TRAVEL BUDDY

SMART TRAVEL RECOMMENDATION AND TOURISM SUPPORT MOBILE BASED SYSTEM

Project ID : 2023-308

SLIIT
FACULTY OF COMPUTING

SUPERVISION PERSONALITIES

Supervisor :

Mrs. Thamali Dassanayaka

Lecturer

Faculty of Computing | Information Technology

Co-Supervisor:

Dr. Samantha Rajapaksha

Head | Department of Information Technology

SLIIT FACULTY OF COMPUTING

PROJECT INTRODUCTION

The Smart Travel Recommendation and Tourism Support Mobile-Based System offers personalized travel suggestions and tourist assistance through a mobile app. Using cutting-edge technologies like natural language processing, machine learning, image processing, emotion analysis, and facial recognition, the system tailors recommendations according to user preferences, location, and emotional state.

Content

1 Research Problem

2 Main Objective

3 System Architecture Diagram

4 Individual Components

Research Problem

1. Absence of a comprehensive mobile platform capable of offering local information, recommendations, support and guidance for tourists.

2. Tourist frequently struggle to find best acceptable locations and services according their preferences because of communication barriers.

3. No efficient system to analyze user emotions and provide for suggestions and tips for travelers.

4. There is no such a system that can provide information about locations by allowing the system to recognize them and helping tourists to explore new places in an efficient way.

Main Objective

The main outcome of the Smart Travel Recommendation and Tourism Support Mobile-Based System is to provide tourists with personalized and real-time recommendations, location discovery, tourist assistance, emotional analysis, and support services to enhance their travel experience in Sri Lanka.

Sub Objective

Tourist Assistant

Offer a tourist assistant for guided tours with emergency support, location information, and accurate responses to tourist questions.

Location Detection

Enhance the tourist experience by delivering real-time, personalized information and improving recommendation accuracy and effectiveness.

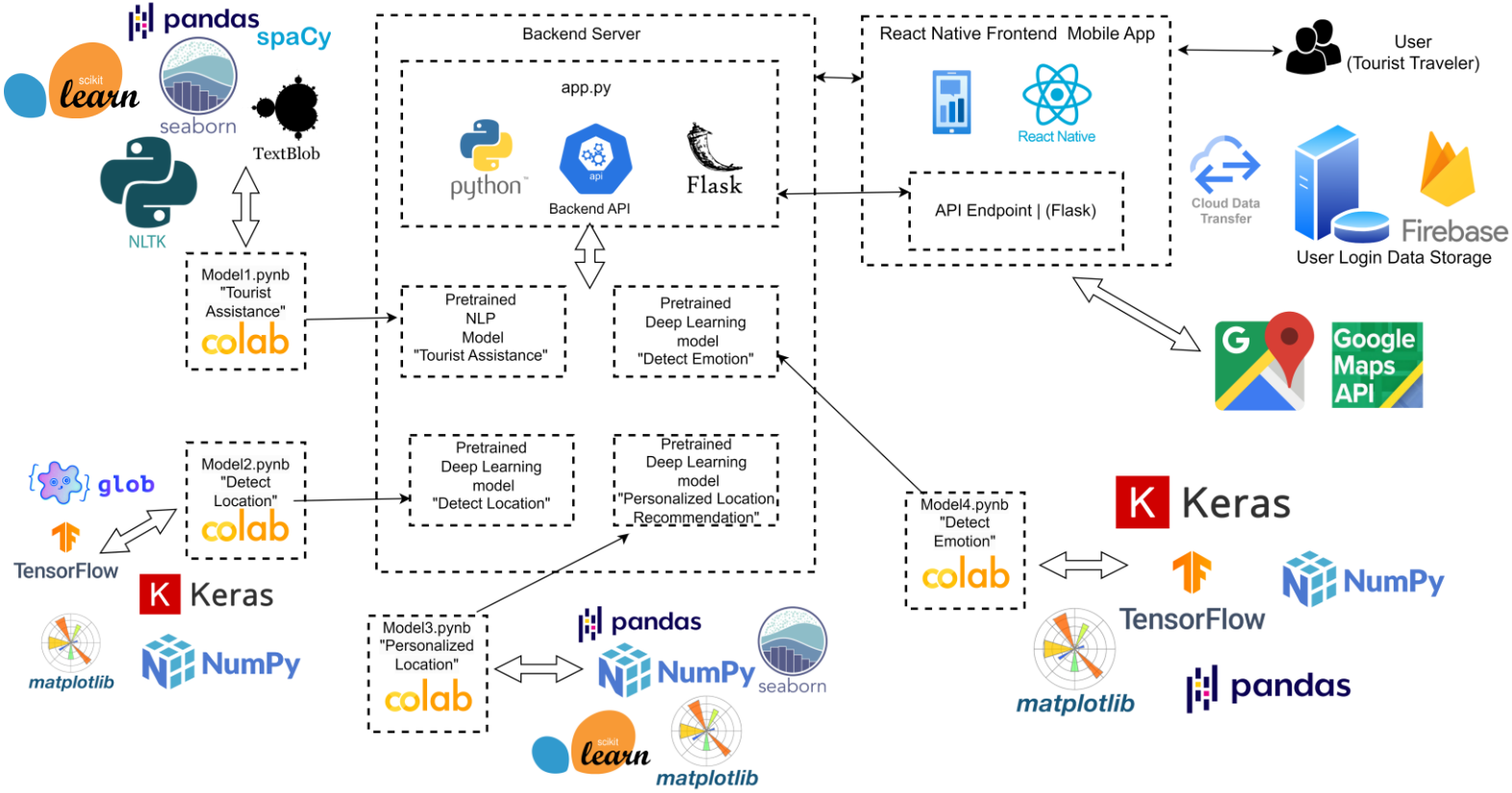
Location & Service Recommendation

Provide information about locations by allowing the system to recognize them and helping to explore new places and information in an efficient way.

Emotion Detection

Accuratly identifiy the emotions of the user and suggest Activities according to their emotional state

System Architecture Diagram



Commercialization

Commercialization

1. **Introduce to Tourism Agency**
2. **Introduce to Foreign Travel Vloggers**
3. **Introduce to the Sri Lanka Tourism Development Authority**
4. **Promote through Social Media**
5. **Publish on Play Store**
6. **Make a Subscription Plan**

   Free Two Days trial period for the new users

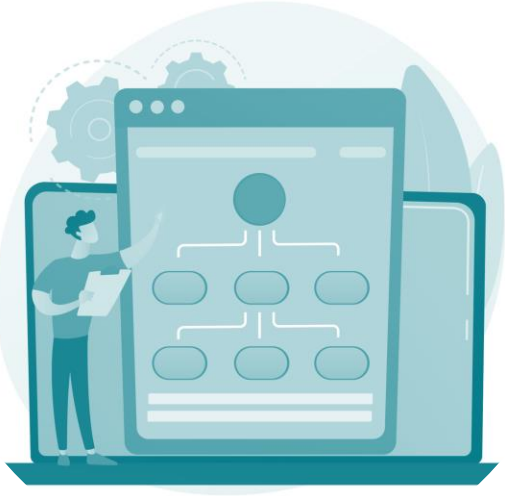
   After the trial period $3.99 per month

Finalized Logo

Budget Plan

Resource Type	Cost Per unit	Units	**Total Cost (1$=324.92)**
Travel & Accommodation			30,000.00
Internet			50,000.00
Cloud Services			
Server	$11 (Per Month)	12 months	48,048.00
Database	$8.5 (Per Month)	12 months	37,128.00
Domain	$11.5 (Per Year)		5,000.00
Total in Rs.			**170,166.00**

Individual Components



IT20029968 | Athukorala Y.J

Specializing in Information Technology

Developing a tourist assistant chatbot that uses NLP algorithms to assist tourists in their travels.

