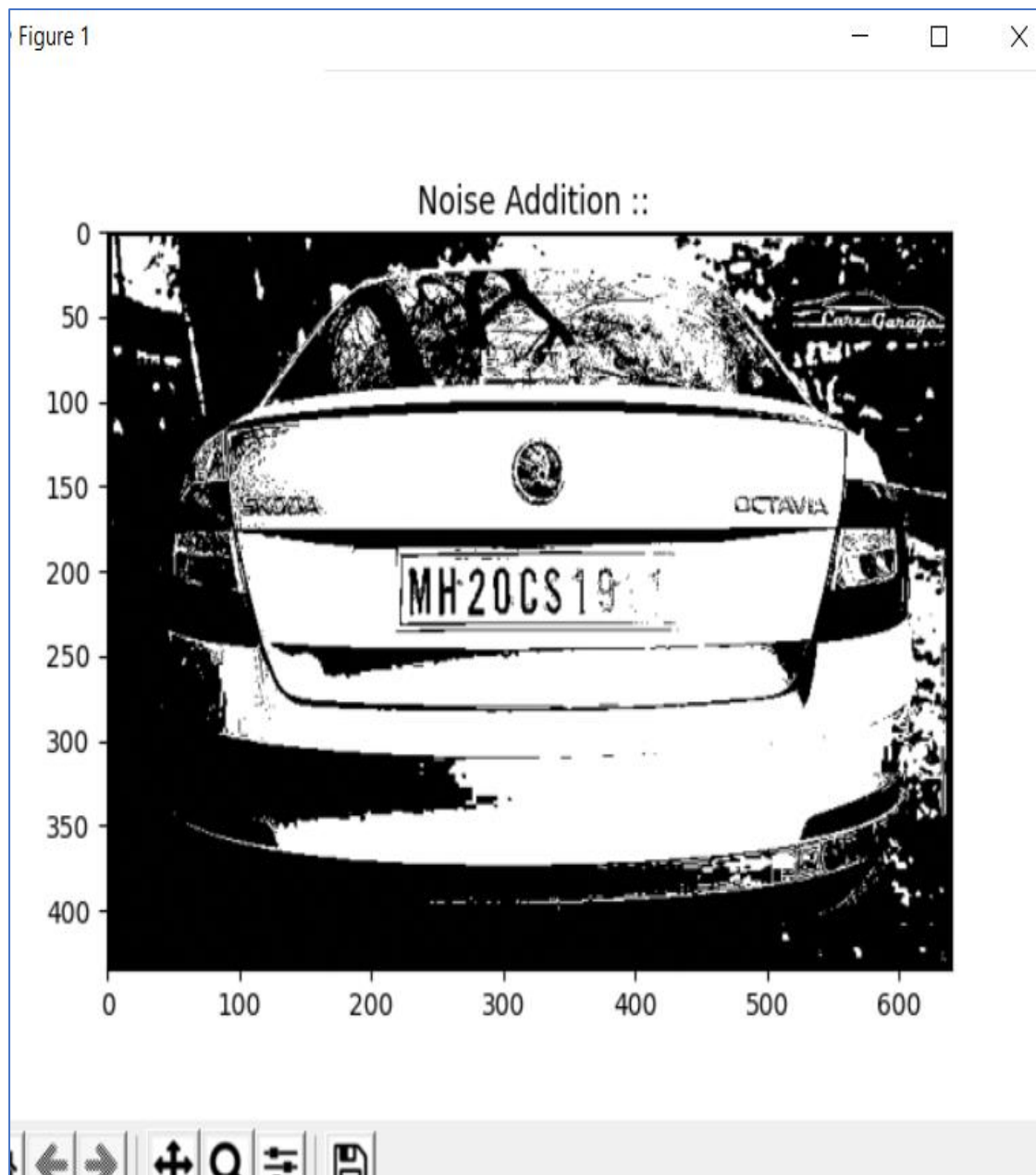


Fig: 5.5 Pre-processing techniques-Noise Addition

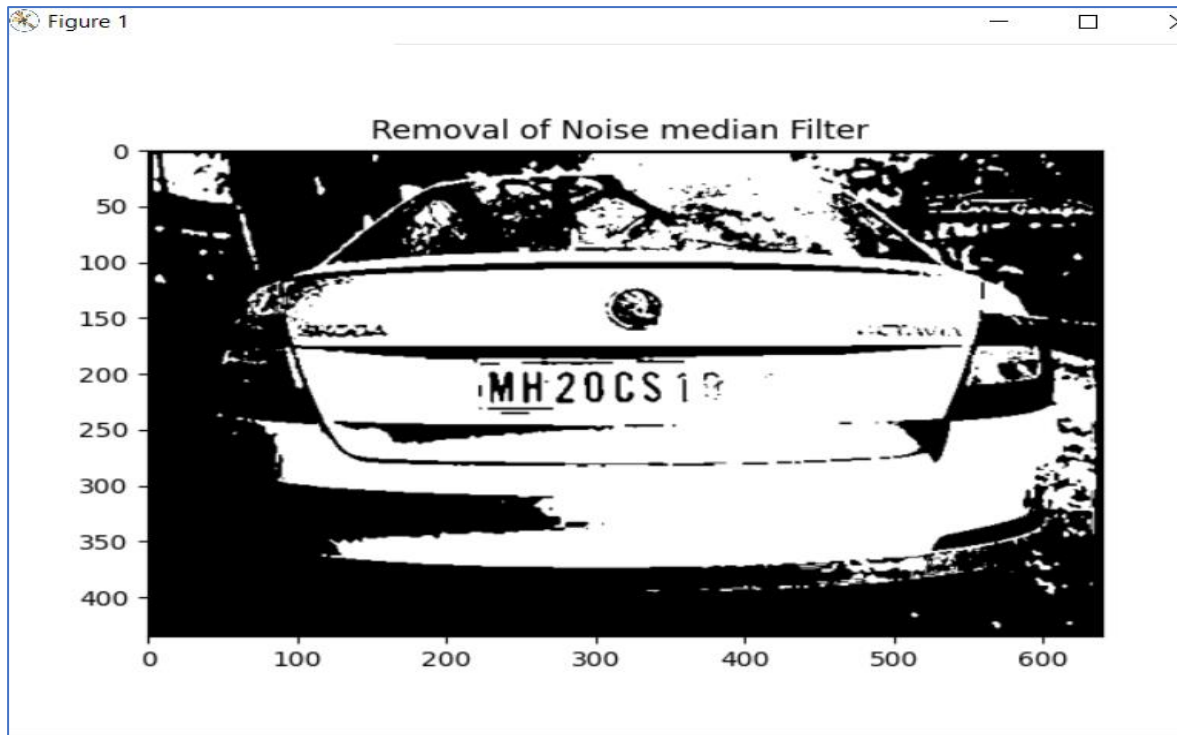


Fig: 5.6 Pre-processing techniques-Removal of noise using Median Filter

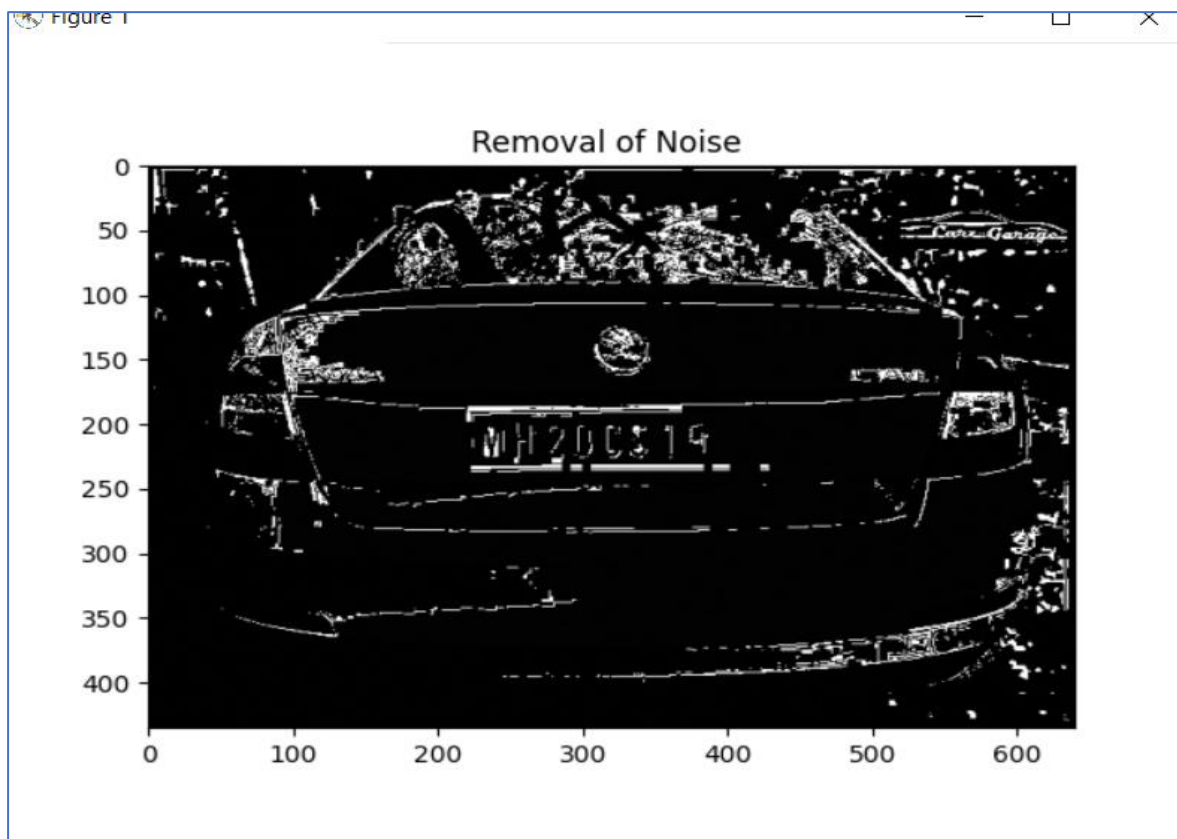


Fig: 5.7 Pre-processing techniques-Removal of noise using Filters

```

pygame 2.0.1 (SDL 2.0.14, Python 3.7.9)
Hello from the pygame community. https://www.pygame.org/contribute.html
12.jpg
Size of Image: 435 X 640
Threshold : 114.41026221264367
Average G1 : 160.30683547252778
Average G2 : 69.71314421842985
Threshold new: 115.00998984547881

```

5.2 VEHICLE IDENTIFICATION AND RECOGNITION RESULTS

Fig: 5.8 Vehicle Number plate Identification

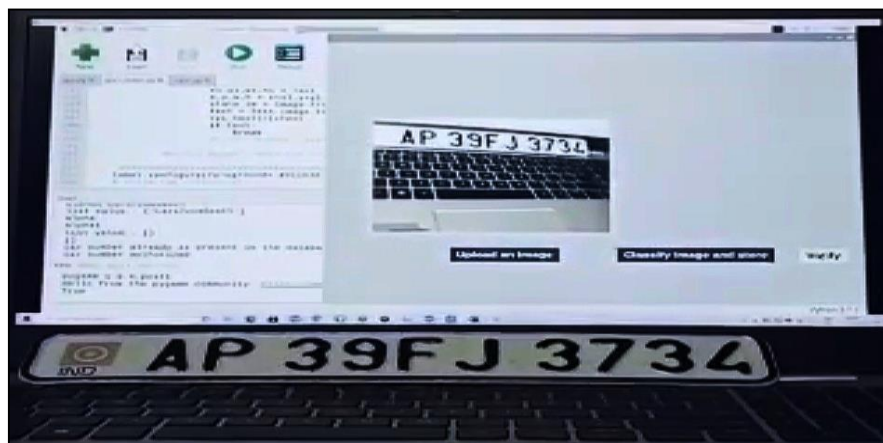


