

2023-24-100

Apeksha Hospital Donor Engagement system

Presented by



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Introduction

Our Project aims to revolutionize the donation process at Apeksha Hospital, ensuring high-quality donations and patient care.

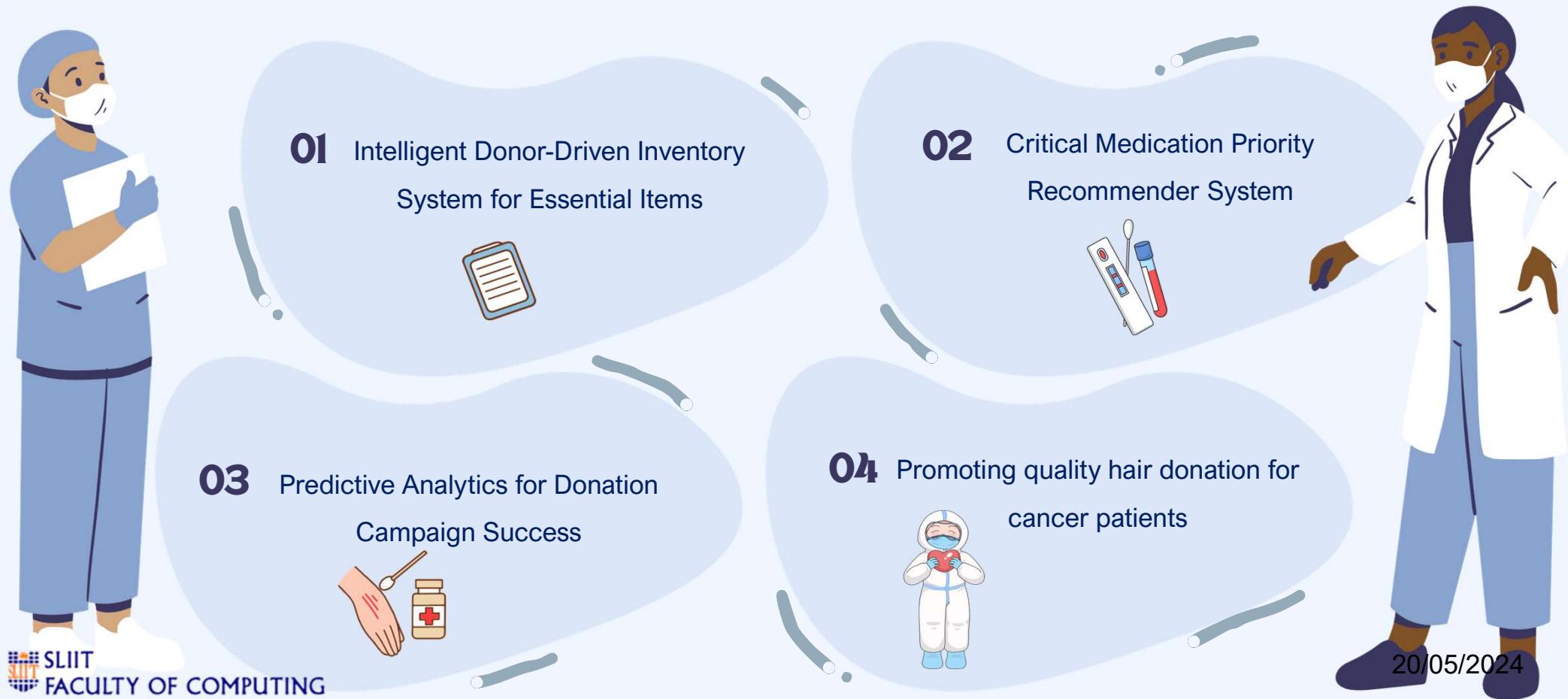


Research Problem

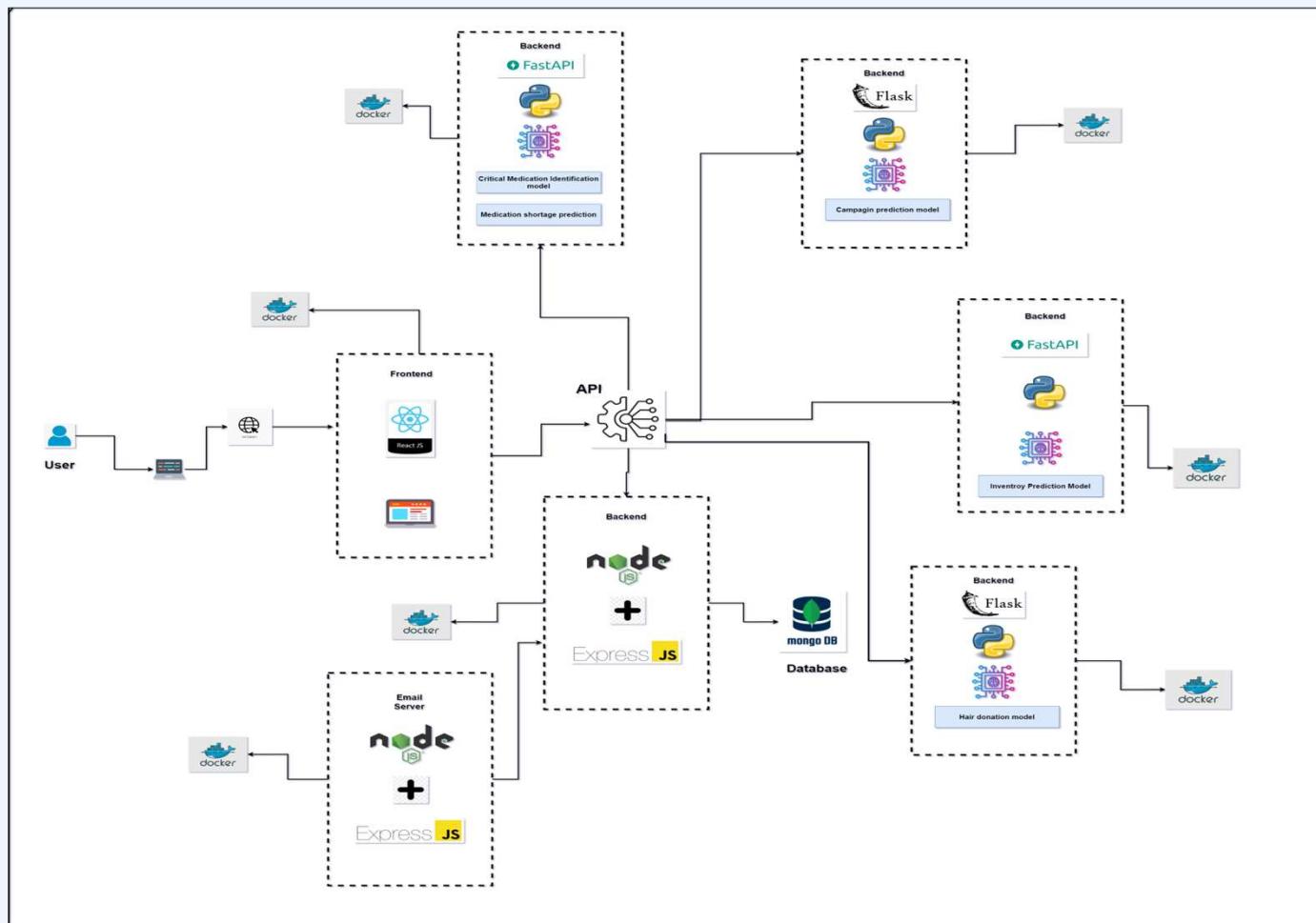


The lack of a reliable and comprehensive platform for donations at Apeksha Hospital poses several challenges, including fraudulent activities and the absence of a specific and trustworthy platform for hair donations. These issues have a significant impact on the overall donation process, leading to inefficiencies, a lack of transparency, and a potential compromise in the quality and suitability of donated items for patient care.