Provide a tourist assistant to guide the tour with,

- Emergency support contact information,
- Best travel location information,
- Local food information,
- Provide answers to other tourist's frequently asked questions

Research Question

- Many tourist travelers face problems in getting reliable and accurate information and helpful tips during their travels.
- Because of limited knowledge of the local language for tourists, it difficult for them to communicate with locals and get information and knowledge about Sri Lanka or travelling guide.
- Guidebooks or online travel websites, may not provide relevant information to travel in Sri Lanka for tourists.
- Most of Local tourist guides behave like scammers
- Lack of knowledge about emergency contact information, best hidden travel location information, local foods, local transportation and travel tips.

My Objectives

1. Gather information by asking tourists and other resources. Creating questions and relevant answers based on collected the data and information.

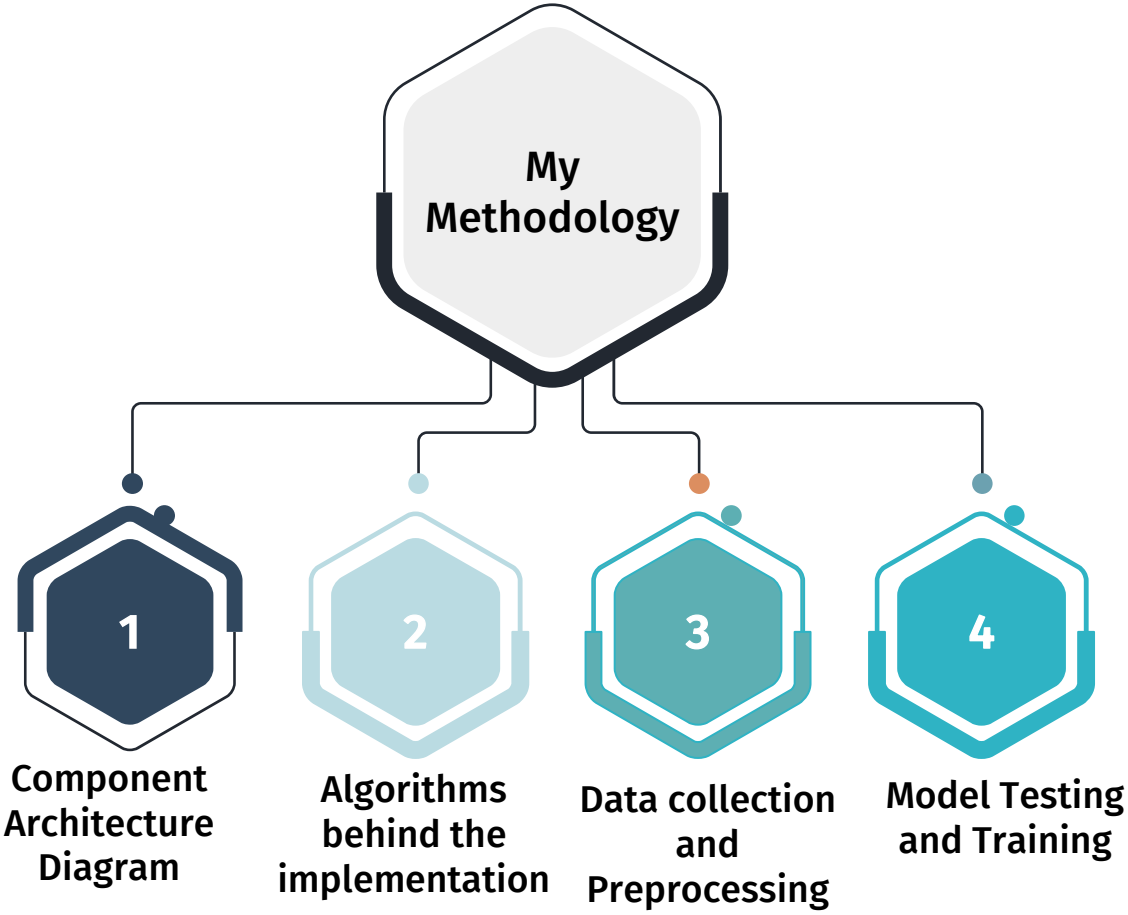
- Interviewing with Tourists
- Internet Resources
- Youtube Tourist Travel Vloggers

2. Preprocessing of the questions and answers dataset

- Creating question and answers according to collected data and information
- Handling missing values by filling them with "null_value.“
- tokenization, stop word removal, and TF-IDF vectorization.

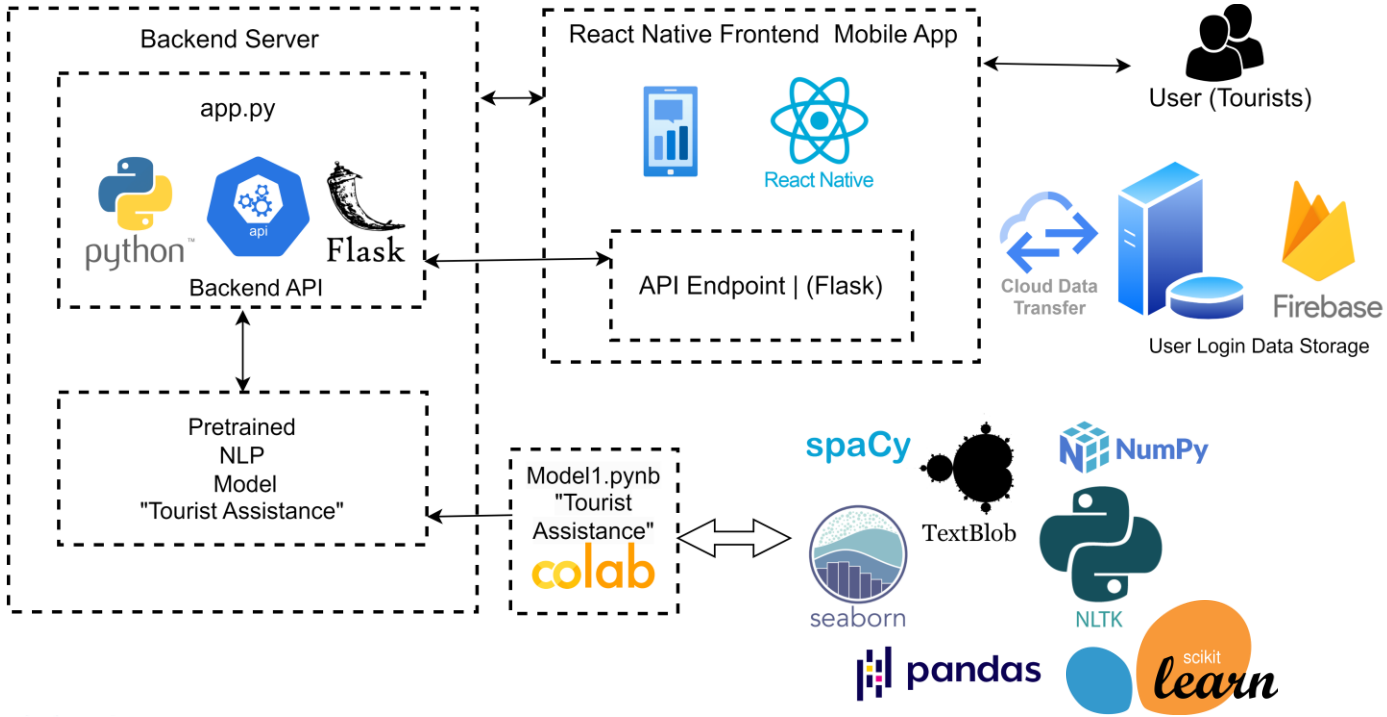
3. Create necessary Model file and Train and Test the Model

4. Deploy NLP model using Flask API and implement the model through the Flask API into Android App.


My Methodology
1
Component Architecture Diagram
2
Algorithms behind the implementation
3
Data collection and Preprocessing
4
Model Testing and Training

METHODOLOGY

Component Architecture Diagram



Algorithms behind the implementation

Multinomial Naive Bayes classifier → **Why???**

- lightweight model and efficient algorithm for text classification tasks, especially when dealing with a large number of features.
- Works well for tasks where the features are discrete, like word counts in a text document.
- Naive Bayes models are also known for their speed and can perform well with limited computational resources

Data collection and Preprocessing

Data Collection

- Gather location, food, culture, tourist scams and emergency contact information
- Youtube Tourist Travel Vlog Videos and Other Internet Resources
- Interviewing Tourists

Data Collection and Preprocessing

Data Preprocessing

- Handling missing values by filling them with "null_value.“
- Use NLTK (Tokenization, stop word removal)
- Use Scikit-learn (sklearn) (TF-IDF, Count Vectorization)

NLTK

TextBlob

pandas

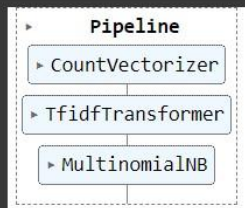
scikit learn

spaCy

Why I use Pipeline?

