"MEDICO"

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This Report Presented in Partial Fulfillments of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering.

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APPROVAL

This project/Internship titled "**MEDICO**" submitted by Jannatul Ferdous, ID :171-15-9397 and Jubayer Ahmed, ID :171-15-9420 to the department of Computer Science & Engineering . Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc in Computer Science & Engineering and approved to it's style and contents. The presentation has been held on 31/01/2020 .
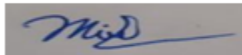
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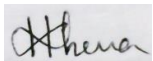Department of Computer Science and Engineering
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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Most. Hasna Hena, Assistant Professor, Department of Computer science & Engineering**, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

The main purpose of "MEDICO" is to provide higher accuracy to detect images of medicines and give health tips, current news. This paper proposes an intelligent medicine recognition system based on TensorFlow Image Classifier. The proposed system consists of an intelligent medicine recognition device, an app running on an Android-based mobile device. Currently, five different medicines can be recognized by the proposed system. The experimental results show that the recognition accuracy reaches 96.6%. Therefore, the proposed system can effectively reduce the problem of drug interactions caused by taking incorrect drugs, thereby reducing the cost of medicine and giving correct price list of medicine. This app will enable users to register, login, view items, add items, remove an item, and log out. This app can search medicines in the drugs directory and read detailed information. App users can use the Medico application for mainly two purposes. They can browse health tips related articles and read them. Also anyone is able to browse the drug directory page and detect drugs by capturing image. All requests from App user will be delivered to server and fetch data from server to populate information.

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INTRODUCTION

1.1 Introduction

Universally, it is assessed that billion individuals live with some type of find exact medication issues. In Bangladesh there are about many weakened individuals. Among them, 80% of individuals live in country territories. As Medicine are the generally utilized stuff in regular day to day existence, understanding the estimation of the medication is significant undertaking for them. Hence, we have proposed an ongoing framework that will assist them with perceiving the medication and resolve this emergency to cause individuals to feel trust in the monetary dealings, not relying upon others.

There are two patterns in photograph acknowledgment: scanner-based and camera-based. Scanner-based frameworks are very difficult to convey and the acknowledgment rate isn't sufficient. While camera-based frameworks can be created with the assistance of current picture preparing methods and each Smartphone has camera highlights, which makes it accessible for all. Hence, the camera-based frameworks will be a lot simpler to utilize and practical for the objective clients.

1.2 Literature Review

Medication is most significant thing for all ages individuals. Individuals additionally mindful before take any medication. Science additionally redesigned step by step in medication area. As demonstrated by in the hour of present day time frame, where we are made through modernized thinking, people are more dependent on the cell. There are various applications, which are make for person reason. There are various applications, which aided medication related probelm. The most supportive medication application for android are talked about underneath:

A : Offline pharmacy system of India

Right now administrative forces have been conveyed between the focal and the state governments. Focal Government is answerable for permitting of medication imports and the state governments are liable for the production, Sale and circulation of medications. Focal Government practices administrative power over medications by New Delhi based Central Drugs Control Organization

headed by the Drugs Controller General India. Express specialists' practices administrative power over medications by state based Drugs Control Administration headed by the State Drugs Regulators. Each state has its own Drugs Control Administration. The laws overseeing Pharmacies in India are gotten from Drugs and Cosmetics Act, 1940. So revisions are needed to Medications and Cosmetics Act, 1940 to bring e-drug stores inside the extent of Drugs and Cosmetics Act, 1940. E-drug store players make translation of laws and rules according to their comfort for exploiting for their business when there is vulnerability on the relevance of these laws to this model. It appears to be that online players do not stand to these guidelines and attempt to sidestep them. There is a major misinterpretation of accepting that rules applied for disconnected drug stores could be effortlessly applied to the online drug stores as well. This may prompt hazardous outcomes and might be demonstrated as hazardous pattern in future. There are not satisfactory arrangements with respect to offer of drugs from web, it appears to be extremely hard to control, screen and track sell of medications through e-drug stores. As of now, manual framework is being used in the drug store. It requires the drug specialist to physically screen each drug that is accessible in the drug store. Drug store the board has kept paper record in file organizers. Dealing with a large drug store with records on papers will be monotonous and hard to monitor inventories concerning the medications in the store, expiry date, amount of medications accessible dependent on the classes and their capacities. This suggests that these administrations will be physically finished by the drug specialist. This typically prompts botches as the outstanding task at hand of the drug specialist increments. This framework likewise guarantees that there exists a degree of limited admittance dependent on usefulness and job.

B : Online Fake Drug Detection System in Heterogeneous Platforms China and USA

The boundless utilization of web gives broad heterogeneous stages for drug deals. The web has significantly encouraged the advancement of product deals, in the interim, many phony medication dealers that has been unequivocally confined in the market by law requirement organizations construct their own foundation for deals by means of the web. To against the phony medication site, lessen time and human asset utilization, it is important to screen and recognize the medication data on the web naturally. Build up a programmed drug data screening and substance logical framework which online occupy the data and mine the concealed relationship what's more, discover the wellspring of the venders. Our significant commitments lie in those viewpoints as

follows: (1) We apply centered crawler method to change the unstructured information on the medication site into organized information, and put away the information in the neighborhood data set. (2) An incorporated phony medication ID technique is proposed which comprises of a picture acknowledgment module and data recovery module. In light of this strategy, the phony medication site is identified individually, yet we likewise remove the covered up associations of numerous stages. Trial results show that our framework can effectively recognize a huge number of phony medication site. They propose a medication data screening framework. This framework contains three module: the crawler module, the medication pictures character acknowledgment module and the recovery module. At last, we actualize the framework for on the web recognizing the phony medication site and effectively follow the source merchants by recovering and dissecting the acquired data.