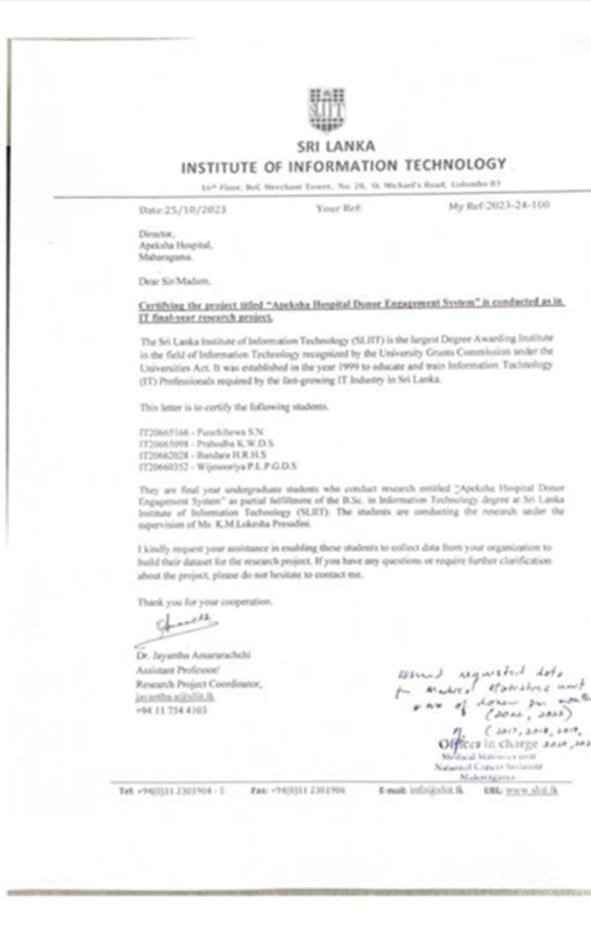
Components



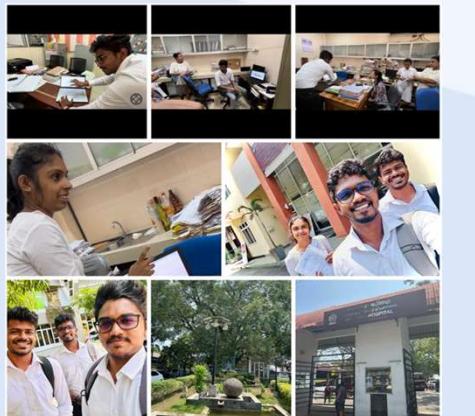
System Overview Diagram



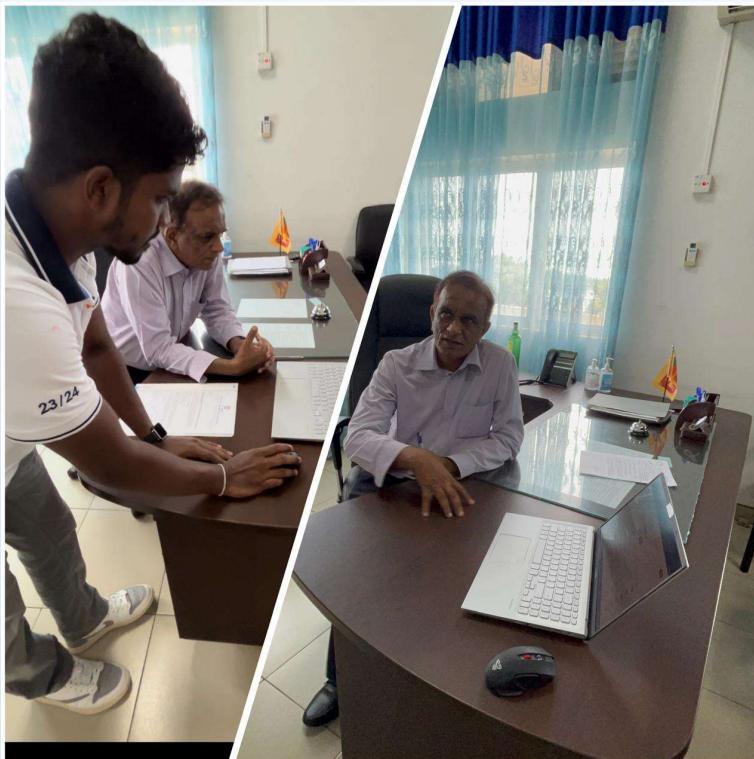
Data Collection Evidence

 <p>Dear Sir/Madam,</p> <p>I am pleased to certify that "Apksha Hospital Donor Engagement System" is conducted at SLIIT.</p> <p>The Sri Lanka Institute of Information Technology (SLIIT) is the largest Degree Awarding Institute in the field of Information Technology recognized by the University Grants Commission under the Universities Act. It was established in the year 1999 to educate and train Information Technology (IT) Professionals required by the fast-growing IT Industry in Sri Lanka.</p> <p>This letter is to certify the following students:</p> <p>IT20065166 - Panchchala K.N IT20065094 - Prabudha K.W.D.S IT20062028 - Bandara H.R.H.S IT20060352 - Wijesooriya P.L.P.G.D.S</p> <p>They are final year undergraduate students who conduct research entitled "Apksha Hospital Donor Engagement System" as partial fulfillment of the B.Sc in Information Technology degree at Sri Lanka Institute of Information Technology (SLIIT). The students are conducting the research under the supervision of Ms. K.M.Lokeda Perera.</p> <p>I kindly request your assistance in enabling these students to collect data from your organization to build their dataset for the research project. If you have any questions or require further clarification about the project, please do not hesitate to contact me.</p> <p>Thank you for your cooperation.</p> <p>Yours sincerely,  Dr. Jayantha Amarachchi Assistant Professor/ Research Project Coordinator, jayantha@slilit.lk +94 11 754 4103</p> <p>Received registered data from [REDACTED] statistics unit on [REDACTED] of [REDACTED] per [REDACTED] ([REDACTED], 2023)</p> <p>Office in charge: [REDACTED] Mr. [REDACTED] National Cancer Hospital Maharagama</p> <p>Tel: +94(0)11 2301904-5 Fax: +94(0)11 2301904 E-mail: info@slilit.lk URL: www.slilit.lk</p>	 <p>Dear Sir/Madam,</p> <p>I am pleased to certify that "Apksha Hospital Donor Engagement System" is conducted at SLIIT.</p> <p>The Sri Lanka Institute of Information Technology (SLIIT) is the largest Degree Awarding Institute in the field of Information Technology recognized by the University Grants Commission under the Universities Act. 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Stakeholder feedback



Data Collection Evidence



Getting feedbacks from
Dr. Roshan Amaratunga

(Acting Director, Apeksha Hospital)

20/05/2024

Commercialization

Enhanced resource management leads to better patient outcomes, making the system attractive to healthcare providers focused on quality care.



By optimizing resource allocation and reducing wastage, the system can lower operational costs for hospitals



- ❖ Scalability to other hospitals
- ❖ Customization for different healthcare settings

- ❖ Partnership and collaboration opportunities
- ❖ Training and support services

Poster

The poster is titled "DONOR MANAGEMENT AND SCARCE MEDICAL RESOURCE ALLOCATION IN A CANCER HOSPITAL IN SRI LANKA". It features a circular graphic on the left with a lightbulb, gears, and the letters "AI". On the right, there is a hand holding a heart icon. The poster is divided into several sections:

- Introduction:** Describes the Apeksha Hospital's Intelligent Donor-Driven Inventory System, which uses machine learning to match donations with needs, including critical medication prioritization, blood donation campaigns, and hair quality assessment for donations, enhancing patient care.
- Research Question:** How can Apeksha Hospital's Intelligent Donor-Driven Inventory System, using machine learning, optimize donor contributions to meet real-time needs, enhance critical medication management, and improve blood and hair donation processes?
- Methodology:** This study uses machine learning to predict medical resource needs at Apeksha Hospital. Data collection, preprocessing, and feature extraction are conducted on hospital records. Decision Tree Regression is used for inventory prediction, Random Forest for medication priority, and predicting donation campaign success. Image processing techniques are employed to assess hair quality for donations. Evaluation metrics include accuracy, precision, and recall, ensuring efficient resource allocation for inventory, medication, blood, and hair donations.
- Findings:** Six numbered images showing: 1. A donation box; 2. Colored beads; 3. A blood bag; 4. A heart-shaped ribbon; 5. Two people smiling; 6. A hair donation bag.
- Conclusion:** Machine learning integration at Apeksha Hospital improved resource management and patient care. Accurate inventory forecasting and medication prioritization optimized allocation. Predictive analytics boosted blood donation campaigns, ensuring continuous supply. Image processing streamlined hair donation, enhancing donation management. These findings highlight data-driven healthcare's pivotal role in efficient resource utilization and improved patient outcomes.
- Results:** The implementation of machine learning algorithms yielded promising outcomes. Decision Tree Regression accurately forecasted inventory requirements, optimizing resource allocation. Random Forest models effectively identified medication shortages and prioritized critical medications, enhancing patient care. Predictive analytics successfully forecasted blood donation campaign success, aiding strategic planning. Image processing techniques streamlined hair donation assessments. These results underscore the efficacy of data-driven approaches in healthcare management, improving resource allocation and patient outcomes.

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Specializing in Software Engineering



Introduction

Apeksha Hospital faces donor engagement and inventory challenges. We propose a machine learning system to recommend needed items by analyzing donor behavior. This platform aligns donor preferences with hospital needs, enhancing satisfaction and efficiency.