- organizing and simplifying complex workflows
- reducing the risk of data leakage and improving reproducibility

```
[ ]  text_clf = Pipeline([
     ...      ('vect', CountVectorizer(analyzer="word", stop_words="english")),
     ...      ('tfidf', TfidfTransformer(use_idf=True)),
     ...      ('clf', MultinomialNB(alpha=.01)),
     ... ])

     text_clf.fit(X_train['Question'].to_list(), list(y_train))
```



Model Training and Testing

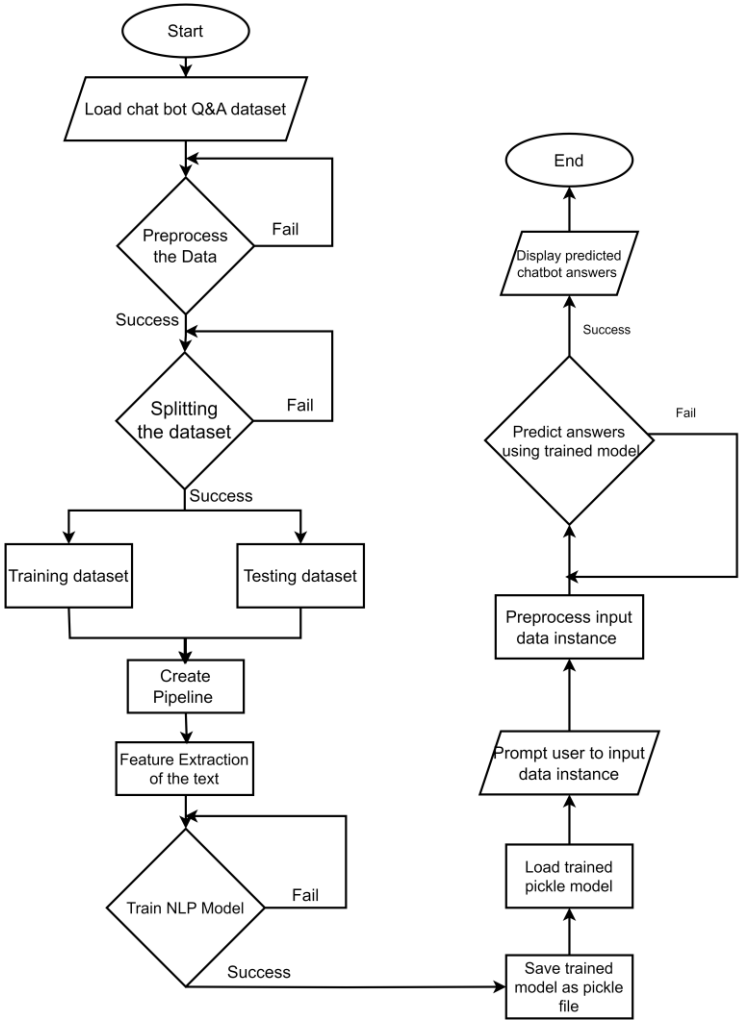
Data Preparation:
Split data into training and testing sets using train_test_split, with a test size of 25%.

Model Building:
Create a text classification model using a scikit-learn Pipeline.

Model Training:
Train the text classification model using the training data (75% of dataset)

Model Testing:
Make predictions on the test data (X_TEST) using the trained model (text_clf.predict(X_TEST)).

Model Serialization:
Save the trained model to a file named "chatbot.dat" using pickle.dump



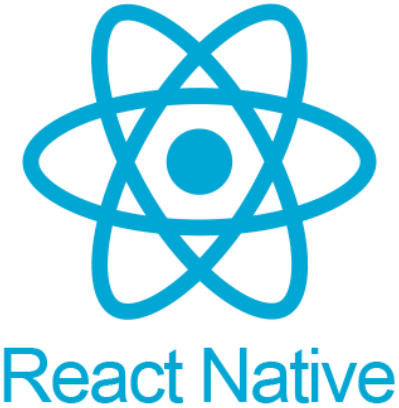
Backend & Frontend Technology Stack

Backend API

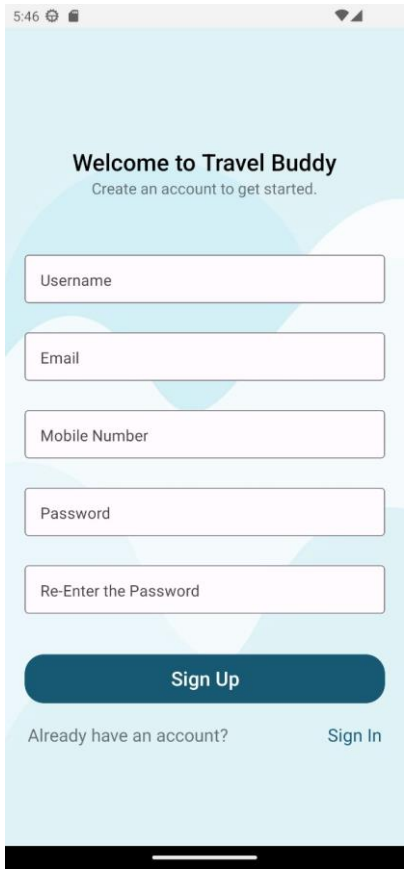
- Python
- Flask

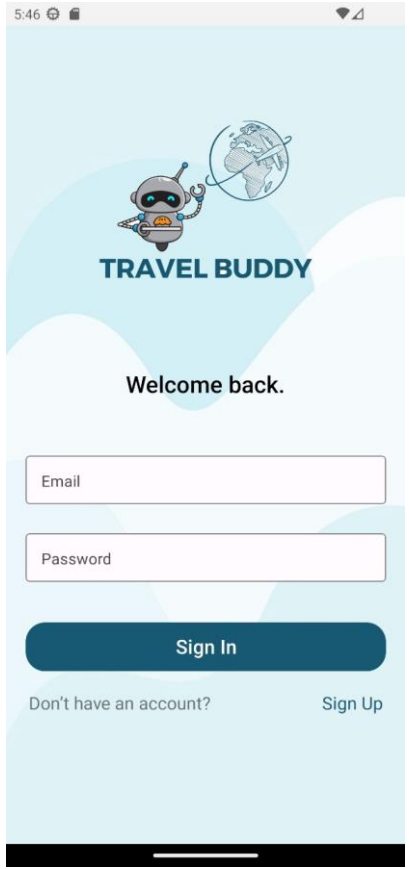
Frontend Mobile App

- React Native
- Firebase



Results and Achievements





Results and Achievements

- In the model training, increase accuracy 0.65 → 0.758 → 0.965
- 65.5%(PP1) → 75.6 %(PP2) → 96.5%

```
# Make predictions
X_TEST = X_test['Question'].to_list()
y_pred = model.predict(X_TEST)

# Calculate accuracy
accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:", accuracy)

Accuracy: 0.6551724137931034
```