C : Healthcare System for Elders with Automatic Drug Label Detection of Thiland

The clinical advancements have been quickly improved, the number of inhabitants in older people has been quickly expanding. Lamentably, because of new conceived infant emergency issue, working age's populace has been keeping diminishing. In this period, the old need to manage another difficult which is an absence of guardians. Therefore, with minor medical problem, the older folks should remain at an emergency clinic or a sanction house since employing individual caretaker to deal with at home expense heaps of cash. The proposed model has been created to give the elderly folks better personal satisfaction by tackling serious issues which are medication taking and observing issue. The framework centers around medication taking framework and it very well may be worked with a standard gadget that anyone can bear, an Android cell phone with the Internet association. To explore a proficiency of the pilot framework, 20 families that live with the older folks was requested to have a go at utilizing the proposed application for one month. The outcome shows that with this framework, the older folks with minor medical problem can carry on with their life in their own home serenely. Once in the past, people live respectively as more distant families, so the incapacitated seniors can be treated with full consideration from their relatives. Sadly, at present, human existence rotates around criticalness and rivalry. Additionally, more distant families have been changed to family units. Such a change brings about a not many relatives dealing with the seniors. In this way, most parental figures need to take elderly folks to a nursing Be that as it may, sending the older folks to the nursing home can cause major issues, for example,

spending issue the senior can get discouraged. In addition, at the nursing home, one parental figure needs to care for some seniors, so the person will most likely be unable to give enough consideration to the seniors. For instance, a guardian can neglect to give medications to seniors, or the elderly folks get into mishap, yet a parental figure doesn't take note. This undertaking has been created to make a patient-caring framework simpler and more advantageous utilizing straightforward gadget, for example, a cell phone.

D : On Mobile Health service System in China

The framework consolidates the remote correspondence innovation and clinical sensor location innovation, to figure it out the distant clinical observing of various physiological parameters. As the premise of the Android stage, the portable wellbeing stage build a wellbeing report with physical assessment, wellbeing direction for each part in family. After utilizing the comparing physiological information securing sensor module to gather physiological information, the portable canny terminal will send the gathered outcomes to the foundation place worker with Bluetooth. The focal worker is answerable for putting away the patient's clinical data and giving the information sharing help for different subsystems in the framework. Android portable information assortment terminal and worker associate together each other with wifi organization, and information benefits through usage dependent on HTTP web worker interface. The outside terminal get clinical data through getting to the web worker. It primarily record the day by day wellbeing states of the relatives, which can viably oversee different constant sicknesses and the anticipation of illness. At the same time, for a portion of the relatives who have been experiencing constant illnesses, it can assist patients with dealing with their day by day diet and treatment. Clinical instrument is encountering the advancement of different capacity, knowledge and scaling down. As of now, there are 20% emergency clinics in China started to attempt versatile clinical administrations, PDA/RFID and other hardware and innovation has been commonsense application. Simultaneously, individuals likewise pay more regard for the strength of the body. The most effective method to give an powerful appraisal of their own wellbeing, the everyday the board of the strength of the body to turn into the agreement, and how to accomplish medical care and care, smart home gives a perspective, that is, the utilization of family portable medical. In the wellbeing versatile clinical framework, an assortment of sensors are applied to convenient identify the client's physical wellbeing list in day by day life.

1.3 Motivation

Tremendous quantities of individuals are experiencing distinctive type of discovering medication issues. The inspiration driving this exploration is to discover a way to deal with execute a picture acknowledgment framework to perceive Bangladeshi medication for individuals. As perceiving a medication is very intense for them in light of similitude of Bangladeshi medication. On the off chance that such a framework can be created, individuals can have certainty on perceiving medication. Likewise they can make their own microfinance organization and have conviction on monetary dealings. It is exceptionally amazing to see an expansion in the quantity of outwardly disabled specialists in government and private positions.

1.4 Objectives

The main purpose of this android application is to help people find drug easily with authentic price and suggest people to eat good food, which food are healthy for our body. Warn to eat Unhygienic food. And also suggest people which fruit contains which vitamin.

1.5 Rationale of the Study

The development of the science of informatics, especially the tools of data processing, graphical user interface information systems based on web technologies, mobile technologies, smartphones, tablet computers and other portative gadgets play an important role in development of e-medicine.

The process of informatization in healthcare is oriented towards the establishment of unified medical information space facilitating the communication among scholars and medical personnel, utilization of archives and libraries of medical knowledge and technologies, as well as the use of active equipment directly at work place and in real time regime. As a result, the advancement in informatization of healthcare.

But if such a system can be developed, it will help the visually impaired people in different ways.

1.5.1 Recognize medicine: User can capture medicine and detect directly from available training classes.

1.5.2 Getting information: User can search medicines in the drugs directory and read detailed information and price list.

1.6 Research Questions

Different inquiries went ahead our psyche before beginning the exploration. The examination depends on making an Image Detection framework to perceive Bangladeshi Medicine for all sort of individuals. Most significant inquiries with respect to this exploration were:

Which picture location way to deal with be followed as the framework will be actualized on an Android Application?

How we'll lessen the issues of low goal camera and lower processor based low spending plan Smartphone?

How we'll accomplish higher exactness as the framework will be utilized in budgetary dealings.

1.7 Expected Outcomes

The essential result of the examination is to perceive Bangladeshi medication for all sort of individuals. Additionally actualize the framework as an Android Application that will have the option to run on low financial plan Smartphone.

1.8 Report Layout

In the rest of the report, Chapter 2 presents the background study, related works, research summary, scope of the problem and challenges. In Chapter 3, we'll briefly discuss our research methodology, data collection and Medicine database setup, statistical analysis and implementation requirements. Experimental results and analysis will be discussed in Chapter 4. In Chapter 5, conclusion will be done by summarizing the experimental results and scopes of future study. References and appendices will be given later on under the title of Appendix A: Research Reflection, Appendix B: Related Issues.

CHAPTER 2
BACKGROUND

2.1 Introduction

In this chapter, we have discussed on numerous research work accomplished by researchers on the problem statement of this report. Various works have been done in this field to recognize objects. But most of the recognitions were done between objects of different shapes as our research is on Bangladeshi medicine and most of the medicine are of same size and texture, it was quite tough to solve. As well as we had to study different real-time object recognition based mobile application.

Considering a continuous framework to distinguish the Bangladeshi medication precisely, we'll be centering two things in this section: related works in medication recognition utilizing picture handling and related chips away at ongoing portable application for a similar issue.

2.2 Related Works

Several methods have been adopted by the researchers for solving this problem.

DIMS in this apps Drugs [2] details (Indications, Dosage & administrations, Contraindications, Side effects, Precautions & warnings, FDA pregnancy category, Therapeutic class, Pack size & price).