Fig: 5.9 Vehicle Number plate Identified out of apartment

Fig. 5.10 Capturing image using camera

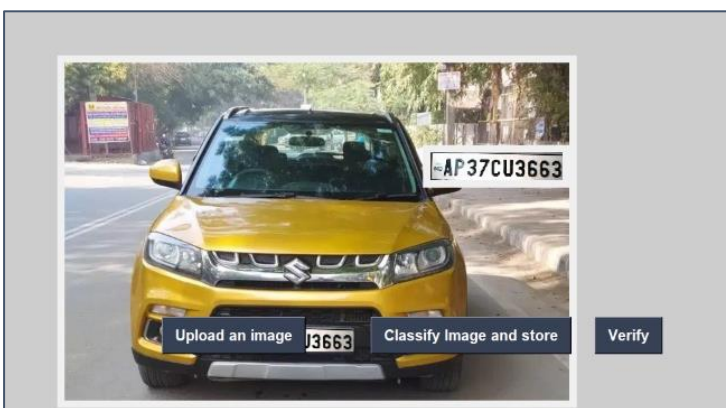


Fig. 5.11 recognizing number plate and verifying with database

```
- RESTART: E:\E-drive\java projects\PYTHON PROJECTS\2020\NUMBER PLATE RECOGNIZATION\FINAL\gui.py
pygame 2.0.0 (SDL 2.0.12, python 3.7.9)
Hello from the pygame community. https://www.pygame.org/contribute.html
Number identified number plate...
AL37CUIB3
[['MH20CS9817'], ['TW07BU5427'], ['MH20CS17'], ['1PB03AGrTI8979'], ['AL37CUIB3'], ['AP37CU3663']]
6
['MH20CS9817']
AL37CUIB3
alpha AL37CUIB3
alpha1 MH20CS9817
list value.. ['MH20CS9817']
alpha AL37CUIB3
alpha1 TW07BU5427
list value.. ['TW07BU5427']
alpha AL37CUIB3
alpha1 MH20CS17
list value.. ['MH20CS17']
alpha AL37CUIB3
alpha1 1PB03AGrTI8979
list value.. ['1PB03AGrTI8979']
alpha AL37CUIB3
alpha1 AL37CUIB3
list value.. ['AL37CUIB3']
['AL37CUIB3']
car number already is present in the database
Number identified number plate...
AL37CUIB3
[['MH20CS9817'], ['TW07BU5427'], ['MH20CS17'], ['1PB03AGrTI8979'], ['AL37CUIB3'], ['AP37CU3663']]
6
['MH20CS9817']
AL37CUIB3
alpha AL37CUIB3
alpha1 MH20CS9817
list value.. ['MH20CS9817']
alpha AL37CUIB3
alpha1 TW07BU5427
list value.. ['TW07BU5427']
alpha AL37CUIB3
alpha1 MH20CS17
list value.. ['MH20CS17']
alpha AL37CUIB3
alpha1 1PB03AGrTI8979
list value.. ['1PB03AGrTI8979']
alpha AL37CUIB3
alpha1 AL37CUIB3
list value.. ['AL37CUIB3']
['AL37CUIB3']
car number already is present in the database
car number authorized
```