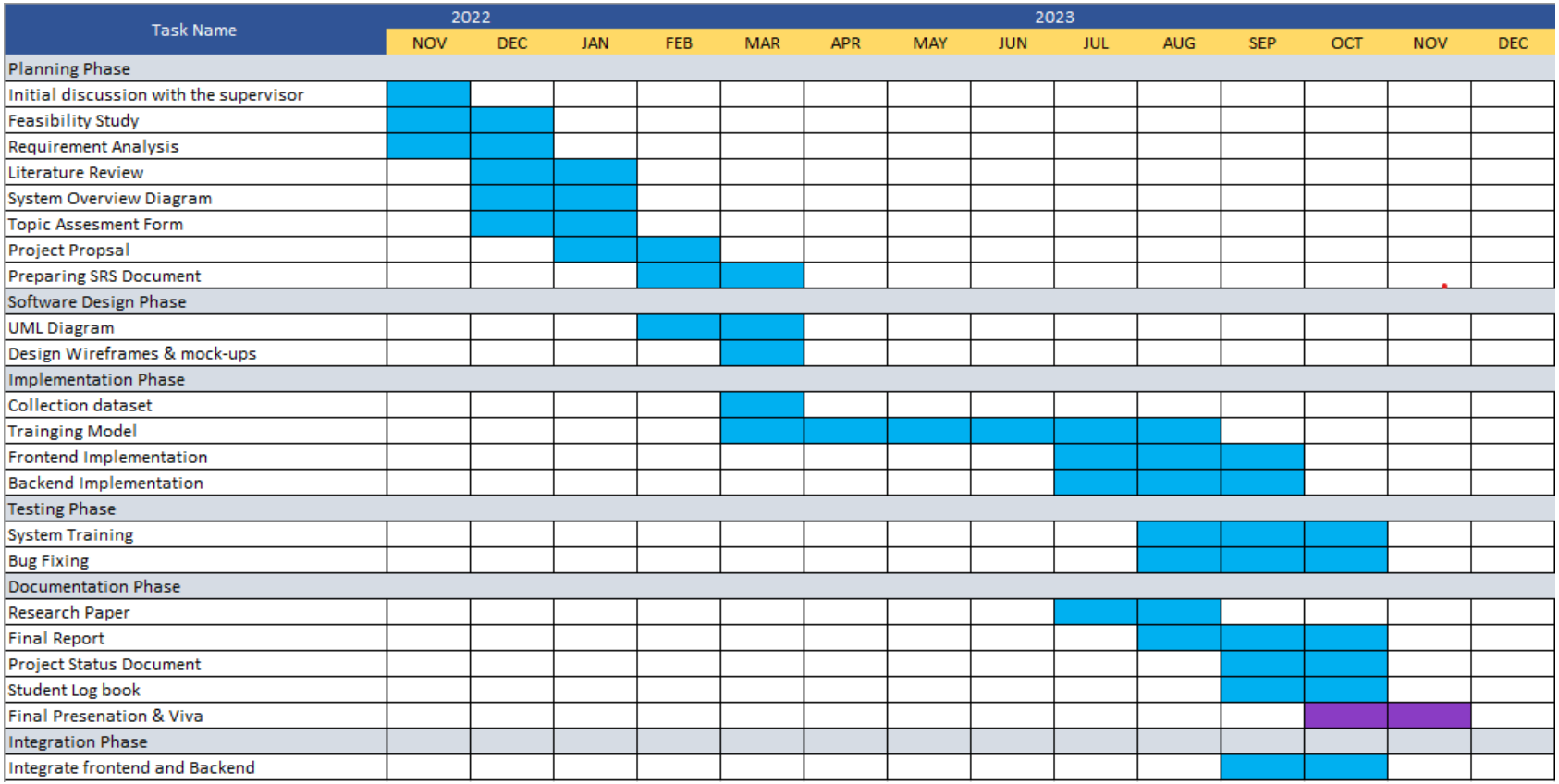
```
# Load the trained model
with open('chatbot.dat', 'rb') as f:
    model = pickle.load(f)


# Make predictions
X_TEST = X_test['Question'].to_list()
y_pred = model.predict(X_TEST)

# Calculate accuracy
accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:", accuracy)

Accuracy: 0.7586206896551724
```

```
from sklearn.metrics import accuracy_score
import numpy as np


# Data preprocessing
df = df.fillna("null_value")
X = df.drop('Answers', axis=1)
y = df['Answers']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.25, random_state=42)


# Load the trained model
with open('chatbot.dat', 'rb') as f:
    model = pickle.load(f)


# Make predictions
X_TEST = X_test['Question'].to_list()
y_pred = model.predict(X_TEST)

# Calculate accuracy
accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:", accuracy)

Accuracy: 0.9655172413793104
```

Results and Achievements

- Identify the user questions and gives answers using Pretrained NLP Model
- If Model didn’t know the answers for user’s questions, in that situation, Web scraping (Open AI) give answers for that questions.

Gantt Chart



Task Name	2022		2023											
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Planning Phase														
Initial discussion with the supervisor														
Feasibility Study														
Requirement Analysis														
Literature Review														
System Overview Diagram														
Topic Assesment Form														
Project Propsal														
Preparing SRS Document														
Software Design Phase														
UML Diagram														
Design Wireframes & mock-ups														
Implementation Phase														
Collection dataset														
Trainging Model														
Frontend Implementation														
Backend Implementation														
Testing Phase														
System Training														
Bug Fixing														
Documentation Phase														
Research Paper														
Final Report														
Project Status Document														
Student Log book														
Final Presenation & Viva														
Integration Phase														
Integrate frontend and Backend														

REFERENCES

[1] S. L. T. D. Authority, "Sri Lanka Tourism Development Authority," [Online]. Available: https://www.sltda.gov.lk/.

[2] K.K.D.N. Dilshan, C.A.J.P. Chandranath, U.M.D.M. Parussella, Samantha Thelijjagoda, H.M.C.J. Herath and Thilini Jayalath, "JESSY: An Intelligence Travel Assistant," 2021.

[3] Chen, W., Cheng, M. and Huang, Y., "Personalized Tourism Attraction Recommendation Using Natural Language Processing and Machine Learning," no. 2019, 2019.

[4] Zhang, X., Cao and J., " Chatbot technology in tourism services: A study of voice and text-based systems," 2018.

[5] Jiang, S., Wu, B., Li and H., "Tourist chatbot: An AI-based tool for improving tourist," Journal of Travel Research, 2019.

[6] Sthapit, E., Basnet, C. R., Singh and R., "Developing a chatbot using natural language processing to assist tourists in Nepal," Journal of Tourism and Hospitality Management, 2020.

[7] Haddara, M., Hamed and S., "Enhancing the accuracy of tourist information retrieval by natural language processing," Journal of Hospitality and Tourism Technology, 2018.

[8] S. A. Kaumalee Bogahawatte, "Intelligent Criminal Identification System," p. 06, 2013.

[9] C. S. S. Isuru Jayaweera, "Crime Analytics: Analysis of Crimes Through," p. 06. [10] M. K. R. S. O. Christian Sunday Nwankwo, "APPLICATION OF DATA ANALYTICS TECHNIQUES IN ANALYZING," p. 08, 2018.

[10] Karl Rock (New Zealand) Catfishing Scammers in Sri Lanka: https://www.youtube.com/watch?v=TJY-vcYczjc

Demonstration

IT20051020 | SHAMINDA W.G.T.

B.Sc.(Hons) in Information Technology Specializing in Information Technology

Developing a system that recognize historical places, monuments, tourist attractive places, destinations through smart phone camera and provide relevant details about them. In current situations of Sri Lanka, this system will replace as tourist guide service and very easy to handle

Research Question

- There are many apps to identify many objects. But in tourism industry there are no accurate app to identify places, tourism attractive places.
- The assistance of a guide is essential when a foreigner wants to know more about places in Sri Lanka.
- Another problem facing foreign tourists is the lack of tour guides due to the economic crisis in Sri Lanka.
- Difficulty in providing guidance to all tourists visiting Sri Lanka is a problem for tour guides
- Is the tourist guide school 100% true? Can they be trusted?
- For these reasons, the location/places identification system shows the need.