BD Medicines Directory is the leading drugs directory [3] dedicated to help you find all information about drugs. It has indexed over 160 pharmaceuticals company drugs mostly used by physicians, medical students, nurses and other healthcare professionals for clinical information. Completely offline and free to download. Auto complete search feature to lookup the drugs. Medications Details (brand name , generics name, measurements, how to take, contains, side effects, precautions, contraindications, indications, manufacturer and cost).

Medicine Directoy Bangladesh is the first full-fledged medicine dictionary of Bangladesh. Search your medicine from 8000+ names and origins, [4] keep your needed ones at favorites. Find related and similar medicines for a name.

Drug Search App its a highly informative Drugs & Medicine Brands search offline. Drug Search APP will provide all the information and details regarding drugs/brands available in the Indian market including, Brand Name, Composition, MRP, [5] Drug Group and Company name.

"Drug Search app" will be of immense help to anyone related to Pharmaceuticals & Medicine i.e. Chemists, Medical and Paramedical staff, Healthcare Professionals, Pharmaceutical Manufacturer, Pharmaceutical franchise & Marketing companies.

All Medicine Inquiry by name In this app you Candice find uses, side effects of medicine. Search about medicine in the search bar by medicine Name & By Salt Name. multi language features.

Though all the above mentioned algorithms and methods were presented and developed system using machine learning.

2.3 Research Summary

In our background study, we are intended to find a feasible solution for creating a android based image recognition system to recognize Bangladeshi Medicine in real-time. As the system needs to recognize medicine in real-time, to we need to reduce the time complexity for recognition. Different approaches were done, some were feature based detection and some were Convolutional Neural Network (CNN) based detection. As implementing CNN Application directly on Android isn't flexible enough right now, we'll need to focus to feature based detection as well as reducing time complexity.

In this report, we have exploited the ORB method for keypoint detection and feature descriptions. The method experimentally shows better accuracy in recognition with faster processing time.

2.4 Scope of the Problem

This study focuses on finding a way to develop a real-time Drug Directory detection system for all people. If such a system can be developed, then visually impaired people can:

i. **Recognize Medicine:** They will be able to recognize Medicine with a handy tool as the system will be implemented as an Android Application that will run on lower budget Smartphone.

ii. **Financial Dealings:** Confidence on recognizing currencies will help them to participate on financial dealings and contribute something for their family.

2.5 Challenges

To develop such a system for visually impaired people we need to create a reliable system with higher accuracy and usability. Some of the challenges may come in the development of this research based system:

i. **Smartphone Usability:** As visually impaired people face difficulties on seeing, then operating a Smartphone will be impossible for them. To overcome these difficulties we need to create such an approach or use a pre-built system that will help them to control a Smartphone.

ii. **Time Complexity:** As the intended system is a real-time detection system, so, we need to focus with highest priority to reduce the processing time of the detection.

iii. **Lower Camera Resolution:** 80% of people in our country live in rural areas as well as their financial conditions are not well enough to buy a Smartphone that has good camera. So the system should be developed in such a way where the camera resolution may be moderate.

iv. **Offline System:** Detection needs to be done offline, as in rural areas internet connectivity isn't well enough still also costly. If we could use internet then we would be able to use machine learning for the solution. Android App doesn't support python programming language directly so the system needs to be created using JAVA or Kotlin programming language, where there are not enough resources available in this area.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Business Process Modeling

Working with an association without very much revealed techniques is look like as a pilot who is flying blind without properly working instruments and course. This paper presents the basic thoughts of showing and completing business methodology using current information advances and measures.
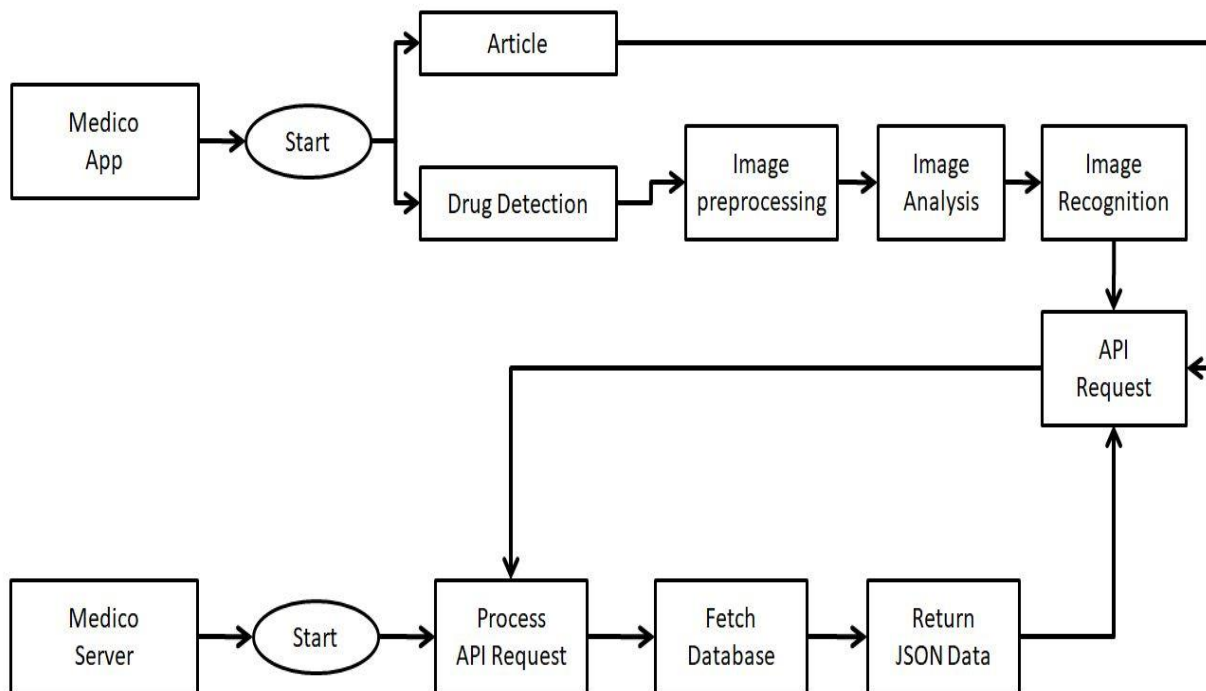

Figure 3.1: Business Process Model.

