CNN-Driven Voice Guidance: Image Based Medicine Recognition

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In

COMPUTER SCIENCE AND ENGINEERING

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December 2023

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CERTIFICATE

This is to certify that the EPICS Report entitled **"**CNN-Driven Voice Guidance: Image-Based Medicine Recognition**."** being submitted by ARUNA BHARATHI JADAM (218W1A0519), DURGEMPUDI DIVYA (218W1A0512), in partial fulfillment for the award of the Degree of Bachelor of Technology in Computer Science and Engineering to the Jawaharlal Nehru Technological University, Kakinada is a record of bonafide work carried out under my guidance and supervision.

Mr. S. Ravi Kishan Ph.D	Dr.D.Rajeswara Rao M.Tech,Ph.D
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DECLARATION

We hereby declare that the EPICS project entitled "CNN-Driven Voice Guidance: Image-Based Medicine Recognition." submitted for the B.Tech Degree is our original work and the dissertation has not formed the basis for the award of any degree, associateship, fellowship or any other similar titles.

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Date: D. Divya (218W1A0512)

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ABSTRACT

Image analysis and information retrieval based on certain key features are now both frequently done using image processing .The majority of people are unaware of the dangers of taking medications without understanding their intended use. We can look up medicine on Google and learn its function, but it is not appropriate for those without formal education. The solution involves applying image processing to examine the medication sheet. when the user take image of the medicine ,the image is given to the model which is trained with the images of the medicine sheet images. And it gives the corresponding class name which the use of that medicine in the form voice based. The previous solution is helpful for those with education, but this solution is suitable for all types of people without taking education into consideration.

Keywords: Medicines, Image Processing, Convolutional neural networks, Alexnet

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Chapter 1

INTRODUCTION

In our daily lives, many medicines used in hospitals and primary care centers are difficult to identify. And those used may be burdensome to detect on a day-to-day basis unless they are obvious. Medicines are one of the most important health care technologies for improving health and quality of life for the generations. Unfortunately, medications are a double-edged sword. Medications will results the side effects also, drug interactions and other undesired outcomes. Many of these medicine-related problems are predictable and therefore can be prevented. In this paper, the model is proposed for the identification of the tablet strip using some of the image processing techniques.

1.1 Basic Concepts

Working of Machine Learning

Machine learning is a data analytics technique that teaches computers to do what comes naturally to humans and animals: learn from experience. Machine learning algorithms use computational methods to “learn” information directly from data without relying on a predetermined equation as a model. The algorithms adaptively improve their performance as the number of samples available for learning increases. Deep learning is a specialized form of machine learning. The included ML model detects the image efficiently when the user give the image of the medicine sheet. The ML model is trained with the dataset consists of the images of the medicine strips.

Figure 1.1 shows about the functioning of Machine Learning [1]

1.2 Motivation

The motivation for this project revolves around addressing the widespread issue of medication misuse by introducing a technology driven, image-based solution that is inclusive, accessible to all, and promotes health literacy. The incorporation of image processing and voice-based interaction aims to overcome barriers related to education and literacy, ensuring that everyone can make informed decisions about their medications.

1.3 Area Visited

Kanuru ArogyaRaksha Pharmacy, Vijayawada.
Client Details: Md. Karamathulla
Profession: Pharmacist at ArogyaRaksha.

1.4 Photo With Client

Figure 1.2 shows about the Photo with client

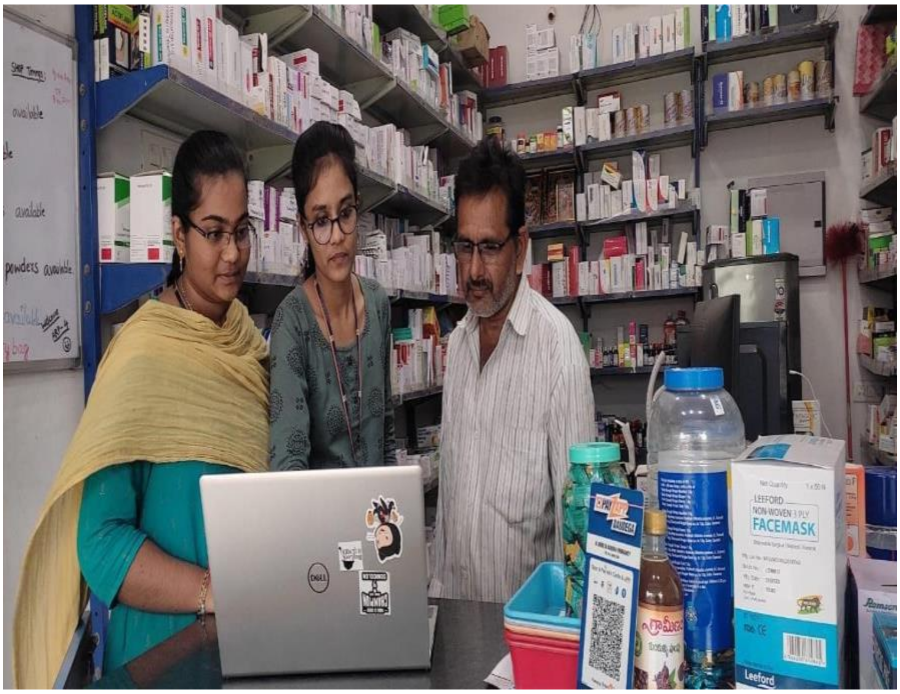


Fig 1.3: Photo with client during the project explanation

1.5 Problem Statement

A significant challenge has been identified concerning the proper utilization of medication, particularly among uneducated individuals and the elderly. Many of these individuals struggle to understand and remember the correct dosages, timings, and purposes of the medications they are prescribed. This lack of medication literacy and adherence has led to recurring health issues and increased healthcare costs. The problem is exacerbated by a lack of access to clear, understandable information about medications, as well as inadequate support systems for these population.

1.6 Scope

The Scope of our project is:

- Limited to identification of the medicines (fever,cold and cough,gastric problem,stomach pain,headache).

1.7 Objective

- To Providing basic knowledge of drug usage to uneducated people .
- To Providing voice message to users about medicinal use.
- To Craft a user-friendly, intuitive, and accessible app interface .

1.8 Advantages

- Accessibility for All.
- User-Friendly Interface .
- Reducing Medication Misuse.

1.9 Applications

- Image Recognition**.**
- Speech Recognition.

Chapter 2

LITERATURE REVIEW

This chapter contains the list of research papers that we have studied under literature survey. We focused on the approaches for maintaining accuracy in these papers.Our study included the techniques used for developing and training the model.

2.1 Artificial intelligence to deep learning: machine intelligence approach for drug discover [2]

The article explores how artificial intelligence (AI), machine learning (ML), and deep learning (DL) are revolutionizing drug discovery by addressing challenges in traditional approaches. AI and ML, including deep learning, play a crucial role in tasks such as peptide synthesis, virtual screening, toxicity prediction, drug monitoring, and more. These technologies offer promising solutions for improving drug design efficiency, overcoming hurdles, and impacting various stages of the drug development process.