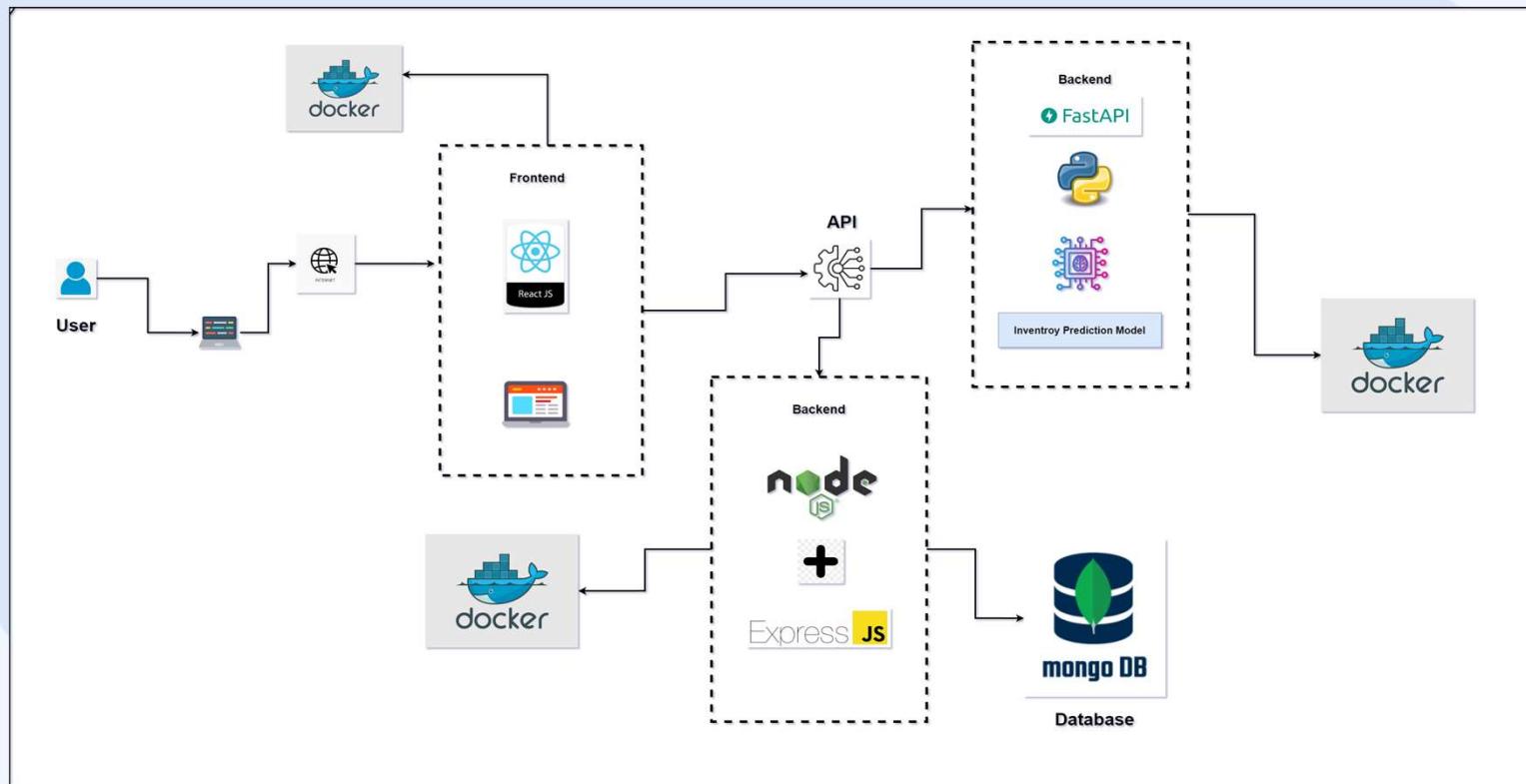
Research Problem

Intelligent donor-driven inventory management system. This solution utilizes machine learning algorithms to analyze Inventory behavior and historical Inventory usage patterns, recommending specific essential items required by the hospital. By providing an interactive interface for donors to select and track their impact, the system aims to enhance donor engagement and resource allocation efficiency.



Methodology

Intelligent Donor-Driven Inventory System for Essential Items



Technologies and Techniques

Programming

Language

- ❖ Python

- ❖ JavaScript

Tools

- ❖ Jupyter Notebook

- ❖ Scikit Learn

- ❖ Anaconda Navigator

- ❖ FastAPI

- ❖ Render

Algorithm

- ❖ Decision Tree Regression

Version Controlling

- ❖ GitHub

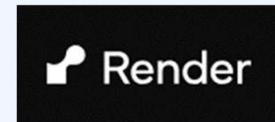
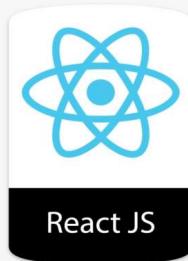
Containerization

- ❖ Docker

Framework

- ❖ NodeJS

- ❖ ReactJS



20/05/2024

Objectives

Intelligent Donor-Driven Inventory System for Essential Items

Data Collection

- ❖ Collected data from Apeksha Hospital

Data Pre-Processing

- ❖ Conversion of Categorical Variables to Numerical format

Implement Prediction Model

- ❖ Implement Machine Learning Model Using "Decision Tree Regression "

```
[2]: import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeRegressor
from sklearn.preprocessing import LabelEncoder

[3]: # Load the dataset
df = pd.read_csv('newdataset.csv')

[4]: # Preprocess the Data
le_ItemName = LabelEncoder()
le_Month = LabelEncoder()
df["ItemName"] = le_ItemName.fit_transform(df["ItemName"])
df["Month"] = le_Month.fit_transform(df["Month"])

[5]: # Define a dictionary to map encoded values to original item names
item_name_mapping = dict(zip(le_ItemName.classes_, le_ItemName.classes_))
month_name_mapping = dict(zip(le_Month.classes_, le_Month.classes_))

[6]: # Define independent variables (features) and the target variable
X = df[['ItemName', 'ItemId', 'ItemCategory', 'UsageHistory', 'Month']]
y = df['RequestedQuantity']

[7]: # Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

[8]: # Initialize Decision Tree Regression model
model = DecisionTreeRegressor(random_state=42)

[9]: # Train the Decision Tree model
model.fit(X_train, y_train)

[10]: DecisionTreeRegressor
DecisionTreeRegressor(random_state=42)

[10]: # Make predictions for all items in the dataset
predictions = model.predict(X)

# Print the predictions for all items
for i in range(len(df)):
    item_name_original = item_name_mapping[df.iat[i][0]] # Map encoded value to original item name

[11]: model.score(X_train, y_train)
[11]: 0.9886072809011376
```

20/05/2024

Developed Solution

Essential Donation Items

Image	Category	Action
	AdultsShirts	Donate
	BathTowels	Donate
	BedCovers	Donate
	Blankets	Donate
	BlueAprons	Donate
	CheckedCloths	Donate
	ChildrenShirts	Donate
	Diapers	Donate

Current Essential Items

Image	Item	Quantity Needed	Action
	VimBottle	10	Donate
	WashingPowder	30	Donate
	TowelRack	3	Donate
	ShoeRack	4	Donate
	PillowCases	30	
	Mettress	100	
	Rexine	40	
	ElectricKettle	30	

Essential Inventory Items List

Image	Item Name	Item Code	Quantity In Stock	Quantity Status	Action	Action
	Diapers	103	115	Good	Edit	Delete
	Jackets	104	124	Good	Edit	Delete
	LargeBedSheet	105	175	Good	Edit	Delete
	BedCovers	100	150	Good	Edit	Delete

Results and Discussion

The screenshot shows a table titled "Predicted Essential Items" with columns for Item Name, Month, Predicted Value, and Priority. The table includes rows for BedCovers, VimBottle, ShoeRack, DrawSheet, FaceMask, Toothpaste, HandSanitizer, BathTowels, Soap, and TowelRack. A search bar and a filter for "Month" are also visible.

Item Name	Month	Predicted Value	Priority
BedCovers	January	30	Low
VimBottle	January	10	Low
ShoeRack	January	4	Low
DrawSheet	January	55	Medium
FaceMask	January	53	Medium
Toothpaste	January	50	Medium
HandSanitizer	January	30	Low
BathTowels	February	200	High
Soap	February	150	High
TowelRack	February	3	Low



Completeness of the Work



- ❖ Identify suitable Machine Learning Algorithm
- ❖ Train Machine Learning Model Using Decision Tree Regression
- ❖ Predict Inventory Requirements
- ❖ Implement Machine Learning Backend Using FastAPI
- ❖ Deploy Machine Learning Model using Render Server
- ❖ Implement Web Application using MERN Stack Technology
- ❖ Component Integration 75% Completed



- ❖ Enhance User Interface
- ❖ Complete component Integration



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Introduction

Critical Medication Priority recommender System

- **Research Problem**

We're addressing medication supply challenges at Apeksha Hospital with a 'Critical Medication Priority Recommender System.' Using machine learning and optimization, we aim to identify crucial medications, predict shortages, optimize procurement, and elevate patient care quality

- **Proposed Solution**

The system uses machine learning to predict shortages, identify critical medications, and optimize recommendations at Apeksha Hospital, improving patient care. It consists of a Shortage Prediction Model and a Critical Medication Identification Model.

Introduction

Critical Medication Priority recommender System

- Main Objective

"Developing an intelligent system for Apeksha Hospital using machine learning to predict shortages, identify critical medications, and optimize their procurement, thus enhancing patient care."