3.2 Requirement Collection and Analysis

3.2.1 Software Requirement:

- TensorFlow Image Classifier
- Android Studio
- MySQL Database

- Apache Server
- Python 3.7+

3.2.2 Hardware Requirement:

- Android OS supported Device (Android Smartphone)
- Windows Operating System
- System Requirements:
  - i) CPU: SSE2 instruction set supported
  - ii) GPU: Graphics card with DX10 (model 4.0) capabilities
  - iii) RAM: 4GB (min), 8GB (preferable)
  - iv) Hard Disk: 150GB (min)
  - v) Processor: 1.5GHz (min)

3.3 Use Case Model

Use case model is a model of how various sorts of clients connect with the framework to tackle an issue. In that capacity, it portrays the objectives of the clients, the communications between the clients and the framework, and the necessary conduct of the framework in fulfilling these objectives. A use case model comprises of various model components. The most significant model components are: use cases, entertainers and the connections between them.

Figure 3.3 shows the use case model diagram of Medico where we can see that there are two types of user in the system, App User and Admin. Admin user can do all the controls and customization of the Application. Also admin can manage categories of Articles and create, modify or delete articles.

App users can use the Medico application for mainly two purposes. He can browse health tips related articles and read them. Also he is able to browse the drug directory page and detect drugs by capturing image. All requests from App user will be delivered to server and fetch data from server to populate information.

3.4 Use Case:

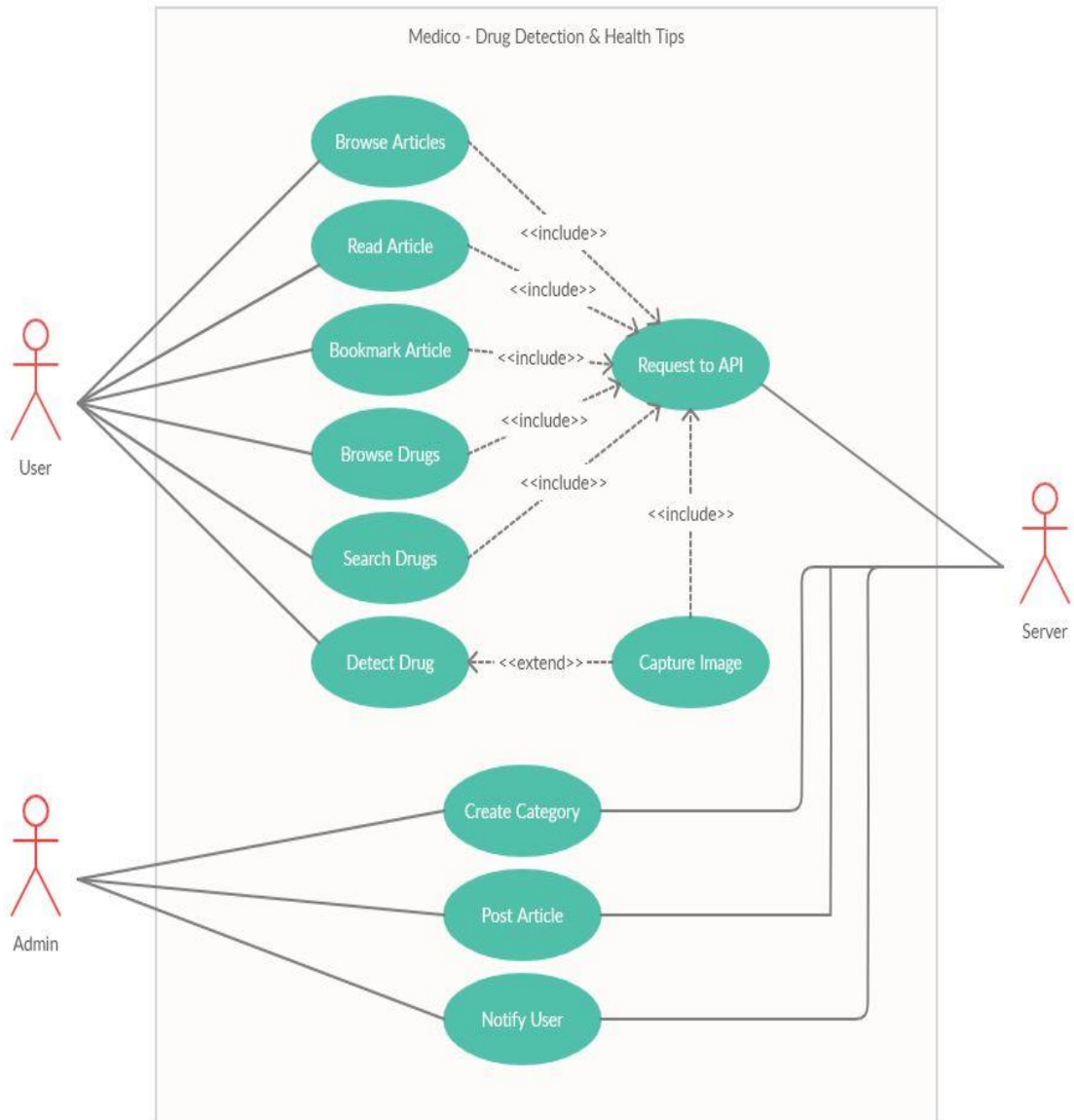Figure 3.3: Use case model of Medico.

Table 3.4.1 : Use case specification for Homepage

Use case name	User Homepage
Actors	User
Purpose	To see all the post by the admin
Main Flow	- Go to home menu - user can see some categories, news article - user can see food and diet chart and some health tips

Table 3.4.2 : Use case specification for Navigation Drawer

Use case name	User Navigation Drawer
Actors	User
Purpose	See other feature
Main Flow	- Click on navigation drawer in the topist - User will see, Drugs Directory News Categories Bookmarks

Table 3.4.3 : Use case specification for menu bar

Use case name	User menu bar
Actors	User
Purpose	To add favorite list
Main Flow	- See the user homepage - Click on menu bar add to favorite list any article and news

Table 3.4.4 : Use case specification for Drugs Directory

Use case name	User Drugs Directory
Actors	User
Purpose	See all drug list with details
Main Flow	- Click on drugs directory - user will scroll and see whole the drugs list those are inputed by admin in database.

Table 3.4.5 : Use case specification for Search Bar

Use case name	User Search Bar
Actors	User
Purpose	Search Drug

Main Flow	- Click on navigation drawer
	- Go to drug directory
	- click on top corner to search drug with keyword

Table 3.4.6 : Use case specification for Drugs Detect

Use case name	User Drug Detect
Actors	User
Purpose	Detect Drug and suggest alternative drugs
Main Flow	- Click on drug directory in navigation bar.
	- Click search bar and type drug name related any keyword and see the result
	- Click camera option in top and focus on drug within several seconds see drug name also hear the name and also suggest alternative drugs.