Advantages:

The through experimental assessment shows that this solution is both highly accurate.

Disadvantages:

AI heavily relies on quality data. Inaccurate or biased data can lead to flawed predictions, and obtaining high-quality, diverse datasets can be challenging.

2.2 Advances and Perspectives in Applying Deep Learning for Drug Design and Discovery [3]

The article explores the application of artificial intelligence (AI) and computational intelligence (CI), specifically deep learning (DL), in medicinal chemistry for drug design and discovery. It focuses on the use of DL methods such as Deep Belief Networks, Convolutional Neural Networks, and multi-task learning in quantitative structure-activity relationships (QSAR) and virtual screening of large compound databases. The text highlights DL's effectiveness in handling extensive chemical libraries, providing predictive models for properties like aqueous solubility, toxicity, and drug-induced liver injury. Overall, the article underscores DL's significance as a powerful tool in drug discovery, enabling the modeling of diverse drug candidate properties and enhancing computational analysis in medicinal chemistry.

Advantages:

Deep learning proves effective in managing and analyzing large chemical libraries, making it well-suited for virtual screening of databases containing thousands of compounds

Disadvantages:

Overfitting: Light GBM split the tree leaf-wise which can lead to overfitting as it produces much complex trees.

2.3 Review of deep learning: concepts, CNN , challenges, applications, future directions [4]

The collaborative research paper, "DeepLearning: Concepts, CNN Architectures, Challenges, Applications, and Future Directions," united experts from diverse global institutions (Australia, Iraq, USA, Spain, UK). Accepted in March 2021 after a January 2021 submission, this independent effort showcases extensive analysis, investigation, and insights into deep learning. The paper intricately explores essential facets, including techniques, CNNs, challenges, solutions, and real-world applications. Emphasizing the influence of computational tools like FPGA, GPU, and CPU, it highlights their impact on enhancing deep learning algorithms. Concluding with an evolutionary matrix, benchmark datasets, and a succinct summary, the paper delivers critical implications drawn from its comprehensive exploration of the deep learning domain.

Advantages:

Providing in-depth insights, it stresses the importance of deep learning, categorizes technique types and networks, traces CNN architecture evolution, and outlines major applications.

Disadvantages:

In comparison to digital content, the paper might pose accessibility challenges for individuals with disabilities, potentially limiting its audience reach.

2.4 Artificial Intelligence in drug discovery and development [5]

Artificial Intelligence (AI) has revolutionized many aspects of the pharmaceuticals.AI assistance to pharma industries helps to improve overall life cycle of product.AI can be implemented in pharma ranging from drug discovery to product management. Future challenges related to AI and their respective solutions have been expounded.

Advantages:

AI expedites the drug discovery process by analyzing vast datasets, predicting potential drug candidates, and optimizing molecular structures..

Disadvantages:

Some AI models, especially deep learning algorithms, lack interpretability, making it challenging to understand how they reach specific conclusions. This opacity can be a concern in critical applications..

2.5 Artificial intelligence in chemistry and drug design [6]

The research discusses the use of antihypertensive peptides (AHTPs) from natural food sources to combat heart-related diseases caused by hypertension. It proposes a deep learning-based in-silico method, employing a CNN-SVM ensemble, with amino acid composition and dipeptide composition for feature extraction. The model achieves high accuracy (95% on benchmarking, 88.9% on independent dataset) and outperforms existing methods. The study highlights the efficiency of in-silico approaches in identifying potential therapeutic peptides for cardiovascular issues.

Advantages:

This proposed method can enhance the performance, and increase accuracy.

Disadvantages:

The accuracy of the model heavily relies on the quality and representativeness of the training data. Biases or inaccuracies in the data could lead to model limitations or misinterpretations.

2.6 Artificial Intelligence and Machine Learning Technology Driven Modern Drug Discovery and Development [7]

Discovering and advancing medicines is crucial but complex, costly, and time consuming. The pharmaceutical industry seeks ways to expedite this process, with Artificial Intelligence (AI), especially deep learning (DL), playing a pivotal role. ML, including DL, is extensively used in computer-facilitated drug discovery, with DL methods like artificial neural networks (ANNs) automating feature extraction. Initially met with skepticism, AI is now recognized as a catalyst for advancing medicinal chemistry. As technology evolves, AI is expected to revolutionize the search for new pharmaceuticals, addressing challenges in a rapid, cost-effective manner. This review explores the imminent applications of AI to enhance and streamline the drug discovery process

Advantages:

The field of adversarial machine learning aims to address these weakness.

Disadvantages:

In case of large datasets with high dimensional and complex data manifold it is difficult due to the curse of dimensionality and the scarcity of training data.

2.7 Artificial Intelligence (AI) in Drugs and Pharmaceuticals [8]

AI, a core branch of computer science, has transformed medicinal chemistry and healthcare. It revolutionizes drug design, improving efficiency and reducing time and costs. AI identifies target proteins, enhances design techniques, and mitigates health hazards in preclinical trials. It is a powerful tool for data mining, machine learning, and various drug design steps. Pharmaceutical companies collaborate with AI firms, accelerating drug development. This review covers AI's role in drug design, including machine learning, deep learning, and neural networks, and highlights recent industry collaborations.

Advantages:

AI accelerates drug design, reducing the time required for development and increasing efficiency.

Disadvantages:

Some AI models, particularly deep learning, lack interpretability, making it challenging to understand how they arrive at specific conclusions.

2.8 Convolutional neural networks in medical image understanding .[9]

This article discusses how Convolutional Neural Networks (CNNs) are powerful tools for medical image understanding, surpassing human experts in various tasks. It provides a comprehensive survey of CNN applications in tasks like image classification, segmentation, and detection for ailments in the brain, breast, lung, and other organs. The goal is to encourage researchers to extensively apply CNNs in medical image understanding, despite challenges such as limited human expert availability and the fatigue associated with manual procedures. The algorithm used will not provide accurate results for small data sets.

Advantages:

CNNs enable the automation of various medical image analysis tasks, leading to faster and more efficient diagnostics.

Disadvantages:

CNNs are often criticized for their lack of interpretability. Understanding the reasoning behind a network's decision can be challenging.

Chapter 3

Design Thinking Process

3.1 Primary Research

As a primary Research, we engaged with a pharmacist named MD.Karamathulla

We asked some questions like:

1.Are you suggested any wrong medicines to the patients?

2.How you are identifying the medicines usages?

3.Is there any person approached you for knowing the tablet?

4.What are the essential details that patients should be made aware of when it comes to medication usage, typically found on the packaging?

5.What challenges you encountered when you tried to suggest people who were unaware about the medicines?