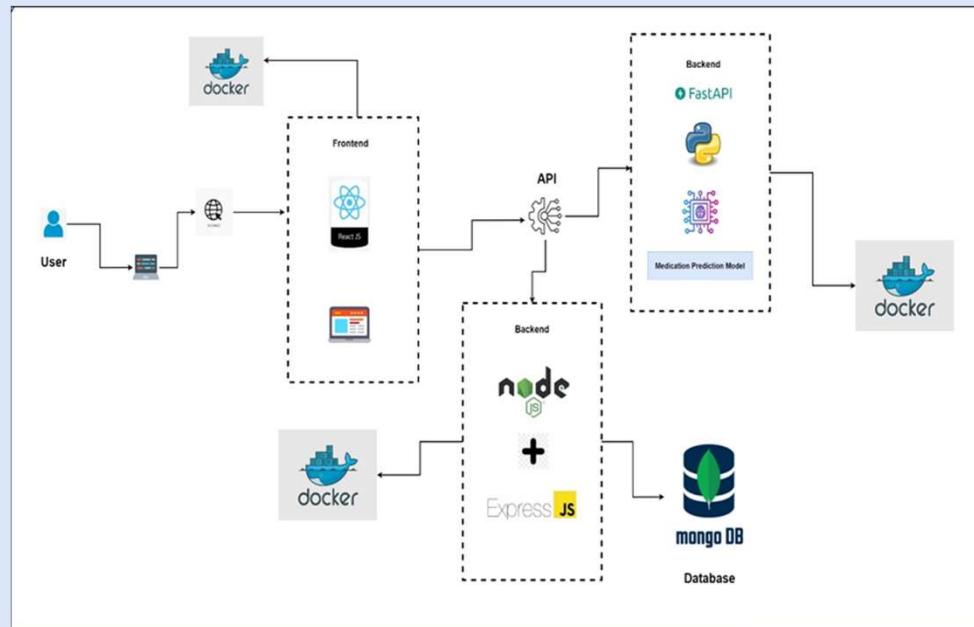
- Specific Objectives

1. Critical Medication Identification Model
2. Medication Shortage Prediction Model
3. Model Integration
4. User-Friendly Interface

Methodology

Critical Medication Priority recommender System

- Component Diagram



Methodology

Critical Medication Priority recommender System

- Tools And Technologies

- Programming Language

- ❖ Python

- Tools

- ❖ Jupyter Notebook
 - ❖ Anaconda Navigator
 - ❖ Scikit Learn
 - ❖ Fast API
 - ❖ Render

- Version Controlling

- ❖ GitHub

- Algorithms

- ❖ Random Forest Classification



Methodology

Critical Medication Priority recommender System

Sub objective 01 - Critical Medication Identification Model

Data Collection

- Collected data from Apeksha Hospital regarding shortaged medications.

Data Pre-Processing

- Conversion of Categorical Variables to Numerical Format
- Date Column Conversion
- Date Feature Extraction

Implement Prediction Model

- Implement Machine Learning Model using "Random Forest Classifier" Algorithm

Random Forest Classifier Accuracy- 86%

```
1 import pandas as pd
2 from sklearn.model_selection import train_test_split
3 from sklearn.ensemble import RandomForestClassifier
4 from sklearn.metrics import accuracy_score
5
6 # Load the dataset
7 data = pd.read_csv("hospital_dataset.csv")
8
9 # Drop rows with missing target values
10 data = data.dropna(subset=['Priority'])
11
12 # Separate features (X) and target (y)
13 X = data.drop(columns=['SR No', 'Item Name', 'Group', 'Priority'])
14 y = data['Priority']
15
16 # Split data into train and test sets
17 X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
18
19 # Train a Random Forest classifier
20 model = RandomForestClassifier()
21 model.fit(X_train, y_train)
22
23 # Make predictions on the test set
24 predictions = model.predict(X_test)
25
26 # Calculate accuracy
27 accuracy = accuracy_score(y_test, predictions)
28
29 # Create a DataFrame with item names and predicted priority values
30 output_df = pd.DataFrame({'Item Name': data.loc[X_test.index, 'Item Name'], 'Predicted Priority': predictions})
31
32 # Display the output and accuracy
33 print("Predicted values:")
34 print(output_df)
35 print("\nAccuracy:", accuracy)
36
37 print("Train set shape:", X_train.shape)
38 print("Test set shape:", X_test.shape)
39
```

```
Accuracy: 0.8604651162790697
Train set shape: (171, 3)
Test set shape: (43, 3)
```

Methodology

Critical Medication Priority recommender System

Random Forest Classifier

Accuracy- 91%

Sub objective 02 - Medication Shortage Prediction Model

Data Collection

- Collected data from Apeksha Hospital.

Data Pre-Processing

- Conversion of Categorical Variables to Numerical format
- Date Column Conversion
- Date Feature Extraction
- Applied feature scaling using the StandardScaler from scikit-learn

Implement Prediction Model

- Implement Machine Learning Model using “Random Forest” Algorithm

```
1 import pandas as pd
2 from sklearn.model_selection import train_test_split
3 from sklearn.preprocessing import StandardScaler, OneHotEncoder
4 from sklearn.compose import ColumnTransformer
5 from sklearn.pipeline import Pipeline
6 from sklearn.ensemble import RandomForestClassifier # Change
7 from sklearn.impute import SimpleImputer
8 from sklearn.metrics import accuracy_score
9
10 # Load the dataset containing all necessary information
11 df = pd.read_csv('medication_shortage.csv')
12
13 # Convert date columns to datetime
14 df['shelf_life'] = pd.to_datetime(df['shelf_life'])
15 df['Admin_Timestamp'] = pd.to_datetime(df['Admin_Timestamp'])
16
17 # Extract date features
18 df['Shelf_Life_Day'] = df['shelf_life'].dt.day
19 df['Shelf_Life_Month'] = df['shelf_life'].dt.month
20 df['Shelf_Life_Year'] = df['shelf_life'].dt.year
21 df['Admin_Day'] = df['Admin_Timestamp'].dt.day
22 df['Admin_Month'] = df['Admin_Timestamp'].dt.month
23 df['Admin_Year'] = df['Admin_Timestamp'].dt.year
24
25 # Drop unnecessary columns
26 df.drop(['shelf_life', 'Admin_Timestamp'], axis=1, inplace=True)
27
28 # Split features and target variable
29 X = df.drop(columns=['shortaged', 'Name', 'ID']) # Exclude non-numeric columns
30 y = df['shortaged']
31
32 # Split data into train and test sets
33 X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
34
35 # Define column transformer to handle numeric and categorical features
36 numeric_features = X.select_dtypes(include=['int64', 'float64']).columns
37 numeric_transformer = Pipeline(steps=[
38     ('imputer', SimpleImputer(strategy='median')),
39     ('scaler', StandardScaler())))
40
41 categorical_features = X.select_dtypes(include=['object']).columns
```

```
Predicted_Shortage_RF
0 1
1 1
2 1
3 1
4 1
...
1207 0
1208 0
1209 1
1210 1
1211 0

[1212 rows x 3 columns]
Random Forest Model Accuracy: 0.9125412541254125
```

20/05/2024

Developed Solution

Critical Medication Priority recommender System

The image displays three screenshots of the LEND A HAND web application, which includes features for managing medication requests and donations.

- Screenshot 1: Urgent Medications**
A table titled "Urgent Medications" showing a list of items with "Place a donation Request" buttons.

Medication Name	Donate
Carbachol Intracocular Sol. 0.01%, Dripper Bott.	Place a donation Request
Celeplatin Inj. 450mg/5ml Vial	Place a donation Request
Carprofen Tromethamine Injection 250mg/ml	Place a donation Request
Cefuroxime Inj. 750mg Vial	Place a donation Request
Cefuroxime Tab. 500mg	Place a donation Request
Nystatin Tab. 500,000U	Place a donation Request
Vancomycin Inj. 500mg Vial	Place a donation Request
- Screenshot 2: Make Donation**
A form titled "Make Donation" for entering donation details.

Item Name	Cefuroxime Inj. 750mg Vial
Quantity	3
User Name	Shankha Prabhu
Email Address	shankakarayawan@gmail.com
Hand Over Date	05/31/2024
Donation Type	MEDICATION

Submit
- Screenshot 3: Staff Dashboard**
A dashboard titled "Staff Dashboard" showing a "Donation Request" section with a table of pending donations.

Item Name	Quantity	Donor Name	Donor Email	Hand Over Date	Donation Type	Change Status	
						Status	Action
Carbachol%20Intracocular%20Sol%200.01%,1ml,%20Dripper,Bott.	1	saharpunchihewa18@gmail.com	saharpunchihewa18@gmail.com	2024-03-27	MEDICATION	Accepted	ACCEPTED
Cefuroxime Tab. 500mg	10	Sahan	saharpunchihewa18@gmail.com	2024-03-27	MEDICATION	Completed	COMPLETED
Cefuroxime Inj. 750mg Vial	23	Sahan	saharpunchihewa18@gmail.com	2024-03-20	MEDICATION	Accepted	ACCEPTED
Vancomycin Inj. 500mg Vial	147	Sahan Punchihewa	sahamilupu18@gmail.com	2024-03-20	MEDICATION	Pending	PENDING
Nystatin Tab. 500,000U	20	Sahan Punchihewa	sahamilupu18@gmail.com	2024-03-27	MEDICATION	Pending	PENDING

Results and Discussion

Critical Medication Priority recommender System

LEND A HAND

Home Contact Us About Us FAQ Dashboard Logged

Predicted Medication Shortages

Filter by Shortage: All Search by Medication Name

Index	Name	Shortage Prediction
1	30mg Tab Atazanavir (as sulphate) Cap 300 mg	not shortage
2	Abacavir Sulfate 60mg +Lamivudine 30mg Tab.	not shortage
3	Abacavir Tab 300mg	not shortage
4	Abciximab IV Infu 10mg/5mL/Vial	not shortage
5	Abiraterone Acetate Tab 250mg	not shortage

Previous Next

Medication Counts

Category	Count
Shortaged	~400
Not Shortaged	~900

LEND A HAND

Home Contact Us About Us FAQ Dashboard Logged

Medication Priority Level

Search Medications Filter by Priority

Medications	Index	Name	Priority
Priority Distribution	1	Benzyl Peroxide Gel 2.5%, 20gTube	Low
	2	Nystatin Tab. 500,000U	High
	3	Captopril Tab. 25mg Losartan	Low
	4	Meropenem Inj. 1g Vial	Low
	5	Cefuroxime Tab. 500mg	Low