Table 3.4.7 : Use case specification for News Categories

Use case name	User News Categories
Actors	User
Purpose	See some categories
Main Flow	- Click on News Categories

	- user see these option
	Food and Diet
	Coronavirus
	Default Category

Table 3.4.8 : Use case specification for Bookmarks

Use case name	User Bookmarks
Actors	User
Purpose	To save/select favorite article for later to discover effectively and read
Main Flow	**-** user read any article or news and can bookmarks for further need

3.5 Detection Process and Database Schemas

Medico uses TensorFlow Image Classifier to classify training images and it provides higher accuracy to detect images of medicines. Figure 3.4.1 and 3.4.2 shows the process of training images with the classifier and database schemas respectively.
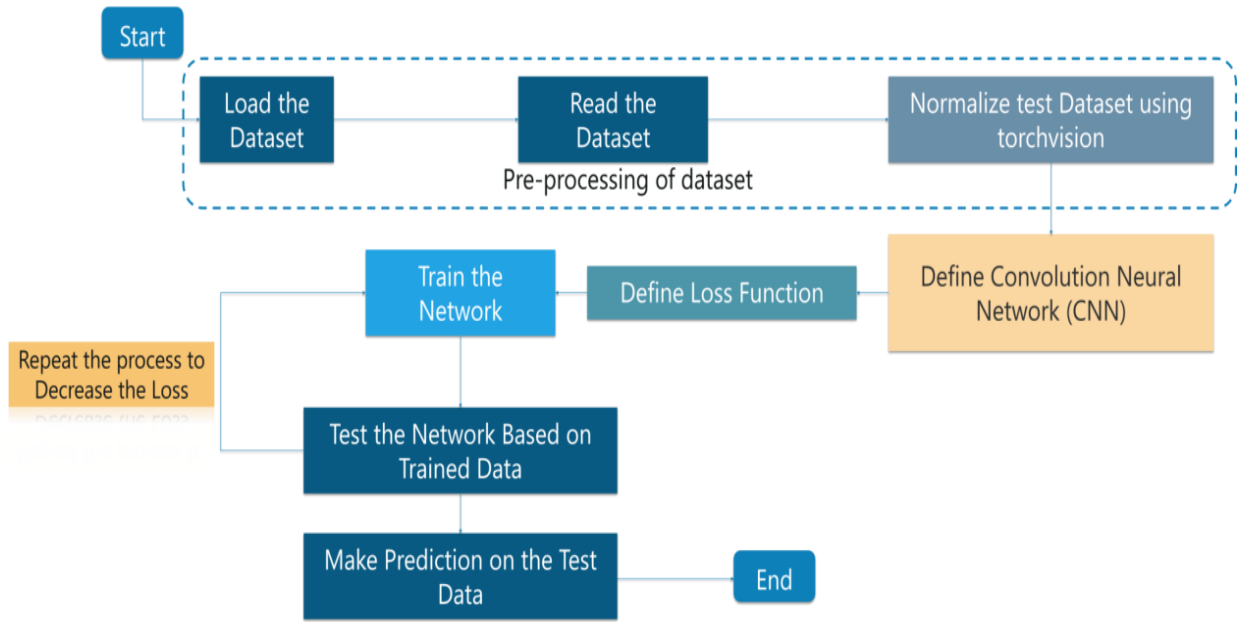
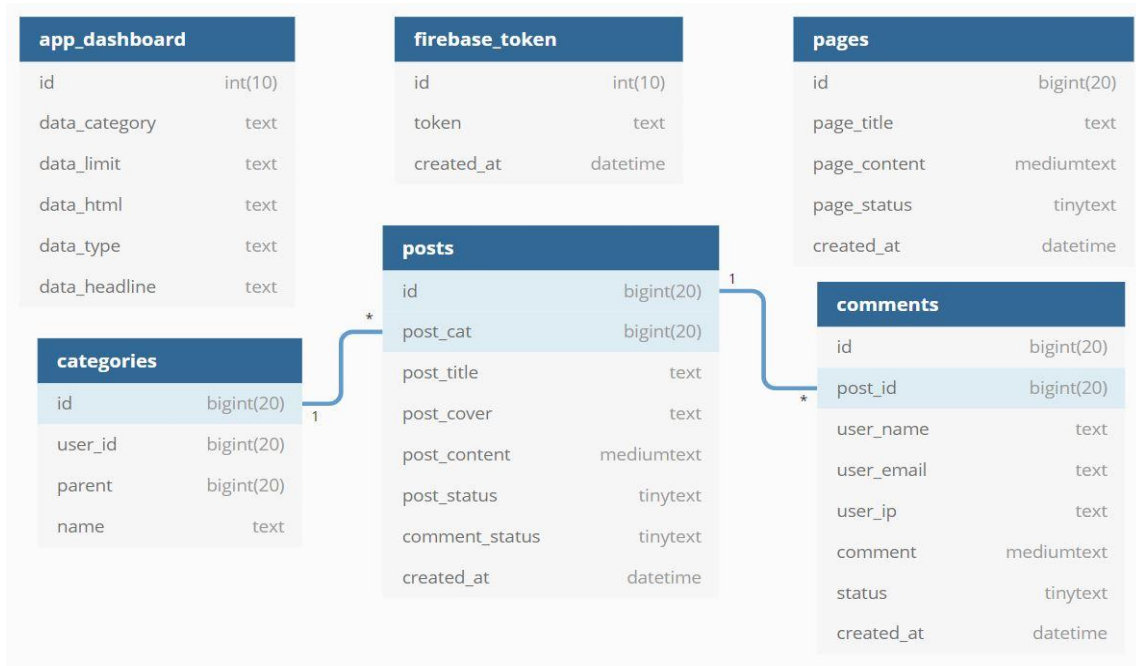Figure 3.4.1: Overview of the TensorFlow Image Classification

Figure 3.4.2: Database Schemas of the Medico Application.