Then we went through our Secondary Research by Validating our Problem Statement with existing technologies or relevant technologies. The Conclusions we made are:

Drugs.com Medication Guide:

This mobile app and website provide information about various medications, including their uses, dosages, side effects, interactions, and more. Users can search for specific drugs and get detailed information.

WebMD:

WebMD offers a comprehensive drug information database where users can look up medicines to learn about their uses, side effects, precautions, and interactions with other drugs.

Medscape:

This app is popular among healthcare professionals, but it also provides information to the general public about medications, their uses, and other related medical topics.

GoodRx:

While primarily known for providing pricing information and discounts on medication offers details about the uses and potential side effects of various drugs.

First Databank's Medication:

This app focuses on simplifying medication instructions for patients, making it easier for them to understand their medications' purposes and how to take them correctly.

Medisafe:

This medication management app helps users organize and track their medications. It can also provide information about the medicines being taken.

3.2 Secondary Research

Extracting text from images depends on the resolution and intensity of image, it become challenging to us to do this for more accuracy. And after that using dataset, we can extract the information but the challenging thing was converting it into voice of preferred language. And one more point is combining all these things in single platform to make android app was challenging and encouraging us to learn new things and exploring ourselves in different fields like machine leaning, App development. All these things are driven us to produce useful application for society in the field of hospitality

3.3 Ideation Phase

In our Ideation Phase, we are coming up with the technologies that we can provide are:

- Clearly outline what we aim to achieve with drug identification solution. This could include goals such as reducing side effects from wrong usage of medicines, improving health conditions, and enhancing basic knowledge of medicines.
- Engage with pharmacists to understand their challenges, and potential ideas. Their inputs guided our solution's development.
- Research and brainstorm various techniques that can be used for drug detection and text extraction. These could include processing drug sheet image.
- Various notions and ideas for employing machine learning, deep learning techniques to process the drug image and provide necessary details about medicine were discussed throughout the ideation phase. We explored different ocr techniques, image processing techniques and mechanisms to determine the most suitable approach for our project.

Chapter 4

ANALYSIS AND DESIGN

This chapter includes the analysis of requirements for the proposed project. This chapter contains

4.1.1 Functional and Non-Functional Requirements.

4.1.2 Design diagrams.

4.1 Functional and Non-Functional Requirements

Functional requirements and non-functional analysis entails a thorough examina- tion, analysis, and description of software requirements and hardware requirements in order to meet actual and also necessary criteria in order to solve an issue. Ana- lyzing functional Requirements and non-functional includes a number of processes. The Functional Requirements include:

Functional and Non-Functional Requirements

- Hardware Requirements
- Software Requirements

Software Requirements Python IDE:

Python is a popular programming language used to develop web applications server side and software development. IDLE is Python's Integrated Development and Learning Environment. It allows to easily write Python code. Just like Python Shell, IDLE can be used to execute a single statement and create, modify, and execute Python scripts. To work with python efficiently and effectively one would require a great IDE. A python Integrated Development Environment provides all the essential tools needed for software development with python.

IDLE is a popular Integrated Environment written in python and it has been in- tegrated with the default language. It is one of the best IDE for python. IDLE is a very simple and basic IDE which is mainly used by the beginner level developers who want to practice on python development. In this project we use python IDLE to develop the web application.

HTML CSS:

- HTML is standard markup language for web pages. By using HTML, you can create your own web pages. HTML is used to provide the structure to the web page.
- CSS stands for Cascading Style Sheets which is used to style and layout the web pages.
- So, we use HTML to create the web pages and CSS to style the WEB pages.

Flask:

Flask is a small and lightweight Python web framework that provides useful tools and features that make creating web applications in Python easier. It gives devel- opers flexibility and is a more accessible framework for new developers since you can build a web application quickly using only a single Python file. To Stored the admin login details we have used the flask server.

Colab Notebook:

Google Colab is an online platform provided by Google that allows users to write and execute Python code in a collaborative and interactive environment. It is particularly popular in the machine learning and data science communities due to its integration with Google Drive, free access to GPU resources, and ease of use.

Python Libraries:

Install essential Python libraries for deep learning and image processing. Common ones include Keras,Tensorflow,Numpy,etc.

ResNet:

Residual Network, is a deep learning architecture designed to address the challenges of training very deep neural networks. ResNet has been highly successful in various computer vision tasks, particularly image classification, object detection, and image segmentation.

Hardware Requirements:

Modern Operating System (windows 7 or 10/Mac OS X 10.11 or higher)

- Modern x86 64-bit CPU
- GPU - GeForce RTX 2060
- RAM/Main Memory - 4GB DDR4 3200Mhz
- Disk Space - 4GB SSD

4.2 Design Diagram

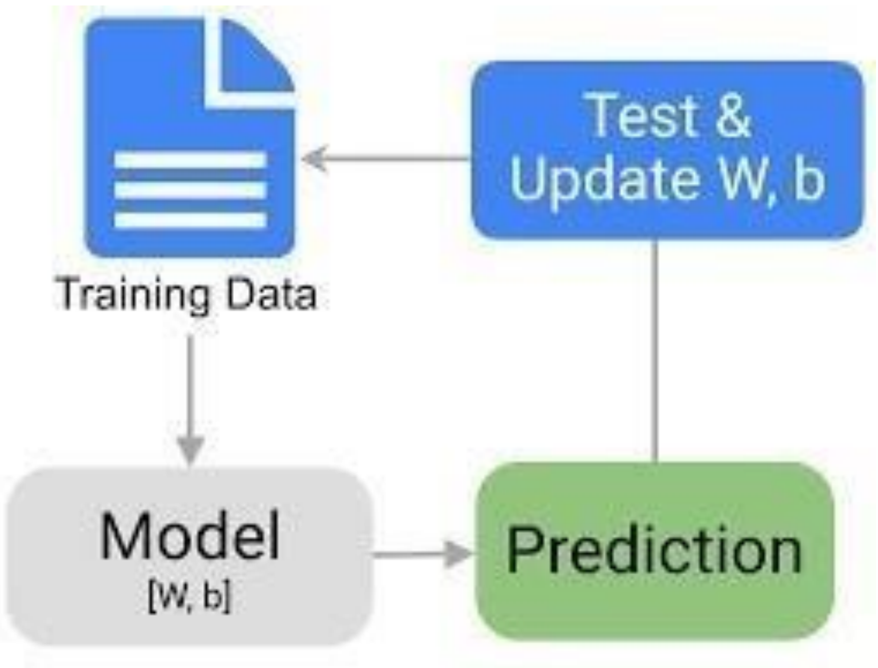


Figure 4.1 shows about the Design Diagram[10]

Chapter 5

PROPOSED SYSTEM

This chapter includes the proposed system architecture along with the mod- ules of methodology

5.1 Process Flow Diagram

The main contributions in the proposed system are as follows:

- To provide the basic use of the medicine.
- To design a android application using flutter and android studios .
- To develop a android application for the medical sector using python and ma- chine learning.