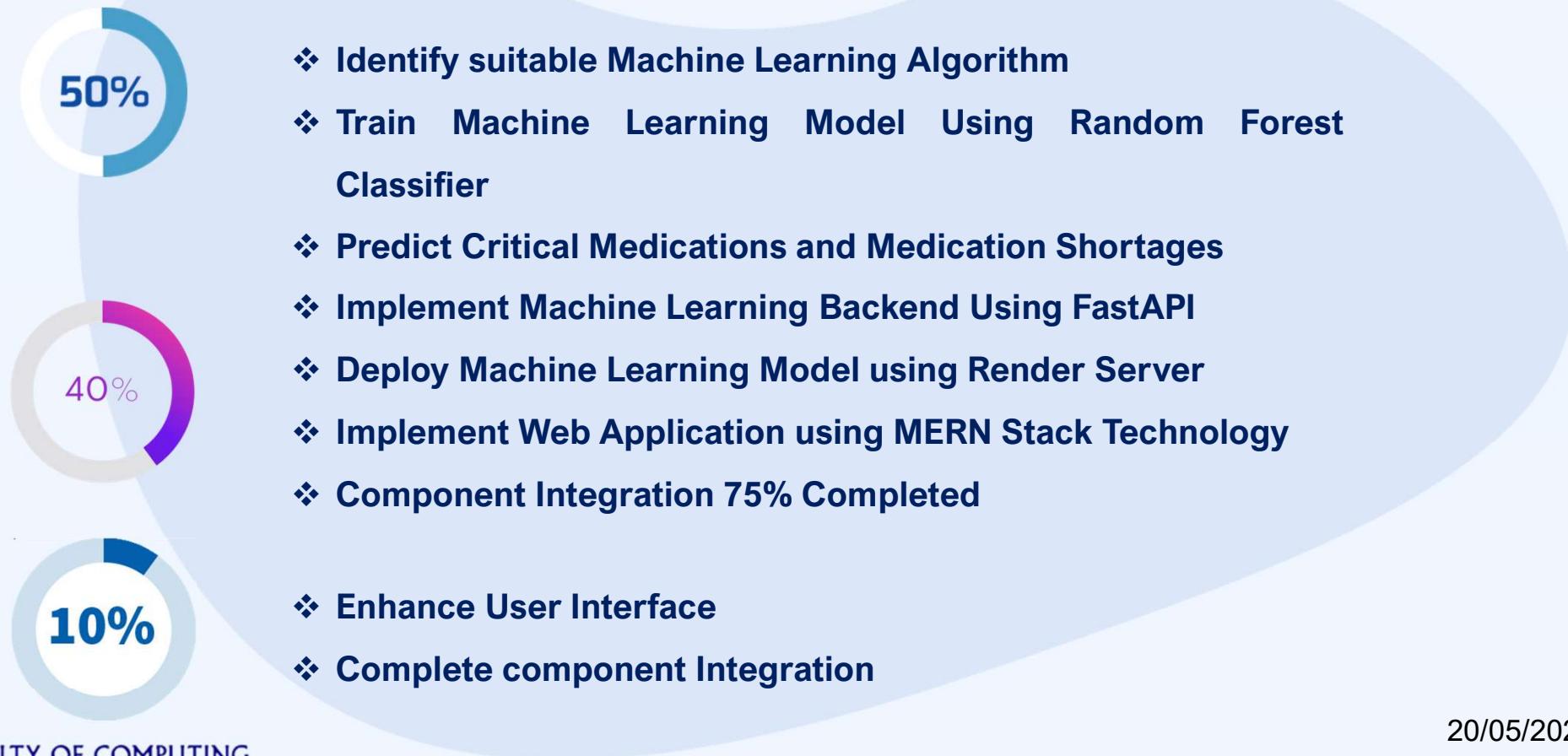
1 2 3 4 5 6 7 8 9

Priority Distribution

Priority	Count
3	~20
5	~22

Completeness of the Work

Critical Medication Priority recommender System



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Introduction

Predictive Analytics for Donation Campaign Success

Apeksha Hospital needs a steady blood supply, but our donation campaigns face challenges like unpredictable donor turnout, food wastage, and high marketing costs.

Research Problem & Solution

- **Problem:**

Apeksha Hospital's blood donation campaigns face challenges due to low donor participation and resource inefficiencies.

- **Solution:**

Using predictive analytics and machine learning, Apeksha Hospital can boost campaign effectiveness by predicting success factors and optimizing resource allocation.

Specific and Sub Objective

- **Main Objective**

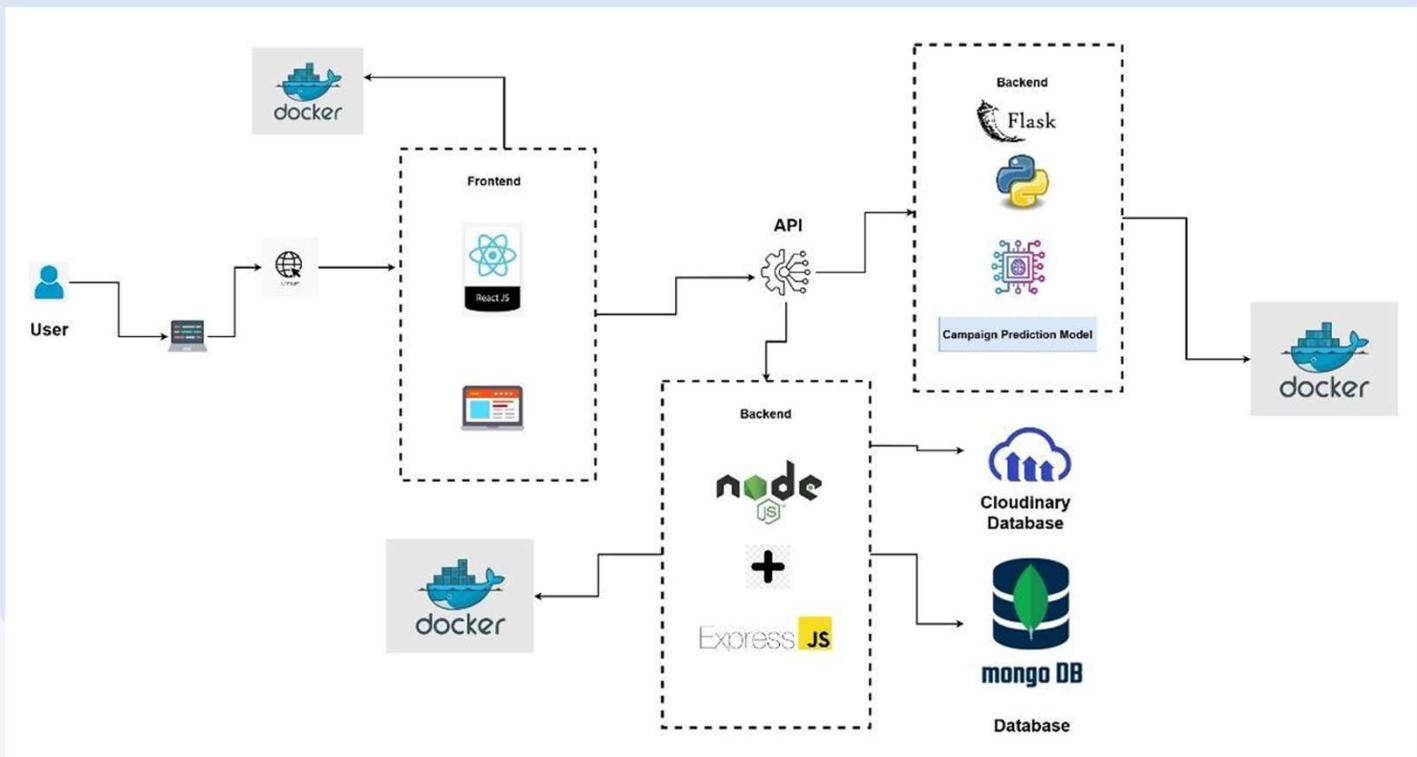
Implement machine learning to enhance the efficiency of blood donation campaigns.

- **Specific Objectives**

- 1.Optimization Algorithms Integration
- 2.Predict People amount
- 3.User-Friendly Interface
- 4.Manage the limited resources

Methodology

Component Diagram



Technologies and Techniques

Programming

Language

- ❖ Python

- ❖ JavaScript

Tools

- ❖ Jupyter Notebook

- ❖ Scikit Learn

- ❖ Anaconda Navigator

- ❖ FlaskAPI

- ❖ Render

Algorithm

- ❖ Random forest Regression

Version Controlling

- ❖ GitHub

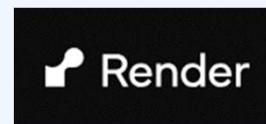
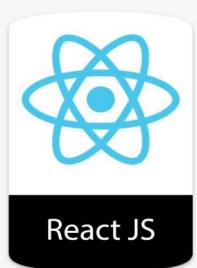
Containerization