3.6 Design Requirements

- Any kind of user will be able to use the Medico Application
- User can only access the data passed via API to android app without direct database access permission
- User can browse and read articles
- User can bookmark articles for future reading
- User can search medicines in the drugs directory and read detailed information
- User can capture medicine and detect directly from available training classes

Design Specification

4.1 Front-End Design

In front-end design we try to keep our (UI) user interface design unique and simple, because user interface allows user to interact with the mobile users. The design of user interface is usually refers to the (GUI) graphical user interface. As well as we'll show the configuration of design from the Admin Panel in this chapter from there we'll manage and update the app in real-time.

4.1.1 Home Screen & Article Page

The home screen of the app contains basically recent news related to health. These news are segmented on various sections on various view to attract the user. We keep our user interface simple and avoid unnecessary elements. We are careful to placement of item and purposeful in page layout.
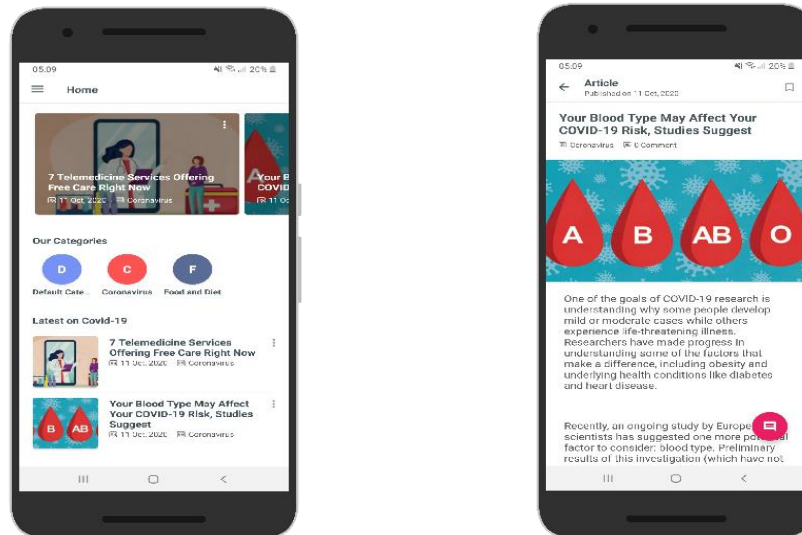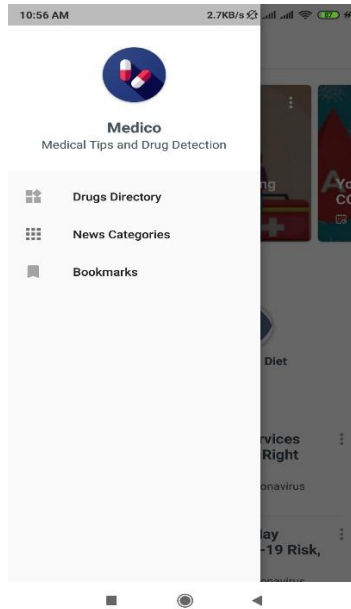

Figure 4.1.1: Home screen (left) and Article page (right) Navigation drawer (down) of Medico App.

Also the article page is super simple with Article Bookmarking for easy to find later, sharing via facebook, twitter, instagram, email etc are also integrated in this layout. Users can also post comments on specific article to share their thoughts. For stopping spam comments, comment will be in pending mode first for Admin Approval. If Admin approve it then it will be visible to all app users.

4.1.2 Drugs Directory Layout

Basically Drug Directory Layout use in admin panel. From here we add new drug information in details. As manufacturer, brand name, generic name, strength, dosages ad price. This all are in our apps when we input and save them here. This all things are controlled by drug directory layout. And also check all the drugs those we have already input. If we need to update drug information or change price etc we can do it from here. In the apps we can see the details.
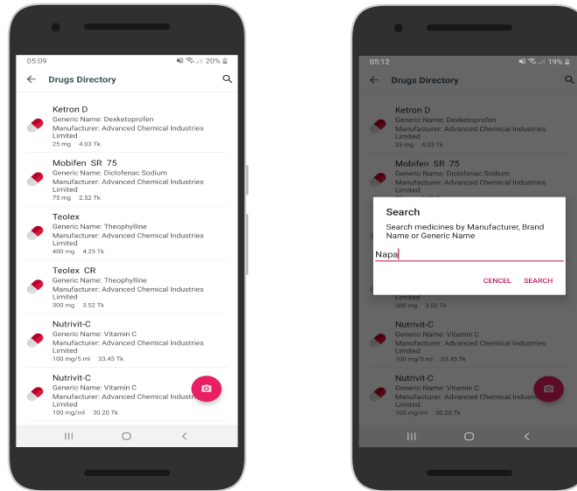
Figure 4.1.2: Drugs Listing (left) and Searching (right) of Medico App.

4.1.3 Drugs Detection in real-time

By using Tensor flow we can detect all those drug and show us the drug name in real time. Here also an option which   Whole this process are held by image processing system. Here a drug, when we focus camera on the drug it detect the name Napa see here, by the real time processing we can detect all the drugs which all are input in drug directory.

Figure 4.1.3: Drugs Detection of Medico App.

4.1.4 Drugs detect and Suggest in real-time

By utilizing Tensor stream we can distinguish every one of those medication and show us the medication name progressively. Here additionally a choice which Whole this cycle are held by picture preparing framework. Here a medication, when we center camera around the medication it distinguish the name Napa and also suggest similar drug as like Ace , Reset , Fast see here. There have an another feature when we focus on drug and we can see the name and hear the audio of drug name.
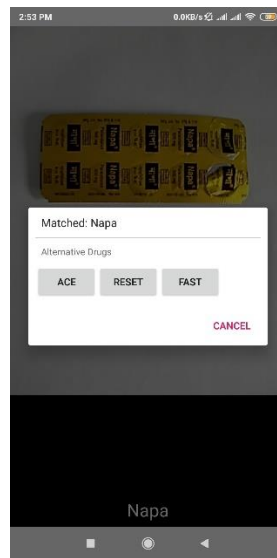

Figure 4.1.4: Drugs suggested (Napa)