Image Capture:

- Users utilize the mobile application to capture images of medicines using their device's camera.

Communication with Flask Server:

- The captured images are transmitted to a Flask server for further processing.

Processing with CNN Model:

- Upon receiving the images, the Flask server employs a pre-trained CNN model specifically designed for medicine classification.

Medicine Classification:

- The CNN model analyzes the images to identify and classify the medicines into their respective categories/classes.

Result Display:

- The server then sends back the classification results to the mobile application.

User Interface:

- The mobile application displays the class or category of the medicine captured, providing users with immediate information about the identified medicine.

5.2 Alexnet Architecture

The AlexNet comprises eight layers with learnable parameters, featuring five layers with max-pooling followed by three fully connected layers, all employing ReLU activation except for the output layer. The use of ReLU significantly accelerated the training process by nearly six times. Dropout layers were incorporated to prevent overfitting during training. The model was trained on a dataset containing approximately 12,000 images distributed across eleven classes. To maintain the size of feature maps and accommodate deep architecture, paddingwas introduced in AlexNet. The input images for the model are of size 227x227x3.

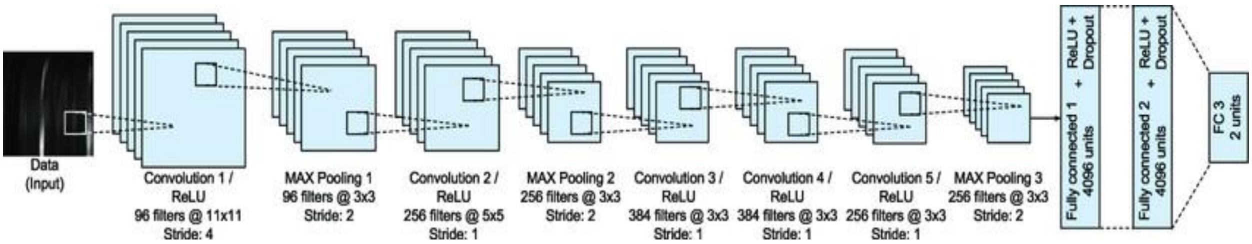


Fig 5.1 Block diagram of the proposed CNN model.[11]

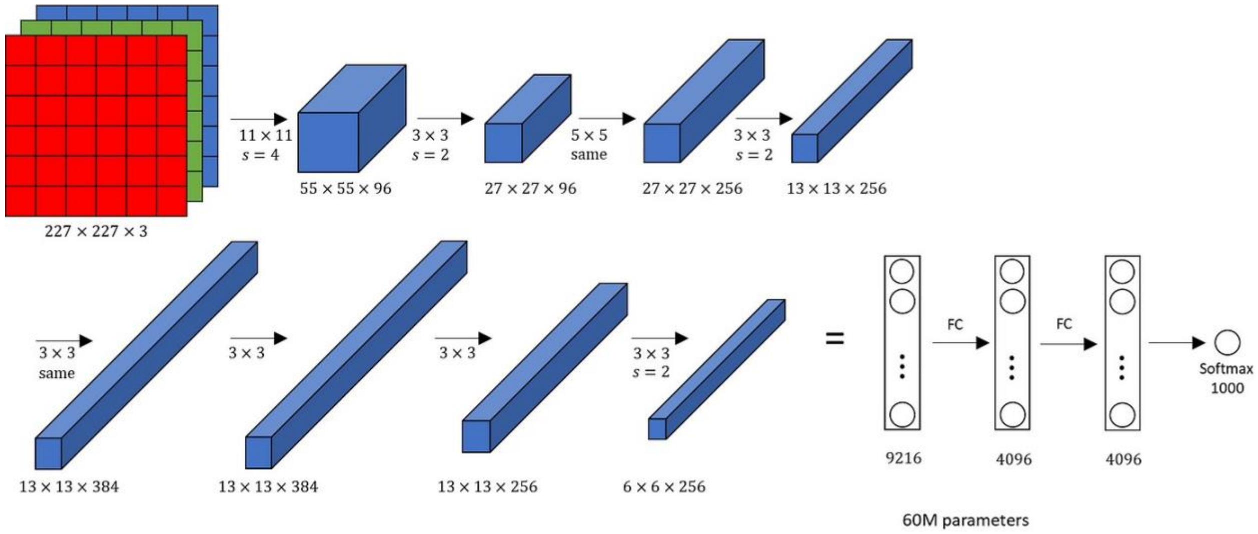


Fig 5.2 Detailed architecture of AlexNet model.[12]

The first max pooling layer follows, with a size of 3x3 and a stride of 2, yielding feature map of size 27x27x96. The second convolution operation employs 256 filters of size 5x5 with a stride of 1 and padding of 2. ReLU is used as the activation function, resulting in a feature map of size 27x27x256. Another max pooling layer of size 3x3 with stride 2 is applied, resulting in a feature map of size 13x13x256. The third convolution operation employs 384 filters of size 3x3 witha stride of 1 and padding of 1.

ReLU serves as the activation function, resulting in a feature map of size 13x13x384. The fourth convolution operation uses 384 filters of size 3x3 with a stride and padding of 1, and ReLU as the activation function, maintaining the output size at 13x13x384. The final convolution layer uses 256 filters of size 3x3 with a stride and padding of 1, and ReLU as the activation function. The resulting feature map is 13x13x256.

The third max pooling layer, with a size of 3x3 and stride 2, produces a feature map of shape 6x6x256. The first dropout layer, with a dropout rate of 0.5, is applied, leading to the first fully connected layer with ReLU activation and an output size of 4096.

Another dropout layer with a dropout rate of 0.5 is followed by a second fully connected layer with 4096 neurons and ReLU activation. The final fully connected layer, or output layer, consists of 1000 neurons (matching the numberof classes in the dataset), and Softmax is used as the activation function. This layer comprises a total of 62.3 million learnable parameters.