Specifics And Sub Objectives

Specific Objective

Detect Places, and analysis them using machine learning and image processing

Sub Objective

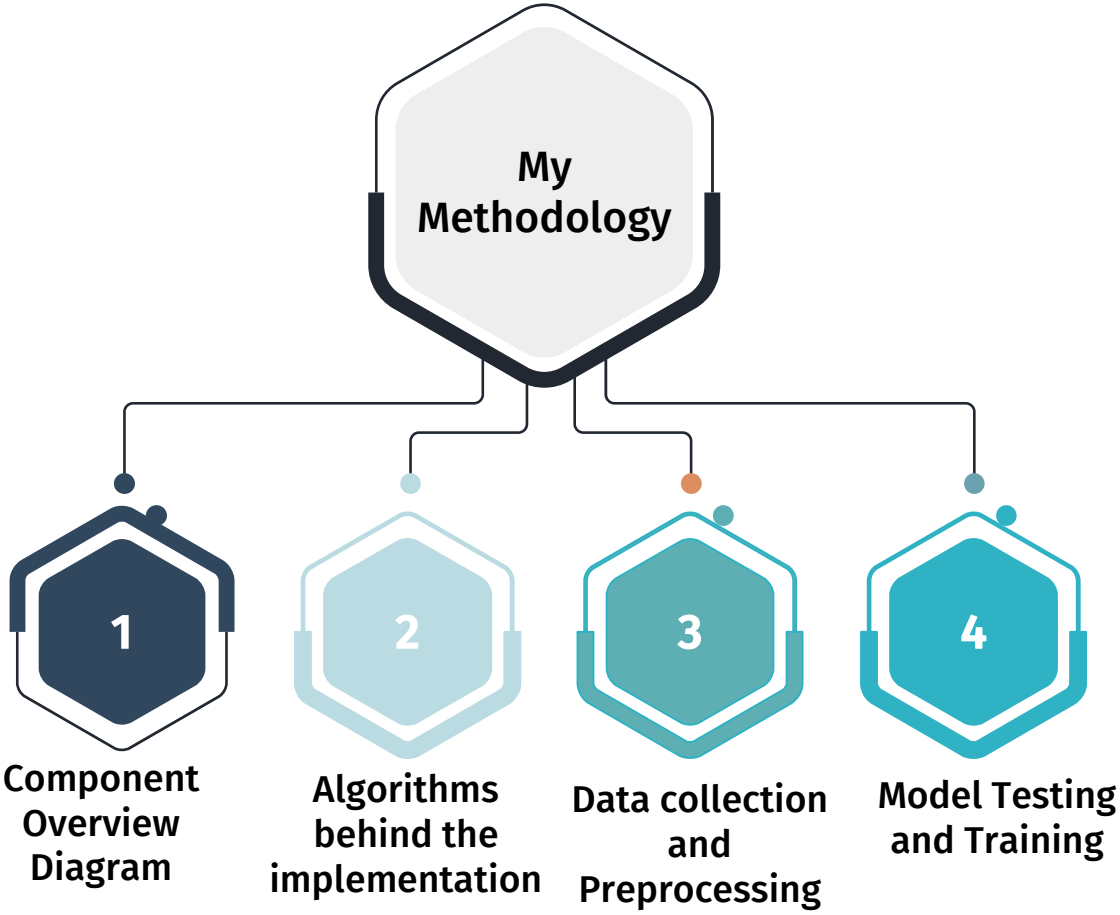
- Collecting data sets
- Creating data sets into normalized form
- Taking photos and videos
- Identifying places
- Add relevant details to places
- Create a ML model to identify place will commit a places/locations based on get discovered datasets
- Identifying the best algorithm for place/ detection.
- Fine tuning and testing of analyzing model to increase accuracy of the results.

Methodology

- Collect data about the historical places, monuments, and tourist destinations that the system will recognize. This can include images, video, and text descriptions. You can gather this information from various sources, such as government websites, travel blogs, and tourist guides.

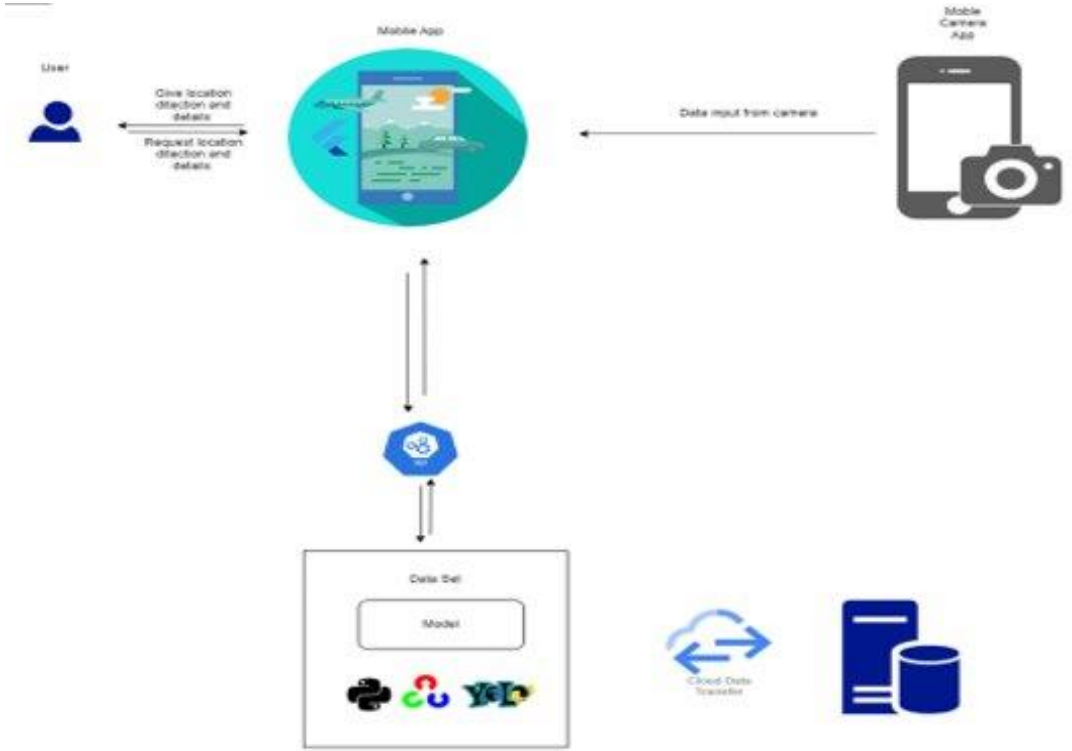
- Once collected the data, need to train the system to recognize the historical places, monuments, and tourist destinations. This involves using machine learning algorithms to identify patterns and features in the images and other data. Use existing machine learning frameworks, such as TensorFlow or Keras, to train the system.

- After developed the app, need to test it thoroughly to ensure that it works as intended.


My Methodology
1
2
3
4
Component Overview Diagram
Algorithms behind the implementation
Data collection and Preprocessing
Model Testing and Training

METHODOLOGY

Component Overview Diagram



METHODOLOGY

•Collect data about the historical places, monuments, and tourist destinations that the system will recognize. This can include images, video, and text descriptions. You can gather this information from various sources, such as government websites, travel blogs, and tourist guides.