Here also some example, Flagyl suggest alternative drugs: Metro , Amodis & Metryl .
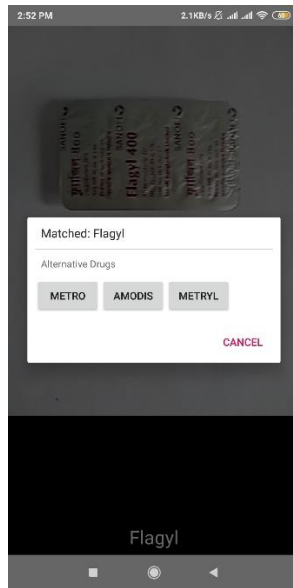
Figure 4.1.5: Drugs suggested (Flagyl)

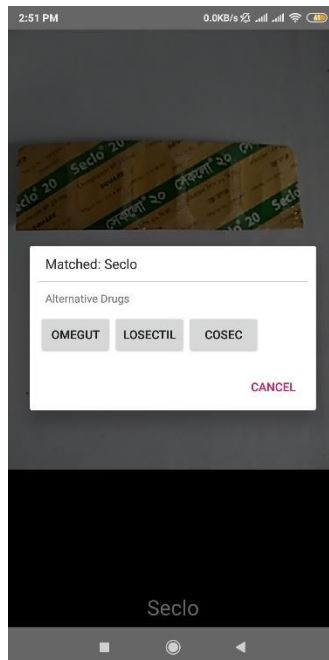Seclo suggest alternative drugs : Omegut, Losectil & Cosec.

Figure 4.1.6: Drugs suggested (Seclo)

4.2 Back-End Design Specification

4.2.1 Data Insertion

Our mobile application will give many different types of information so that we need to work with database. And for this we work with MYSQL database. We need to create a database and store all the data and information in MYSQL database. For different data and information of different features or section will store in different categories in database. When a user will navigate to a feature into the application then the application will request to the specified API from the server. From MYSQL database server will get data. And it will pass to the application through JSON.

id	manufacturer	brand_name	generic_name	strength	dosages	price
1	Ad-din Pharmaceuticals Ltd.	Alerjess	Chlorpheniramine Maleate	2 mg/5 ml	Syrup	20.00 Tk
2	Ad-din Pharmaceuticals Ltd.	B Plex	Nicotinamide + Pyridoxine Hydrochloride + Riboflav...	20 mg + 2 mg + 2 mg + 5 mg	Tablet	0.46 Tk
3	Ad-din Pharmaceuticals Ltd.	B Plex	Nicotinamide + Pyridoxine Hydrochloride + Riboflav...	20 mg + 2 mg + 2 mg + 5 mg/5 ml	Syrup	20.84 Tk
4	Ad-din Pharmaceuticals Ltd.	Ciproxen 250	Ciprofloxacin	250 mg	Tablet	7.00 Tk
5	Ad-din Pharmaceuticals Ltd.	Co-Try	Sulphamethoxazole + Trimethoprim	200 mg + 40 mg/5 ml	Suspension	21.50 Tk
6	Ad-din Pharmaceuticals Ltd.	Co-Try	Sulphamethoxazole + Trimethoprim	800 mg + 160 mg	Tablet	2.00 Tk
7	Ad-din Pharmaceuticals Ltd.	Duomeal	Aluminium Oxide + Magnesium Hydroxide	175 mg + 225 mg/5 ml	Suspension	40.00 Tk
8	Ad-din Pharmaceuticals Ltd.	Duomeal	Aluminium Hydroxide + Magnesium Hydroxide	250 mg + 400 mg	Tablet	0.53 Tk
9	Ad-din Pharmaceuticals Ltd.	Feva	Paracetamol	120 mg/5 ml	Suspension	18.00 Tk
10	Ad-din Pharmaceuticals Ltd.	Feva	Paracetamol	500 mg	Tablet	0.75 Tk
11	Ad-din Pharmaceuticals Ltd.	Helben	Mebendazole	100 mg/5 ml	Suspension	14.80 Tk
12	Ad-din Pharmaceuticals Ltd.	J Mox 250	Amoxicillin	250 mg	Capsule	2.86 Tk
13	Ad-din Pharmaceuticals Ltd.	J Mox	Amoxicillin	125 mg/5 ml	Powder For Suspension	45.00 Tk
14	Ad-din Pharmaceuticals Ltd.	J Mox	Amoxicillin	125 mg/1.25 ml	Paediatric Drops	28.32 Tk
15	Ad-din Pharmaceuticals Ltd.	Jefenac TR 100	Diclofenac Sodium	100 mg	Capsule	3.00 Tk
16	Ad-din Pharmaceuticals Ltd.	J Zinc 10mg/5ml	Zinc	10 mg/5 ml	Syrup	30.00 Tk

Figure 4.2.1: Drugs Table of Medico App.

4.3 Interaction Design and UX

Despite of being a huge system of backend work load we have tried to make comfortable, easy to understand user interface by android X materials and library files the extension we've use is a android X's life cycle extension. UX design is all about shaping the experience of using a system product, and most part of that experience involve some interaction between the user and the system. The goal of our interaction design is to create product that allows the user to achieve their objective in the best way possible. We keep our button label meaningful and simple to understand.
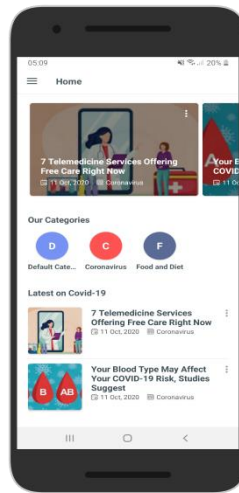
Figure 4.3.1: Interaction Design of System.

We concerns about the graphical elements like images, typography and icon that users interact with. A smartphones uses by user's fingers so we concerns about what kind of physical space needed for user. We also concern about timing and behavior of the interface that we designed.

4.4 Implementation Requirements

To implement our proposed project we need some hardware and software and many other things which are given below:

   i.   We needs some technology e.g. Android X, XML, MYSQL
   ii.   In programming or scripting language we need to know JAVA, XML
   iii. We need to know MYSQL database.
   iv.   From tools and sites we need Android Studio
   v.   In Server site we must have WI-FI Router and WAMP or XAMPP
   vi.   And a stable teamwork needed with active team member.