Layer		Size	Feature Map	Activation	Kernel Size	Stride	Padding
Input	Image	227x227x3	1	-	-	-	-
1	Convolution	55x55x16	16	ReLU	11x11	4	-
	Max Pooling	27x27x96	96	ReLU	3x3	2	-
2	Convolution	27x27x256	256	ReLU	5x5	1	2
	Max Pooling	13x13x256	256	ReLU	3x3	2	-
3	Convolution	13x13x384	384	ReLU	3x3	1	1
4	Convolution	13x13x384	384	ReLU	3x3	1	1
5	Convolution	13x13x384	256	ReLU	3x3	1	1
	Max Pooling	6x6x256	256	ReLU	3x3	2	-
6	FC	1024	-	ReLU	-	-	-
7	FC	512	-	ReLU	-	-	-
8	FC	4096	-	ReLU	-	-	-
Output	FC	1000	-	SoftMax	-	-	-

Table 5.3. Detailed architectural parameters of the Alexnet [13]

Evaluation Metrics:

The effectiveness of a model can be assessed using a variety of metrics, such as precision (P), recall (R), and F1 score (Dice coefficient). True Positive (TP)indicates the proportion of pixels correctly identified diseases, False Positive (FP) indicates the proportion of pixels incorrectly identified, True Negative (TN) indicates the proportion of appropriately identified pixels and False Negative (FN) indicates the proportion of incorrectly identified pixels.

$$\text{Precision} = TP/TP+FP$$

$$\text{Recall} = TP/TP+FN$$

$$\text{FI-Score} = 2 \times TP/2 \times TP+FP+FN$$

$$\text{Accuracy} = TP+TN/TP+TN+FP+FN$$

PROPOSED SYSTEM STEPS:

Medicine use prediction Mobile Application:

- STEP 1: In the first page it has the instructions page and has the “next” button .When we click the next button it redirects to step 2.
- STEP 2:There is only one button take picture it will redirect to step 3.
- STEP 3: The third page has the image and camera icon , when we click on camera image it will opens the camera from there we can capture the image and sneds to fourth page.
- STEP 4: The image taken by user is displayed here and has a button “send “,when we click on it , it will send the image to server which is running on same machine .
- STEP 5: The CNN model process the image and classifies it and give the result (the use of the medicine as a response to request.
- STEP 6: Use will be displayed on App page.

5.3 Proposed Methodology

This project utilizes a Convolutional Neural Network (CNN), a deep learning supervised algorithm, for classification tasks. The data collection process is overseen by the administrator, after which data preprocessing occurs involving formatting, cleaning, and sampling. However, the key deviation from traditional logistic regression is the use of a CNN model specifically designed to classify images.

Our proposed solution using dataset which was created by ourself and contains the six classes of images , the classes are named on the basis of medicine use.

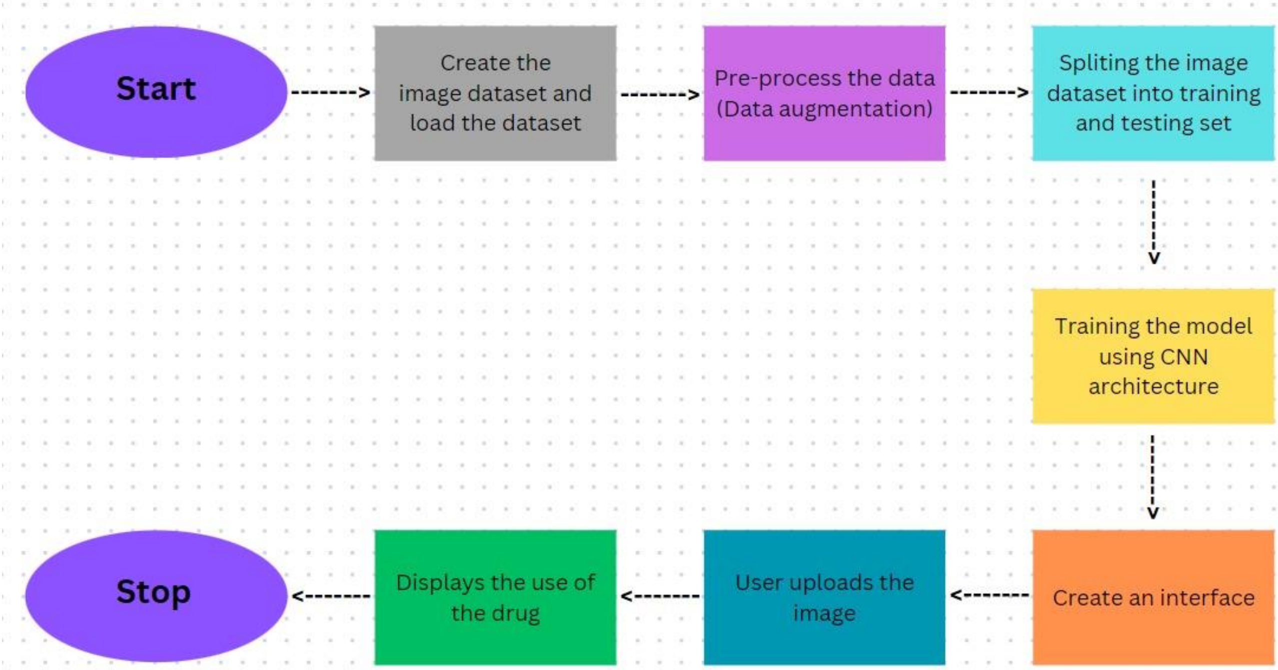


Figure 5.5 shows about the Methodology Diagram

IMPLEMENTATION OF CONVOLUTION NEURAL NETWORKS

5.3.1 STEP 1:Importing all the required Packages.

5.3.2 STEP 2:Load the Data from the dataset and perform data cleaning, explo- ration, and define the features.

5.3.3 STEP 3:Performing Data pre-processing by using MIN MAX Scaler.

5.3.4 STEP 4:Train and Test the cnn model.

5.3.5 STEP 5:Identify the accuracy score and the confusion matrix and predicted values should be updated in the website.

5.4 Evaluating The Classifier

Confusion matrix is the major effective matrix that can be used for analyzing how the applied algorithm will recognize the set of records at the different classes. For the implementation of confusion matrix, the below terms are to be considered:

5.4.1 **True Positive** :These are the positive records that are correctly labelled by the classifier.

5.4.2 **True Negative** :These are the negative records that are correctly labeled by the classifier.

5.4.3 **False Positives** :These are the negative records that are incorrectly labelled positive.

5.4.4 **False Negatives** :These are the positive records that are mislabeled nega- tive.

Based upon the confusion matrix, the sensitivity, accuracy and the error approx- imation metrics can be achieved and classified. For the classifier that we have used the accuracy will be calculated based upon the recognition rate (the class of the given image), and by considering the number of records that are classified correctly in the test set and training set.

After passing an image through the CNN model, the output of the softmax layer gives probabilities for each class.

For instance, if classifying between "fraudulent" and "non-fraudulent" medicines, the output might show probabilities like:

Probability of Correct Class detection: 0.85

Probability of Wrong Class detection: 0.15

5.5 Dataset Collection

5.5.1 We created our own dataset which consist of 6 classes images.

https://drive.google.com/drive/folders/1KWrGMvWdjWCowL26qUIU3cDD8QcJaIfh?usp=dr ive_link

Fig 5.6. Sample images of the dataset.