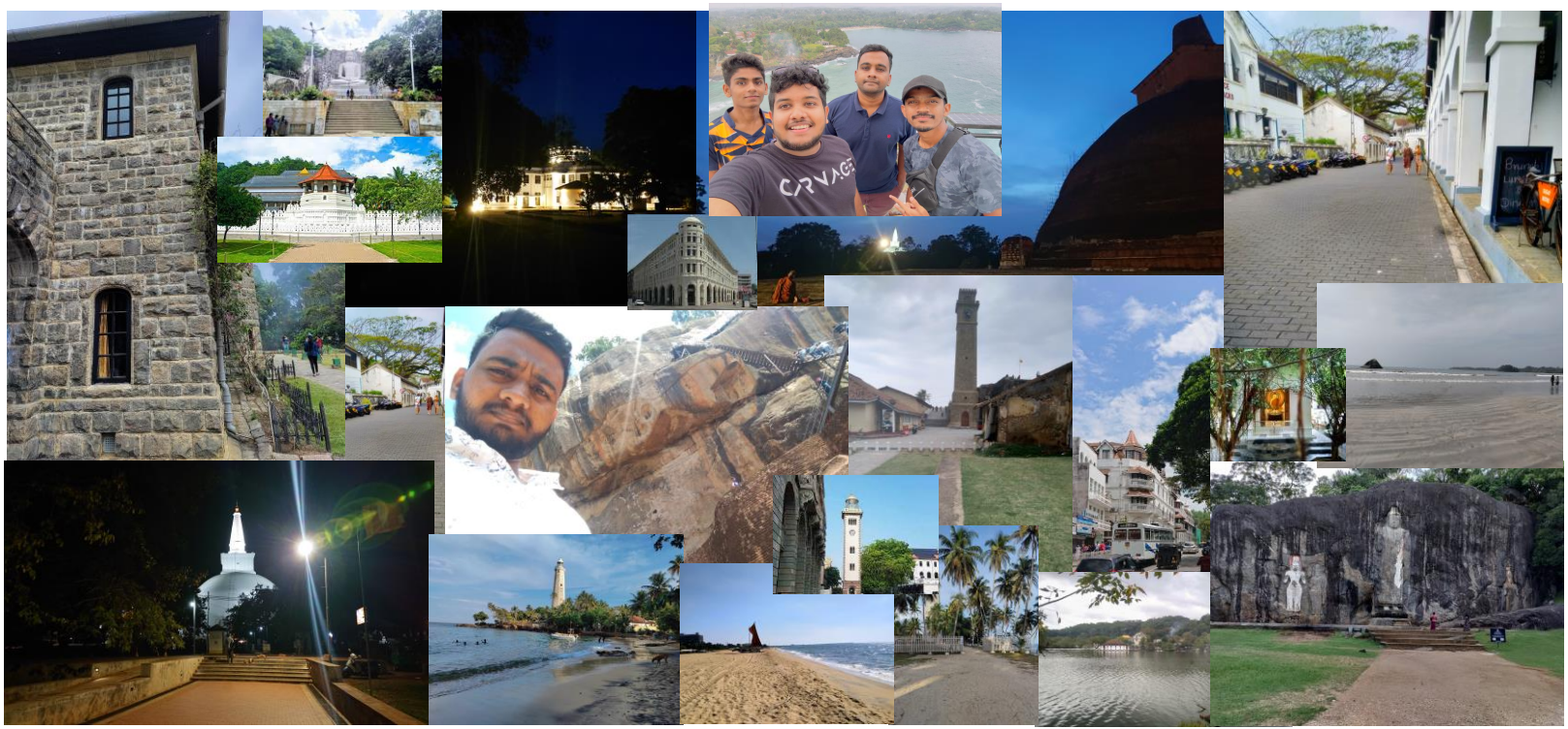
Once collected the data, need to train the system to recognize the historical places, monuments, and tourist destinations. This involves using machine learning algorithms to identify patterns and features in the images and other data. Use existing machine learning frameworks, such as TensorFlow or Keras, to train the system.

After developed the app, need to test it thoroughly to ensure that it works as intended.

Algorithms behind the implementation

1. **Loading Pre-trained Model:** *Loads a pre-trained ResNet-50 model with weights from ImageNet and freezes its layers for transfer learning.*
2. **Model Architecture:** *Creates a custom classification model by adding a Flatten layer and a Dense layer on top of the ResNet-50 base.*
3. **Model Compilation***: Compiles the custom model with a categorical cross-entropy loss function, the Adam optimizer, and accuracy as the evaluation metric.*
4. **Data Augmentation:** *Applies data augmentation techniques to the training dataset, enhancing the model's ability to generalize from limited data*
5. **Data Generators:** *Sets up data generators for training and validation datasets using ImageDataGenerator.*
6. **Training:** *Trains the model on the training dataset for 50 epochs, using the specified data generators.*
7. **Saving the Model:** *Saves the trained model to a file named 'place_model.h5'.*
8. **Making Predictions***: Loads the saved model and uses it to predict the class of input images.*

Data collection and Preprocessing



Data collection and Preprocessing

```
from tensorflow.keras.preprocessing.image import ImageDataGenerator

train_datagen = ImageDataGenerator(rescale = 1./255,
                                   shear_range = 0.2,
                                   zoom_range = 0.2,
                                   horizontal_flip = True)

test_datagen = ImageDataGenerator(rescale = 1./255)
```

Data Collection:

•**Data Sources**: Collect images of tourist places from reliable sources.

•**Data Size**: Gather a sufficient amount of data for better model performance.

•**Data Quality**: Ensure images are high-quality, clear, and free from noise or artifacts.

•**Labeling**: Organize images in folders, each representing a specific tourist place, to label the data effectively.

•**Data Balance**: Strive for a balanced dataset with roughly equal examples for each class.

•**Data Split**: Divide data into training, validation, and test sets, e.g., 70% for training, 15% for validation, and 15% for testing.

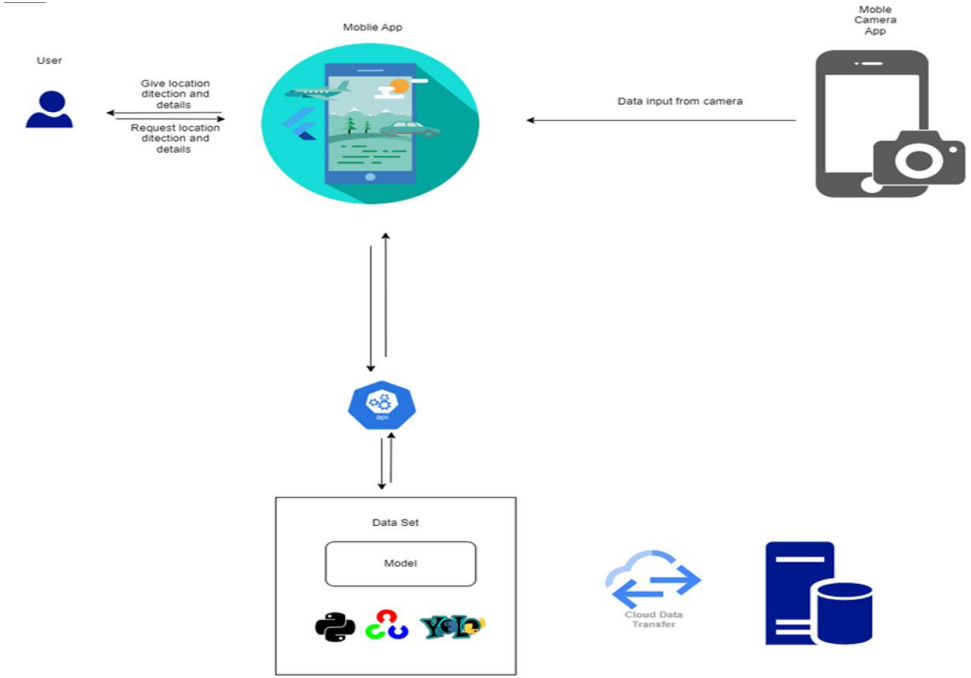
Data Preprocessing:

- **Resizing**: Ensure all images are the same size (e.g., 224x224 pixels) to meet model input requirements.
- **Normalization**: Scale pixel values to a consistent range, typically [0, 1] or [-1, 1], for uniformity.
- **Data Augmentation**: Apply techniques like rotations, flips, and zooms to diversify the training dataset and improve generalization.
- **Label Encoding**: Convert class labels into numerical format, such as one-hot encoding for categorical labels.
- **Data Generators**: Use generators to process and load data in batches, which is memory-efficient and suitable for large datasets.
- **Handling Imbalanced Data**: Address class imbalance by oversampling minority classes or using class weights during training.
- **Data Verification**: Visually inspect a few preprocessed samples to ensure resizing, normalization, and labeling are correct.
- **Data Augmentation Validation**: Check augmented images to ensure they remain representative of the original class.
- **Data Cleaning**: Remove corrupted or irrelevant images to maintain dataset quality.
- **Data Split Validation**: Confirm that the dataset split into training, validation, and test sets is properly balanced and representative.
- **Data Storage**: Organize preprocessed data systematically, like creating folders for each class with processed images.