Chapter 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Database

SQLite is an in-measure library that executes an independent, serverless, zero-setup, value-based SQL data set motor. The code for SQLite is in the public area and is accordingly free for use for any reason, business or private. SQLite is the most generally sent information base on the planet with a larger number of uses than we can tally, including a few prominent tasks. SQLite is a smaller library. With all highlights empowered, the library size can be under 600KiB, contingent upon the objective stage and compiler advancement settings. (64-digit code is bigger. Also, some compiler advancements, for example, forceful capacity inlining and circle unrolling can cause the article code to be a lot bigger.) There is a tradeoff between memory utilization and speed. SQLite for the most part runs quicker the more memory you give it. By the by, execution is typically very acceptable even in low-memory conditions. Contingent upon how it is utilized, SQLite can be quicker than direct filesystem I/O. The proper diagram of SQLite and how it works is given below:


```java
public class DBHelper extends SQLiteOpenHelper {
    public static final String databseName = "NewsAppBookmarks.db";
    public static final String tableName = "bookmarks";

    public DBHelper(Context context) { super(context, databseName, factory: null, version: 1); }

    @Override
    public void onCreate(SQLiteDatabase db) {
        // TODO Auto-generated method stub
        db.execSQL(
            "CREATE TABLE " + tableName + "(id INTEGER PRIMARY KEY, post_id TEXT)"
        );
    }

    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
        // TODO Auto-generated method stub
        db.execSQL("DROP TABLE IF EXISTS " + tableName);
        onCreate(db);
    }

    public void insertBookmark(String post_id) {

        SQLiteDatabase db = this.getWritableDatabase();
        ContentValues contentValues = new ContentValues();
        contentValues.put("post_id", post_id);
        db.insert(tableName, nullColumnHack: null, contentValues);
    }

    public Boolean isBookmarked(String post_id) {
        SQLiteDatabase db = this.getReadableDatabase();
        Cursor res = db.rawQuery( sql: "select * from " + tableName + " WHERE post_id = '" + post_id + "' order by id desc", selectionArgs: null);
        if(res.getCount() > 0) {
            return true;
        }else{
            return false;
        }
    }

    public void deleteBookmark(Context c, String post_id) {
        SQLiteDatabase db = this.getWritableDatabase();
```

Figure 5.1.1 : Database Implementation Model

5.2 Implementation of Interaction

We completing our application affiliation makes the application engaging the customer. It is the main partner every customer need. To connect with the applications we make our undertaking straightforward and strong to the customer. We completed our assignment with straightforward image and fundamentally for a wide scope of customer. Our undertaking executed appropriately with all the vital things which associate to the client without any problem.

5.3 Testing Implementation

The Android system incorporates a coordinated testing structure that encourages you test all parts of your application and the SDK apparatuses incorporate devices for setting going test applications. Regardless of whether you are working in Eclipse with ADT or working from the order line, the SDK devices help you set up and run your tests inside an emulator or the gadget you are focusing on. It's the main piece of an applications to testing the blunder part of the applications. We attempt to built up our task and attempt to less blunder.

This parts includes-

1. Internal Logic
2. Input and Output Domain

Table 5.1.1 : Test case table for "Medico" application

Test Case	Test Input	Expected Outcome	Actual Outcome	Result
1.Run the app	Uses some android OS phones	Run the application successfully	Run the application successfully	Passed
2.Try to Sign in without Info	Blank or incorrect address	The login is invalid	Invalid info	Passed
3.Password	Blank or incorrect address	The login is invalid	Incorrect password	Passed

4.User Name	Blank or incorrect address	Correct user name must be needed	Incorrect user name	Passes

5.4 Test Result and Reports

Test reports contain with the delayed consequence of testing project in a traditional way. It's portrayed the test condition and delayed consequence of yield .We can take a decision if our report is set up through by the table our testing table. From the table we test a couple of number of testing and we got the authentic result. That is mean our endeavor is successfully cultivated for using the customer, so our applications freed from botch.

CHAPTER 6

Summary, Conclusion, Recommendation and Implication for Future Research

6.1 Summary of the Study

It is needless to tell that we are living in a world of technology. Technologies are improving day by day, but using the technologies in appropriate field that will help human beings is necessary. In this research based work, we tried to use image recognition system to detect Bangladeshi Medicine. It was our intension to make the system as real-time image recognition Android App. For this, we tried with various feature based methods to determine which method is more suitable with minimum time complexity and maximum accuracy.

6.2 Conclusions

In this report, we attempt to formalize a constant Bangladeshi medication identification framework executed over versatile application. The normal acknowledgment rate for every one of the various kinds of medication is reported in the test results. The acknowledgment rate is higher than some other techniques applied for experimentation and the normal coordinating rate is likewise very good thinking about a constant framework. The presented structure could be helpful who can use the compact application to see the medicine accurately.

6.3 Recommendations

There are some recommendations that should be followed if this research is to be conducted again in the future.

- More numbers of training images to be used for betterment of results.
- More preprocessing techniques to be used to clear the image before starting the recognition.
- For the Application Development, Koltin programming language should be used to get faster processing speed.

6.4 Implication for Further Study

Due to the advancement of technologies our day to day life are getting easier. Using these technologies in appropriate fields is also necessary. We must use technologies for them. There are other people who may have difficulties in listening, walking, taking and so on. Technologies should be use for their betterment. There are many researches are being conducted all over the world. But we should also use those researches to make a complete solution that will help people directly. Researchers conduct research, but if the research cannot be implemented in real-life then it will be just a piece of paper.

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APPENDIX A

Research Reflection

By doing this research we have learned various approaches in the field of image recognition, as well as understood the necessity of using technologies for the people who face serious difficulties. In the very beginning of our research, we started to implement the recognition using Tensorflow, but we found that if the objects are of similar shapes then Tensorflow can't recognize properly, as well as the image quality needs to be better. So we moved to feature based image recognition. Also we've learned the importance of time complexity as recognition time needs to be lower and accuracy needs to be higher in this case. The whole implemented application is based on OpenCV. By doing this research, we learned various preprocessing techniques that OpenCV made easy. While implementing the research as android application we learned offline integration of OpenCV SDK for Android. Though it increases the size of the application but reduces the problem of downloading OpenCV SDK externally as well.

APPENDIX B

Related Issues

Various research and development has been done in the field of image processing and recognition. But it is also very important to use these researches as implemented system to make real-life usable. In this report we have used image recognition to help the people who are visually impaired to recognize paper currencies. Similarly image recognition can be used to them on other sectors like reading book, getting help in the road by providing directions, learning different shapes, using internet and so on. Not only of people who are visually impaired, but also it can be used for children education. Image recognition can be helpful to teach a child on learning different things, learning alphabets etc.

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