5.6 Data Gathering and Cleaning

In this project, the dataset utilized for the Convolutional Neural Network (CNN) model consisted of folders representing distinct medical conditions initially encompassing six classes, including cold, cough, fever, stomach pain, headache, and other health conditions. The dataset collection involved sourcing data from reputable medical databases, web repositories, or healthcare institutions, organizing each class into separate folders for efficient data retrieval. The data cleaning phase focused on ensuring data accuracy, completeness, and uniformity, encompassing tasks such as removing duplicates, addressing missing data, and standardizing image sizes and formats for consistent inputs into the CNN model. Additionally, augmentation techniques were employed to enhance dataset diversity. Expanding the dataset involved potentially adding more classes or nuanced health conditions, aiming to augment the model's understanding of various medical issues. Efforts were made to balance the dataset representation across classes to prevent biases, ultimately laying a solid foundation for robust CNN model training and accurate classification of medical conditions.

Chapter 6

IMPLEMENTATION

6.1 Output Screenshots

The Fig describes about the instruction page. The page contains the instructions an how the user need to take the image and how he/she didn't take the picture of the medicine strip. The images have been provide for the users to identify easily. The information is provided in two languages.

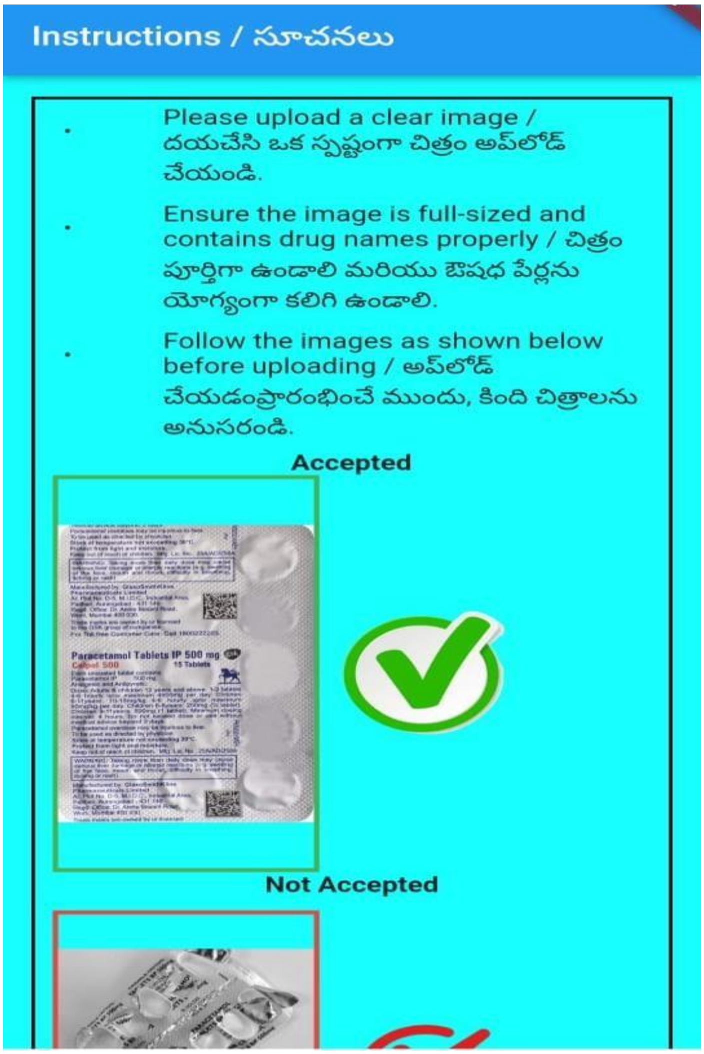


Fig6.1: InstructionPage

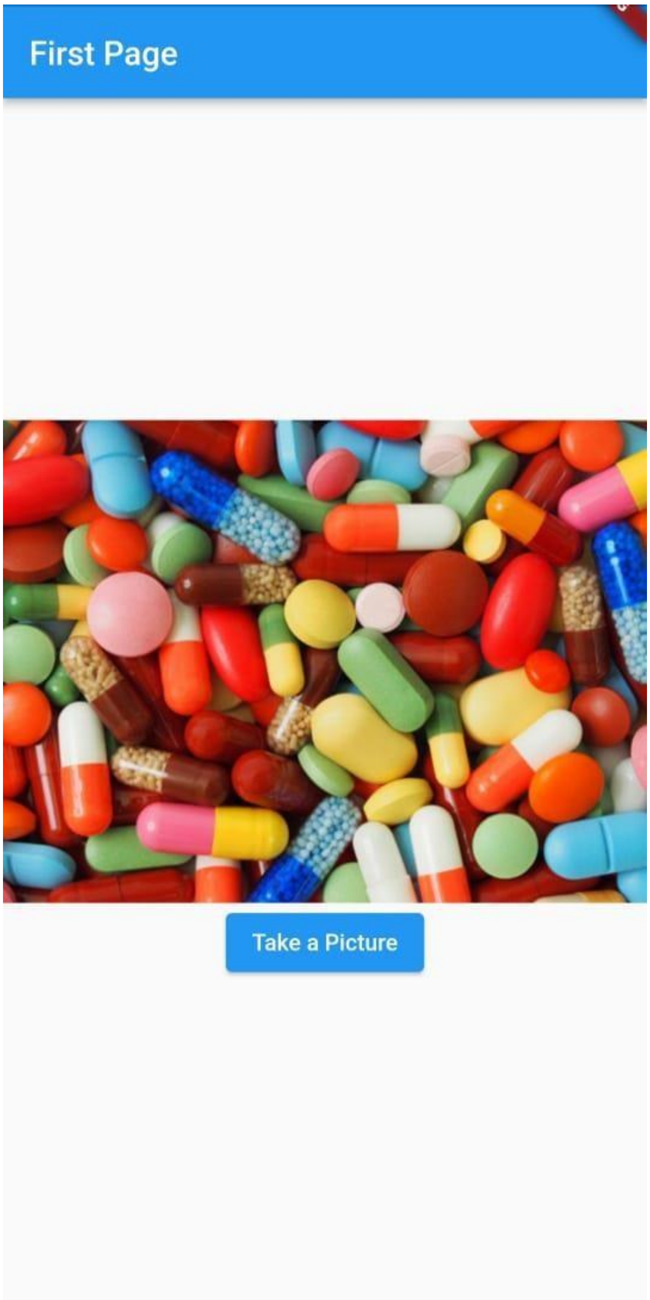


Figure 6.2: First Page

After reading the instructions there is a next button ,when we click on that it redirect us to the page as shown in the FIG .In this page the user will have to click on the Take picture button and it redirect it to the next page.