Fig. 5.12 verified and matched with apartment database.

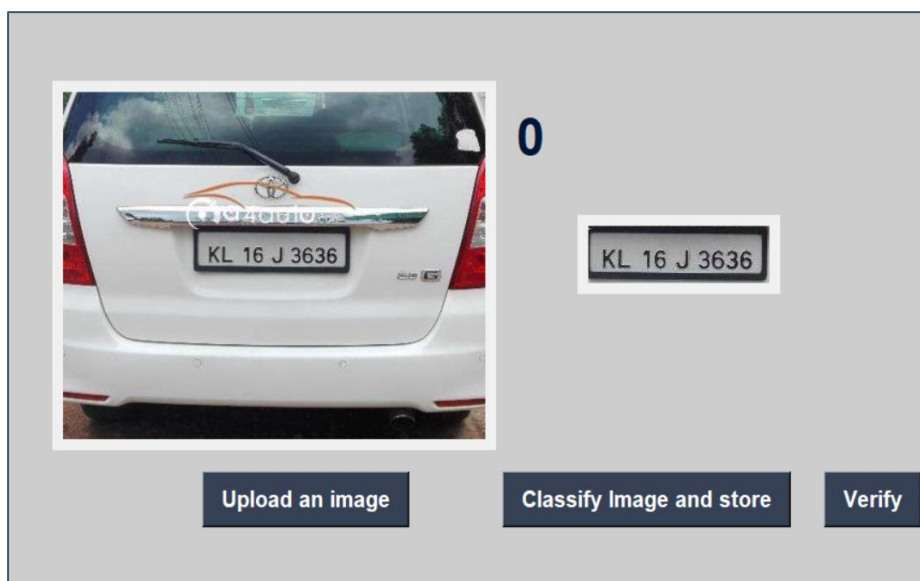


Fig. 5.13 Vehicle Number plate Identified out of apartment



Fig. 5.14 Vehicle Number plate Identified.

CHAPTER-6

CONCLUSIONS AND FUTURE SCOPE

6.1 CONCLUSION:

Smart number plate identification system proposed. The system allows users, based on their registered vehicle number, to get information about the vehicle owner. To extract the vehicle from the knowledge base of the system, the generated tire uses KNN calculation. It is well suited for different situations and different types of vehicle license plates. The present study used standard classifications of neural regulators to identify number plates on curved number plates and for character recognition. The completed system allows the customer's owner information and proper identification of the vehicle registration number from the sticker. It can also be used for militant psychological training, intrusion, invalid number plates, stolen cars and other illegal activities involving vehicles. It can also be used to collect automated interstate expenses. We refer to this system when the car is stolen and the owner registers it. Every time a vehicle passes by the camera, it is detected and reported to the police. He realized that if a fake number plate or number was used, that number was not in the dataset and that the number plate could be a fake number plate. The INPR method is clearly difficult to framework due to its different steps and it is also impossible to achieve 100% accuracy because each step is based on the previous one. Image noise, ghost, marker character manipulations, expensive text patterns and base color, vehicle design are all factors that affect INPR performance. Not many of these systems are designed for India [9], [14]. As a result, there are a wide variety of options for implementing such a system in India.

6.2 FUTURE SCOPE:

Using staging inheritance equations, the potential range of the system implemented to identify the number plates of different cars in a single picture diagram can be expanded. Similarly, a more accurate version of this framework can be implemented using input from a live video stream and using neural regulators as a reference for vehicle type characterization and selecting the best vehicle layout for number plate perception. It can also be used to identify vehicle type, monitor traffic lights and track vehicle area. Any country that profits financially from this framework if the system is implemented by another government must give it in the Authority's Vehicle Data Collection, which contains all the data and details of the owner and the vehicle separately. Calculations can be made as super-objective for low resolution images.

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