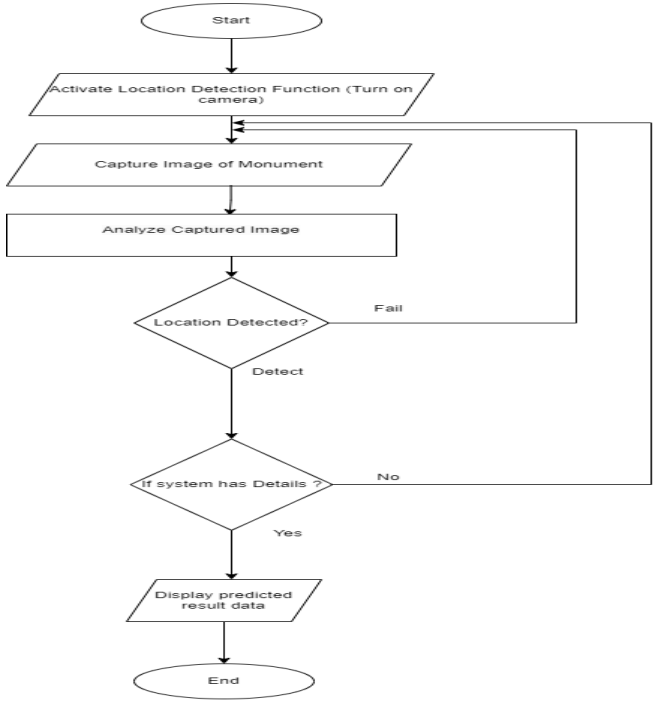
Backend & Frontend Technology Stack

- React Native
- Firebase
- Flask
- Python
- TensorFlow
- Pandas

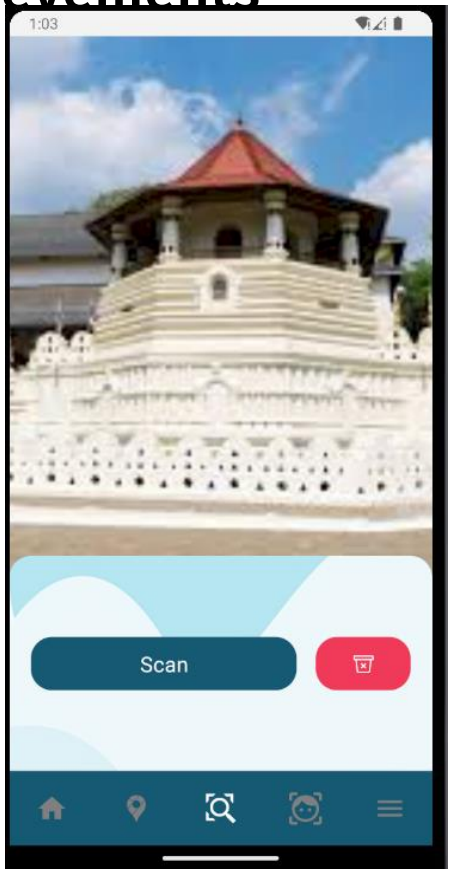
System Architecture Diagram

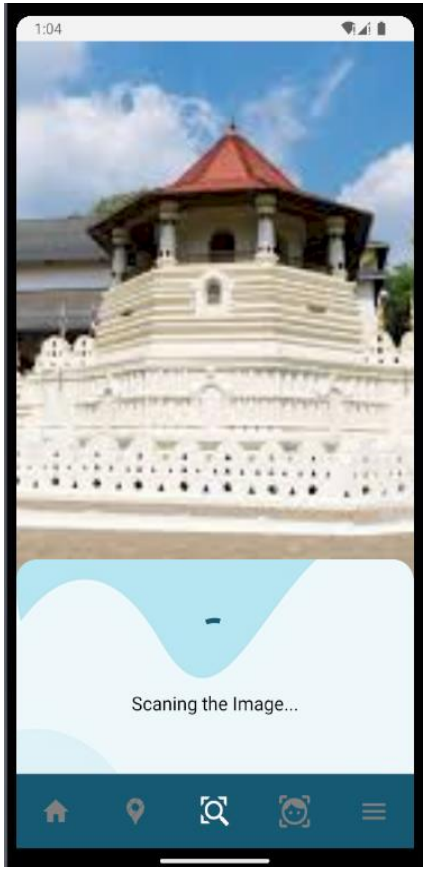


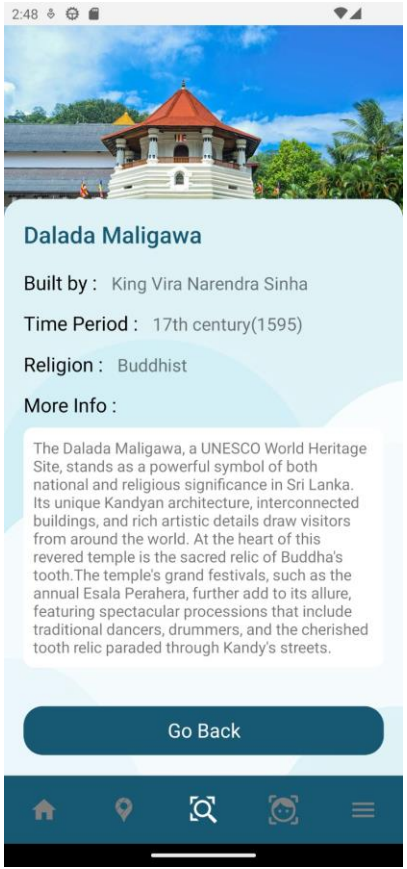
Flow Chart



Results and Achievements

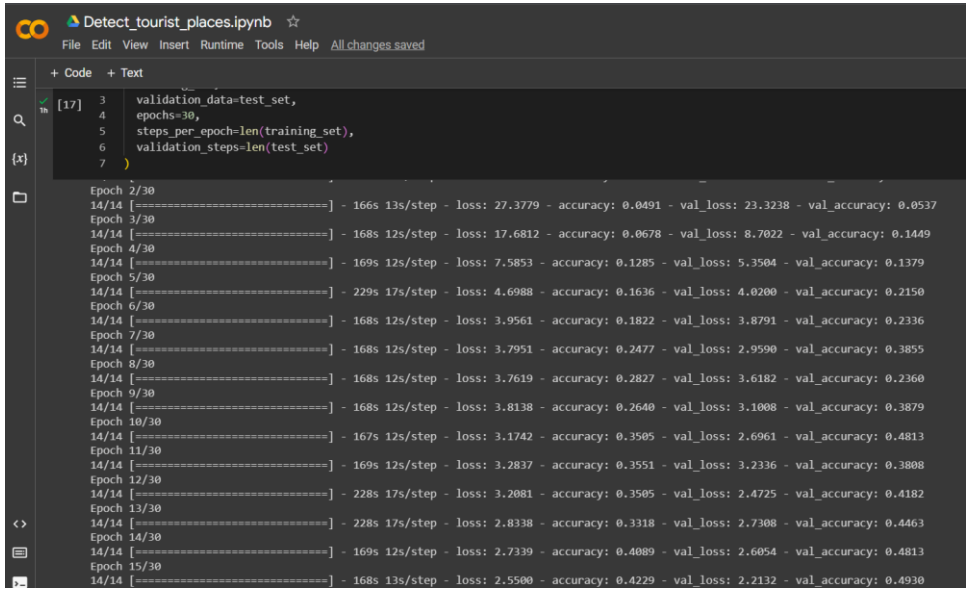




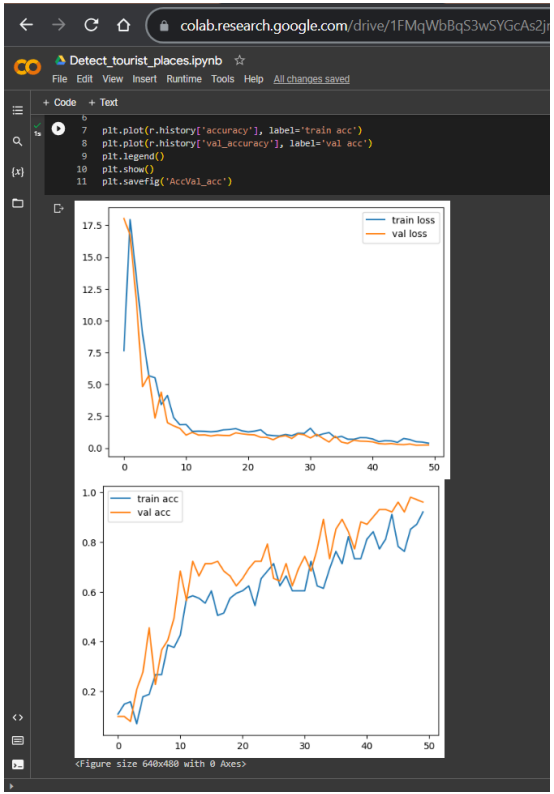


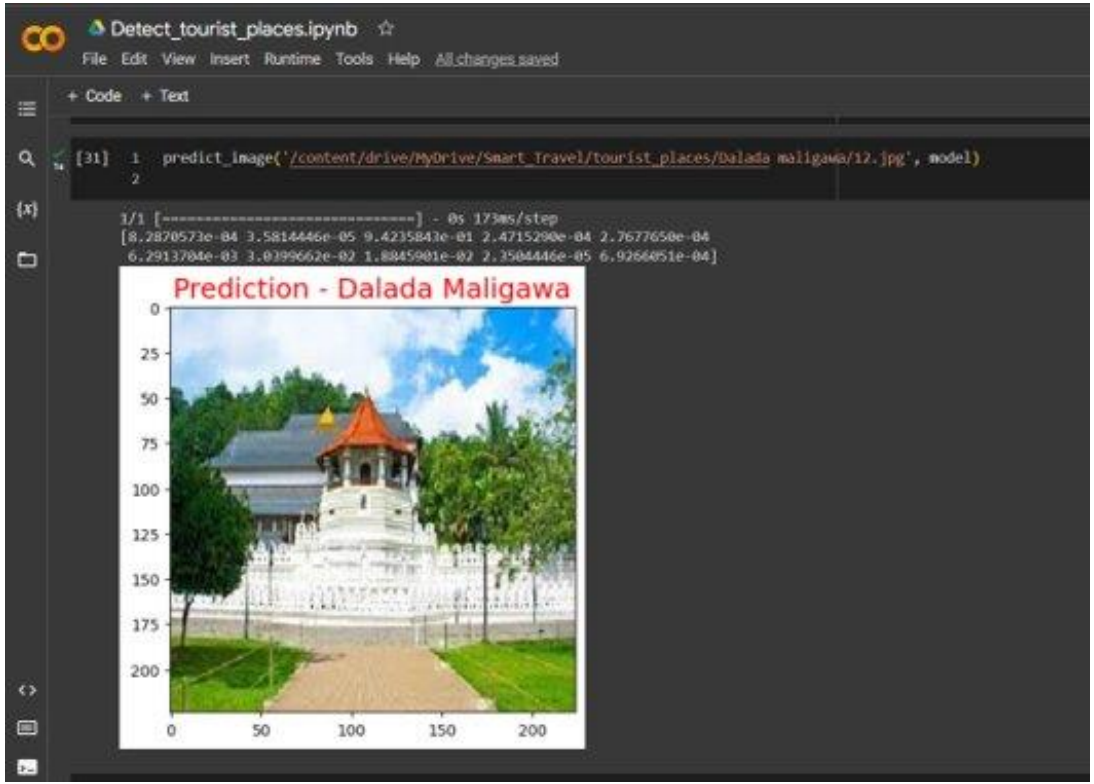
Results and Achievements

```
LOG  Upload Response: Dalada maligawa
LOG  Upload Response1: The initial construction dates back to the 16th century, with subsequent renovations and expansi
ons taking place in the 17th and 18th centuries.