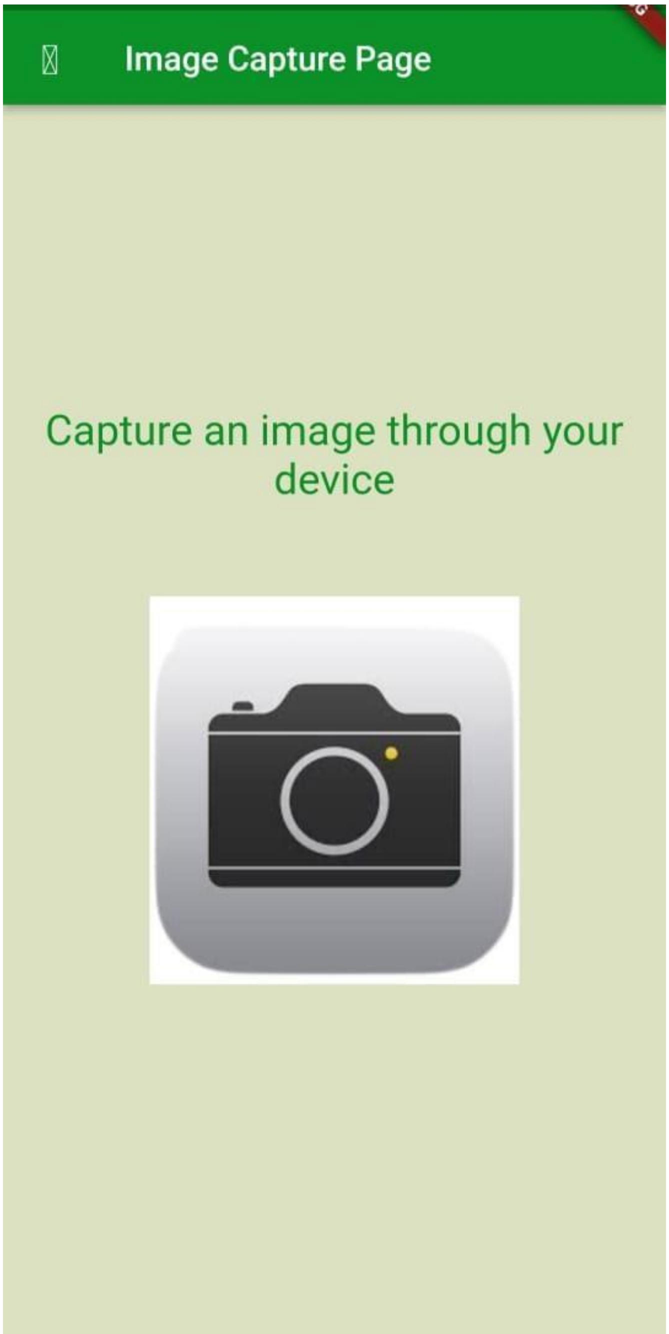


Figure 6.3: Image uploading page

After the First page it redirect to this page as shown in the FIG. In this page the user need take the image of the medicine sheet as read in the instructions form . And the image is clarity enough and after that their will get two options click on correct symbol to redirect to the next page. If taken image is not clarity we can take the image by clicking wrong symbol.

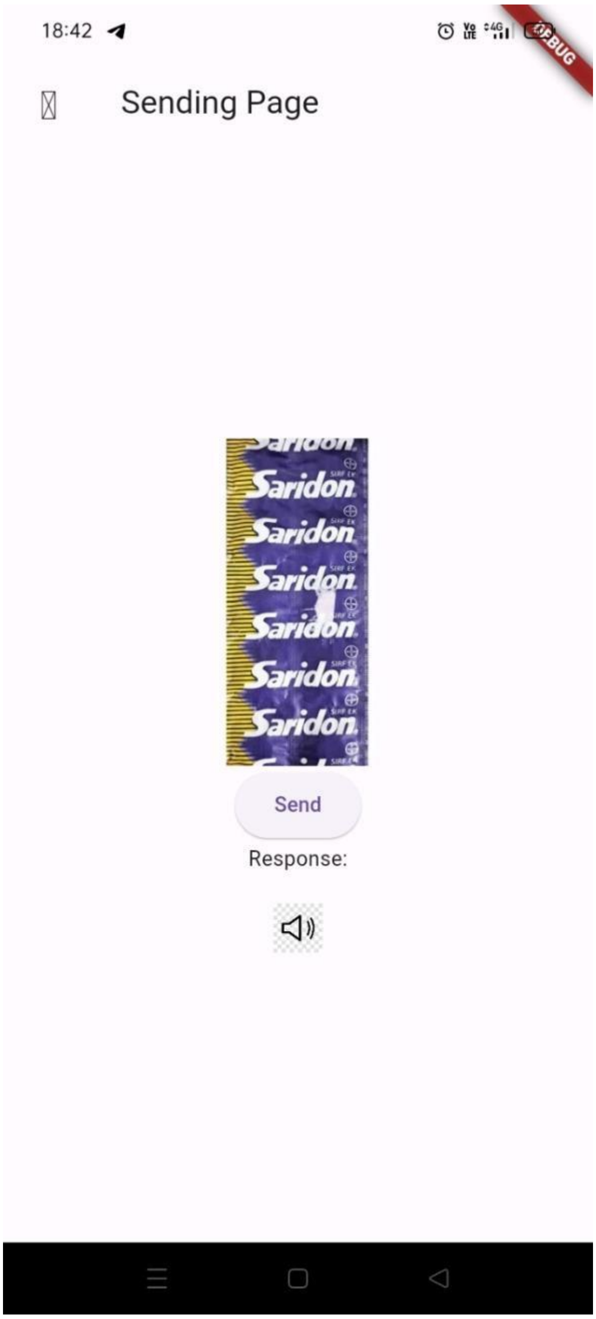


Figure 6.4 : Sending page

After upload the image it direct to the next page as shown in the FIG. And in this page the image will go to server their the image will get processed and compared with the dataset and give the output as use of the medicine.