- ❖ Docker

Framework

- ❖ NodeJS

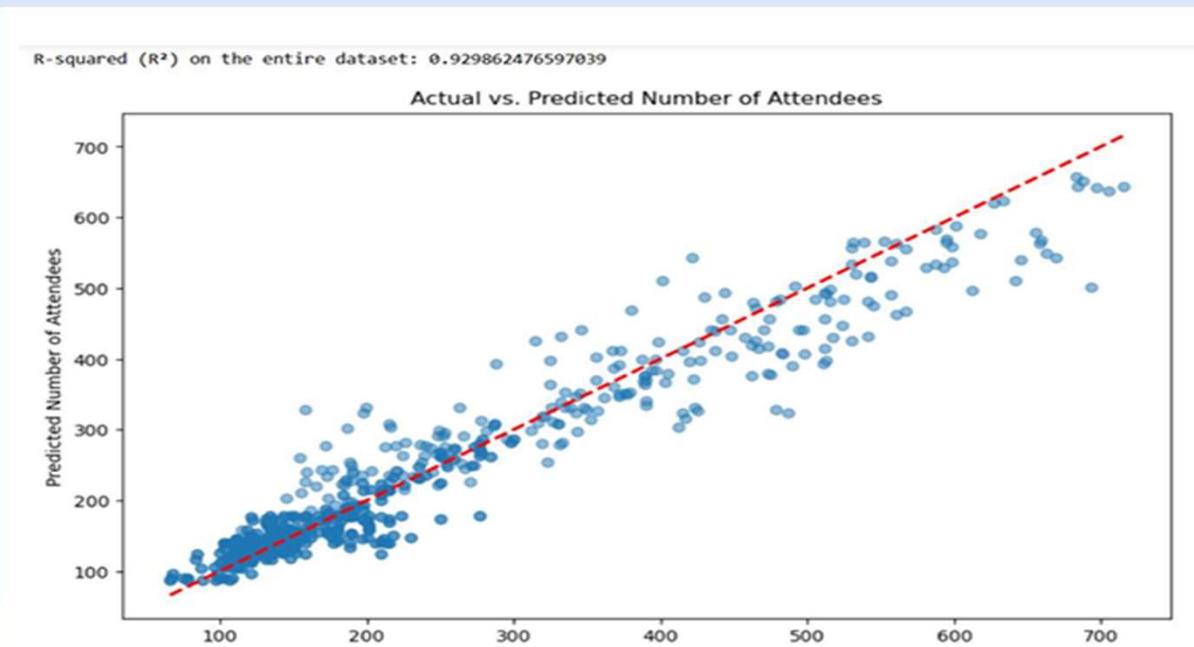
- ❖ ReactJS



20/05/2024

Developed Solution

Successfully trained an accurate **machine learning model**
for Predict next campaign people amount - 92% accuracy



Developed Solution

Manage each donation campaign

 **LEND A HAND**

Home Contact Us About Us FAQ Logout

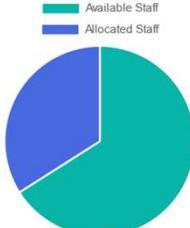
All Blood Donation Camps

Account Status Distribution



Approved
Rejected
Pending

Medical Staff Distribution



Available Staff
Allocated Staff

Medical Items Distribution



Available Items
Allocated Items
Allocated Items: 600

ORGANIZER NAME	MOBILE	EMAIL	PLACE	DATE	PEOPLE AMOUNT	PERMISSION LETTER	STAFF	REQUIRED ITEMS	CAMP STATUS
kamal	071123456	hasitha@gmail.com	Apeksha Hospital	3/20/2024	248		10 Update	250 Update	Pending ▼
shanuka	0712352582	it20662028@my.sliit.lk	Apeksha Hospital	3/20/2024	250		150 Update	0 Update	Rejected 

Results and Discussion

 **LEND A HAND**

Upcoming Blood Camp Events



Place:Apeksha Hospital
Date: 3/19/2024



Place:maharagama temple
Date: 3/28/2024

 **LEND A HAND**

Attendance Prediction

Month:

Day Type:

Predict **Organize Camp** **Refresh**

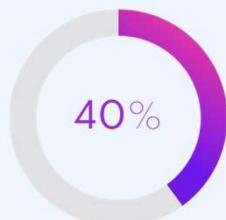
Predicted Number of Attendees
315

Top Blood Donors	
hasitha	Donations: 8
Sahan Punchihewa	Donations: 7
Shanuka Prabodha	Donations: 6

Completeness of the Work



- ❖ Identify suitable Machine Learning Algorithm
- ❖ Train Machine Learning Model Using Random forest Regression
- ❖ Predict the next campaign people amount



- ❖ Implement Machine Learning Backend Using FlaskAPI
- ❖ Deploy Machine Learning Model using Render Server
- ❖ Implement Web Application using MERN Stack Technology
- ❖ Component Integration 75% Completed

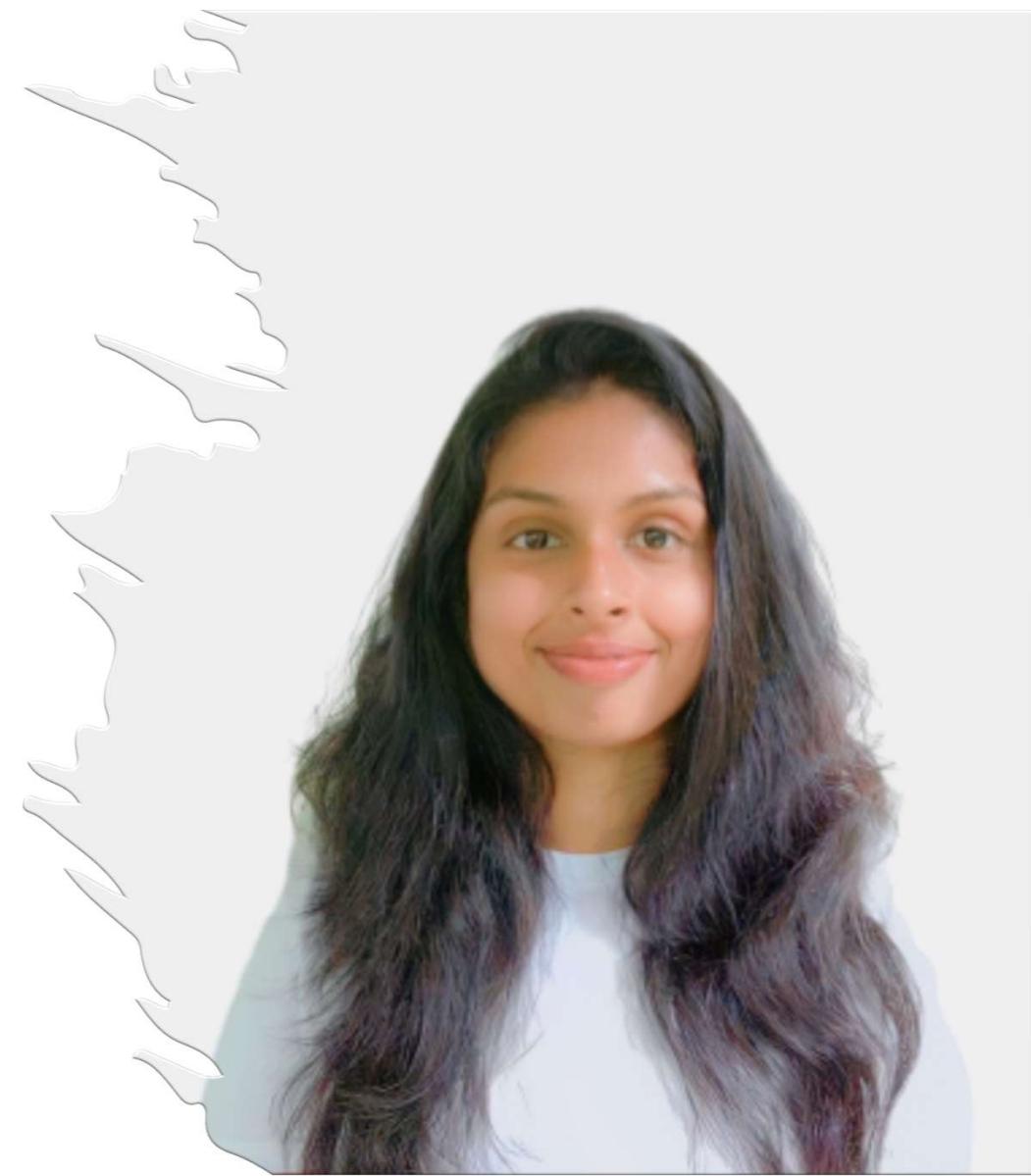


- ❖ Enhance User Interface
- ❖ Complete component Integration

IT20660352

Wijesooriya P.L.P.G.D.S

Bachelor of Science (Hons) in Information Technology
Specializing in Software Engineering



Introduction

Apeksha hospital-based hair donation process currently has no specific method. Applying to build the system to obtain hair from hair donors according to the standards recommended by the hospital and to eliminate the distance between the hospital and the donor. Using CNN Architecture in image processing.

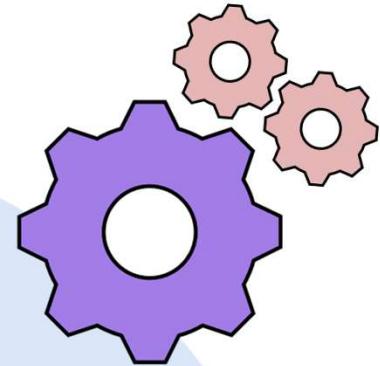
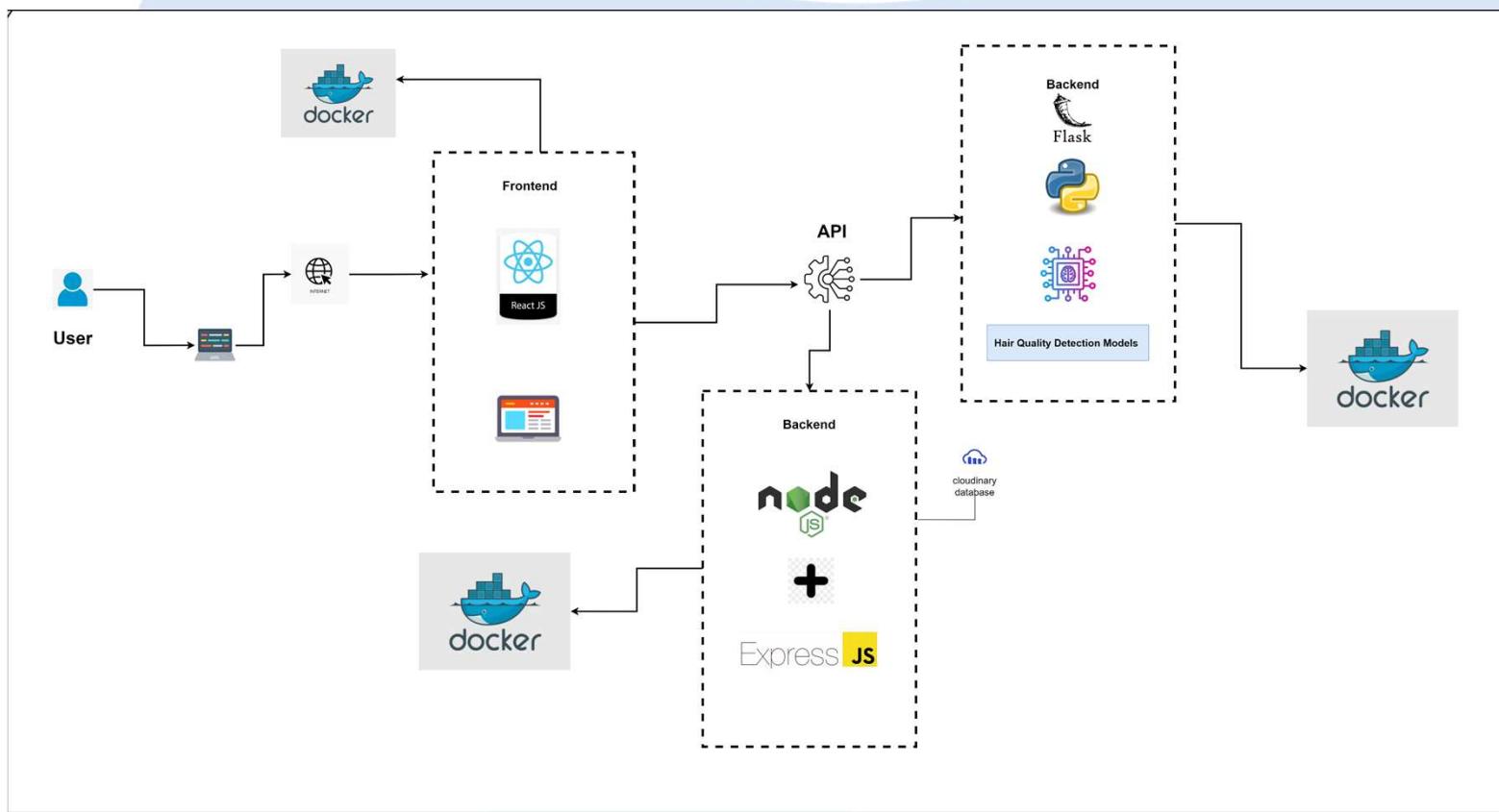


Research Problem

How to determine whether hair donated by hair donors meets the standards and qualities of hair recommended by the Apeksha hospital?



Methodology



Technologies and Techniques

Programming

Language

- ❖ Python

- ❖ JavaScript

Tools

- ❖ Jupyter Notebook

- ❖ Anaconda Navigator

- ❖ FlaskAPI

- ❖ Render

Architecture

- ❖ Convolutional Neural Networks (CNN)



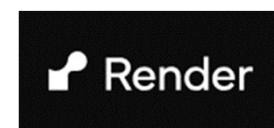
Version Controlling

- ❖ GitHub



Containerization

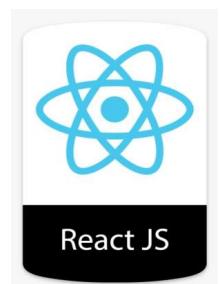
- ❖ Docker



Framework

- ❖ NodeJS

- ❖ ReactJS

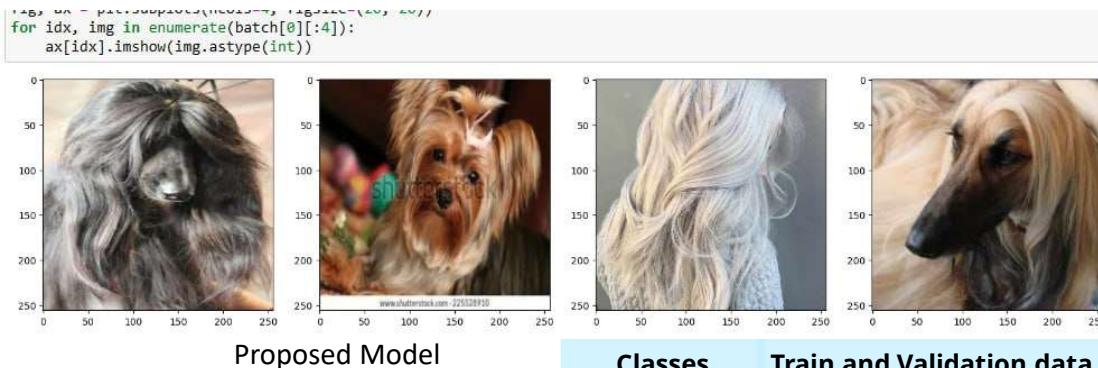


20/05/2024

01. Model for the Hair identification

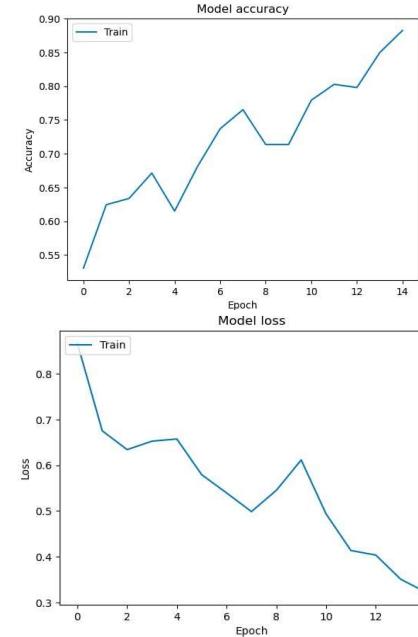
The donor will confirm whether the images uploaded to the system are related to a hair or not. It was found that **MobileNetV2** is the best architecture to implement in image processing.

- To implement this model the data was collected through [istockphoto](#) data collection.



Classes	Train and Validation data
Hair	Train - 460 Validation - 110
Others	Train - 440 Validation - 108

Data Collection



Accuracy: 0.9560

Loss: 0.0453

Best
Architecture

MobileNetV2

02. Model for the Hair Color Detection

According to the hair donation rules of Apeksha Hospital, currently they only receive black hair. Other colors hair is not accepted. This system uses a model to identify the color of the donor's hair. Only black color hair can be donated here.

- To implement this model the data was collected through [istockphoto](#) data set.

```
In [5]: data = tf.keras.utils.image_dataset_from_directory('C:/Users/Ridma/Downloads/newimages')
Found 989 files belonging to 2 classes.

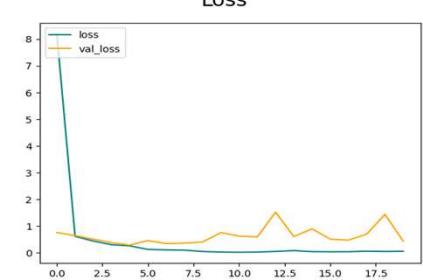
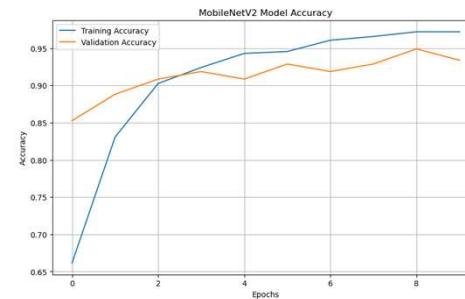
In [6]: data_iterator = data.as_numpy_iterator()

In [7]: batch = data_iterator.next()

In [8]: fig, ax = plt.subplots(ncols=4, figsize=(20,20))
for idx, img in enumerate(batch[0][4:]):
    ax[idx].imshow(img.astype(int))
    ax[idx].title.set_text(batch[1][idx])
```



Proposed Model



Loss: 0.0576

Accuracy: 0.9785

Classes	Train and Validation data
Black Hair	Train - 480 Validation - 100
Other colours Hair	Train - 450 Validation - 105



Data Collection

Best
Architecture

MobileNetV2

03. Model for the hair Bleached Detection

It verifies whether the hair images uploaded by the donor are bleached or not.

- To implement this model the data was collected through a [Kaggle](#) data set.