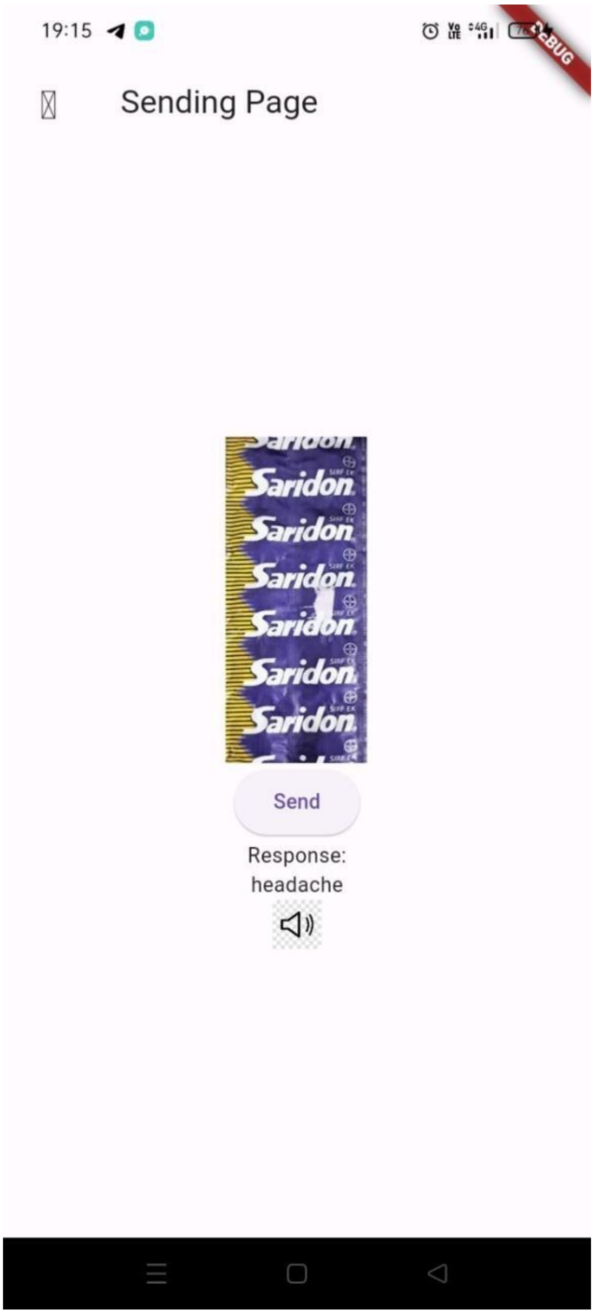
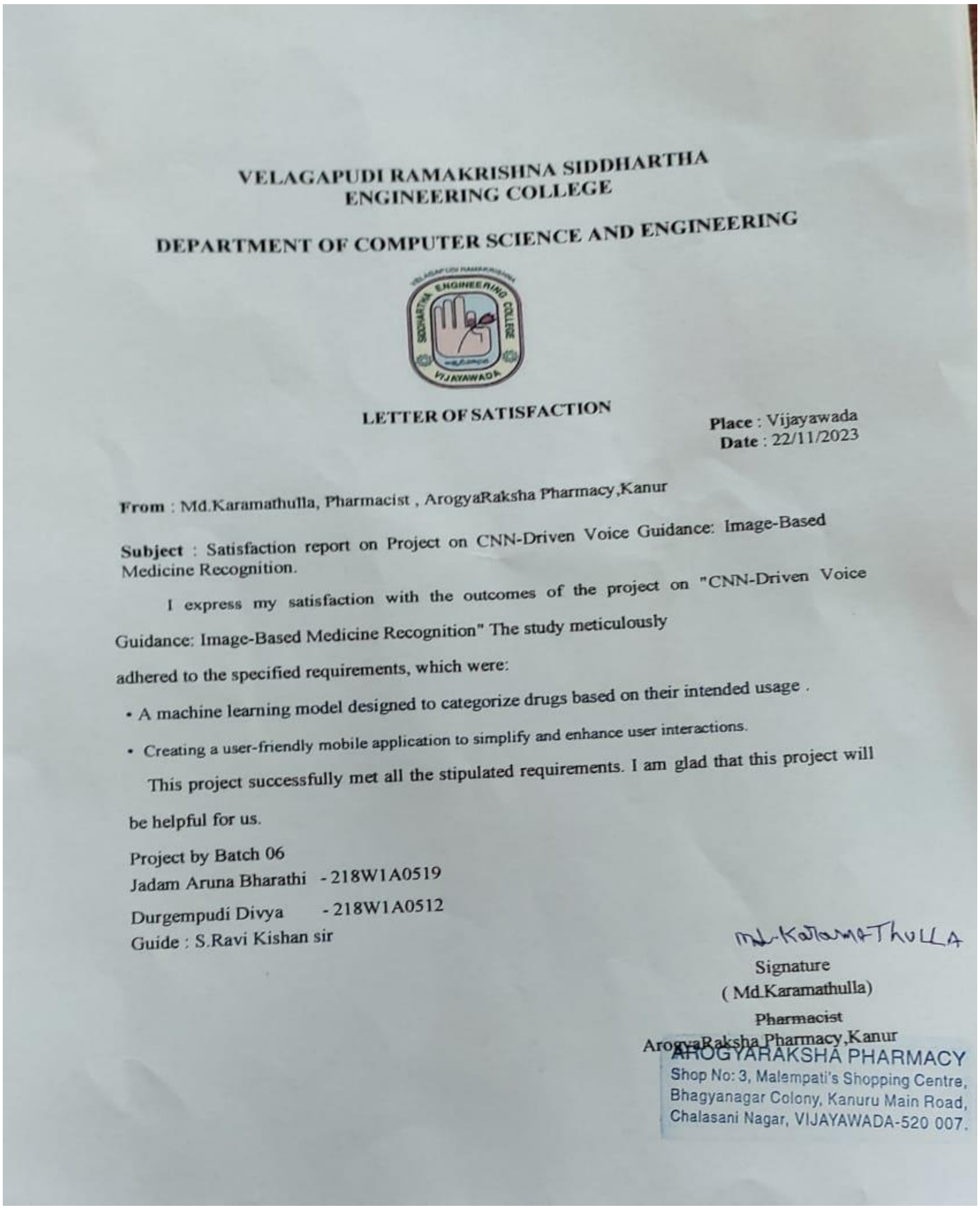


Figure 6.5 : output page

The above FIG is the output here the use of the medicine is p

Chapter 7

Client Satisfaction Report



VELAGAPUDI RAMAKRISHNA SIDDHARTHA
ENGINEERING COLLEGE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

LETTER OF SATISFACTION

Place : Vijayawada
Date : 22/11/2023

From : Md.Karamathulla, Pharmacist , ArogyaRaksha Pharmacy,Kanur

Subject : Satisfaction report on Project on CNN-Driven Voice Guidance: Image-Based Medicine Recognition.

I express my satisfaction with the outcomes of the project on "CNN-Driven Voice Guidance: Image-Based Medicine Recognition" The study meticulously adhered to the specified requirements, which were:

- A machine learning model designed to categorize drugs based on their intended usage .
- Creating a user-friendly mobile application to simplify and enhance user interactions.

This project successfully met all the stipulated requirements. I am glad that this project will be helpful for us.

Project by Batch 06
Jadam Aruna Bharathi - 218W1A0519
Durgempudi Divya - 218W1A0512
Guide : S.Ravi Kishan sir

Md.KaramaThulla
Signature
(Md.Karamathulla)
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Chalasani Nagar, VIJAYAWADA-520 007.

Figure 7.1: Client satisfaction report

Chapter 8

CONCLUSION AND FUTURE WORK

This chapter includes the conclusion of the project and future work

In conclusion, identification of drug and facilitating the users to know about its uses in their native languages will become more useful to users. By this application learners will be beneficial and it is for uneducated people so our application if easy to use and giving effective results. This will reduce the side effects and harmful drug interactions by establishing awareness among the people. It will result in healthy state of users and make them aware of medicines and our future work is to provide the use of medicines in other languages and we increase our dataset with some other medicines .

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