Best
Architecture

```
fig, ax = plt.subplots(ncols=4, figsize=(20, 20))
for idx, img in enumerate(batch[0][4:]):
    ax[idx].imshow(img.astype(int))
```

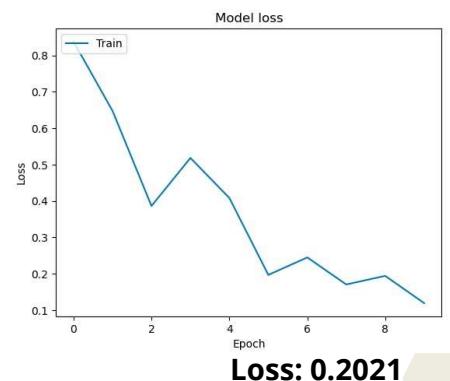
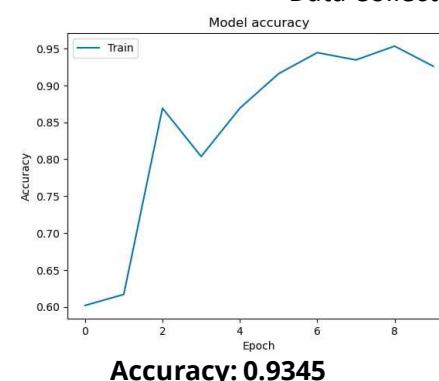


Accuracy: 0.9345

Loss: 0.2021

Classes	Train, Validation and Test data
bleached Hair	Train - 150 Validation - 37
Not bleached Hair	Train - 430 Validation - 76

Data Collection



04. Model for the hair Dryness Detection

The hair images uploaded by the donor will confirm whether the hair is dry or not.

How
We can
Detect
Hair
Quality

- To implement this model the data was collected through a [Kaggle](#) data set.

```
: fig, ax = plt.subplots(ncols=4, figsize=(20, 20))
for idx, img in enumerate(batch[0][4]):
    ax[idx].imshow(img.astype(int))
```



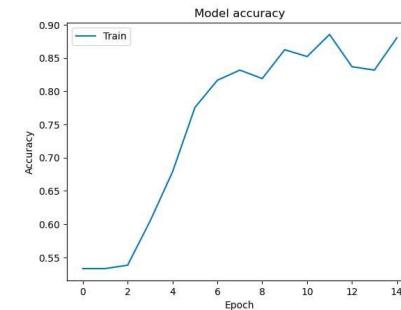
Proposed Model

Accuracy: 0.8856

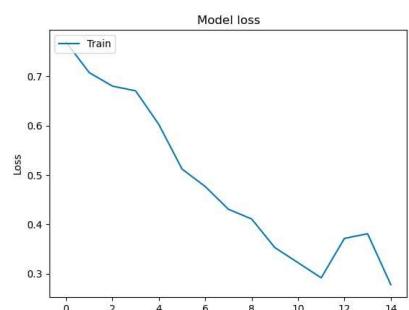
Loss: 0.2002

Classes	Train, Validation and Test data
Dry Hair	Train - 468 Validation - 67
Wet Hair	Train - 130 Validation - 36

Data Collection



Accuracy: 0.8856



Loss: 0.2002

Best
Architecture

05. Model for the Dandruff & Lice Detection

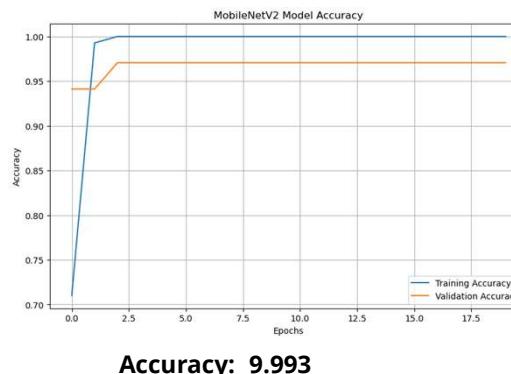
As per hair donation rules at Apeksha Hospital, they require clean, healthy hair free from dandruff and lice infestation. This system checks whether the donor's hair is healthy and free from dandruff and lice.

- To implement this model the data was collected through [istockphoto](#) data set.

```
n [12]: data_iterator = data.as_numpy_iterator()  
n [13]: batch = data_iterator.next()  
n [14]: fig, ax = plt.subplots(ncols=4, figsize=(20,20))  
for idx, img in enumerate(batch[0][4]):  
    ax[idx].imshow(img.astype(int))  
    ax[idx].title.set_text(batch[1][idx])
```



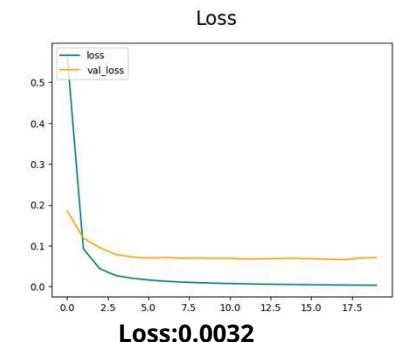
Proposed Model



Accuracy: 9.993

Classes	Train, Validation and Test data
Lice & Dandruff	Train - 160 Validation - 48
Hair	Train - 150 Validation - 40

Data Collection

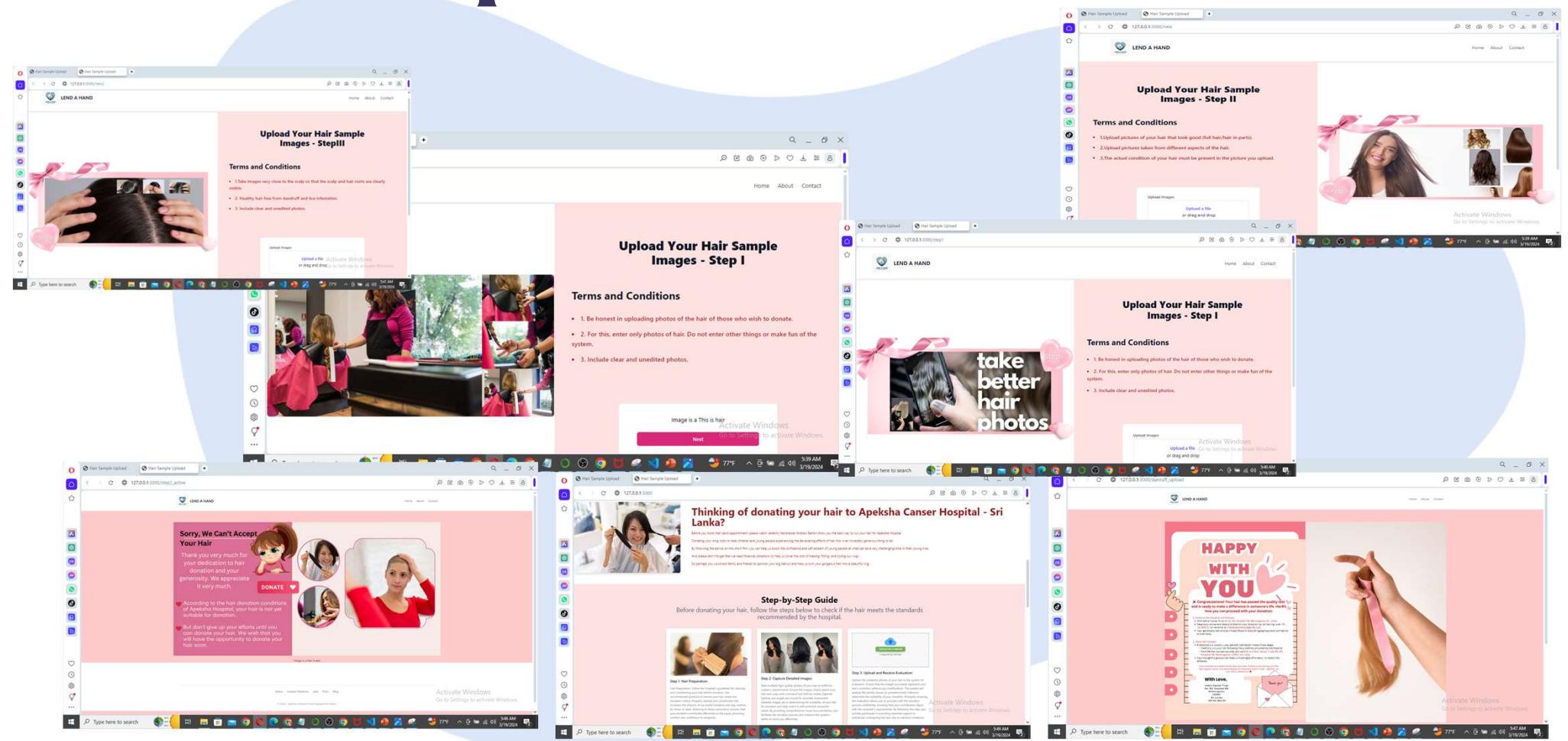


Loss:0.0032

Best
Architecture

MobileNetV2

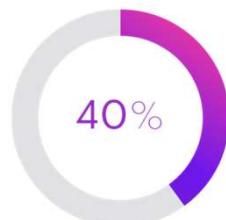
Completeness of the Work



Completeness of the Work



- ❖ Data Collection
- ❖ Identify suitable Deep Learning Algorithm-CNN
- ❖ Train Deep learning Models Using CNN Architectures



- ❖ Implement Deep Learning Backend Using FlaskAPI
- ❖ Combine All models to implement the final model
- ❖ Implement Web Application using MERN Stack Technology
- ❖ Component Integration 75% Completed



- ❖ Enhance User Interface
- ❖ Deploy Deep Learning Models using Render Server
- ❖ Complete component Integration

2023-24-100

Thank you for your attention