LOG  Upload Response3: King Vimaladharmasuriya I, King Wimaladharmasuriya II, and King Narendrasinha
LOG  Upload Response2: Dalada Maligawa, also known as the Temple of the Sacred Tooth Relic, is not only a prominent rel
igious site but also a significant symbol of Sri Lanka's historical and cultural identity. Its architecture reflects the
 amalgamation of diverse cultural influences, showcasing the rich heritage of the region. The temple's conservation effo
rts and its role in fostering unity among different communities further underscore its broader importance in the country
's social and cultural fabric.
```

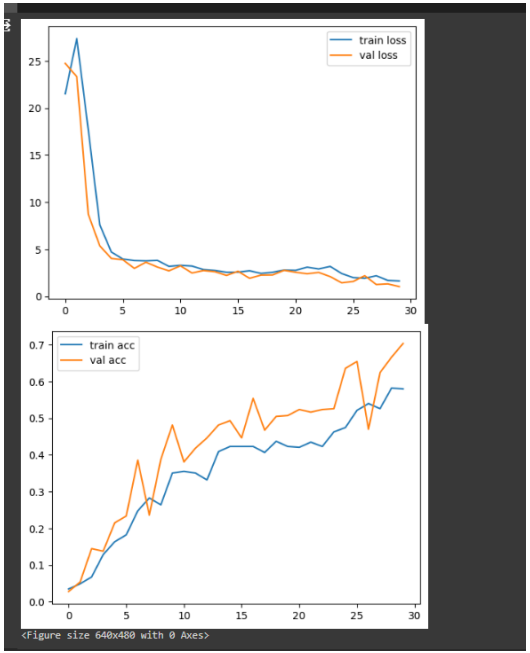


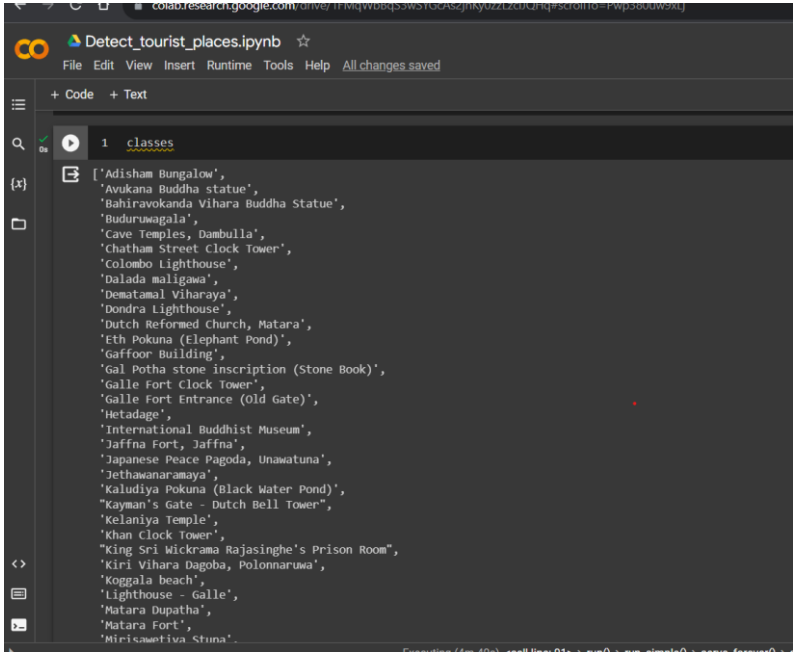
Results and Achievements



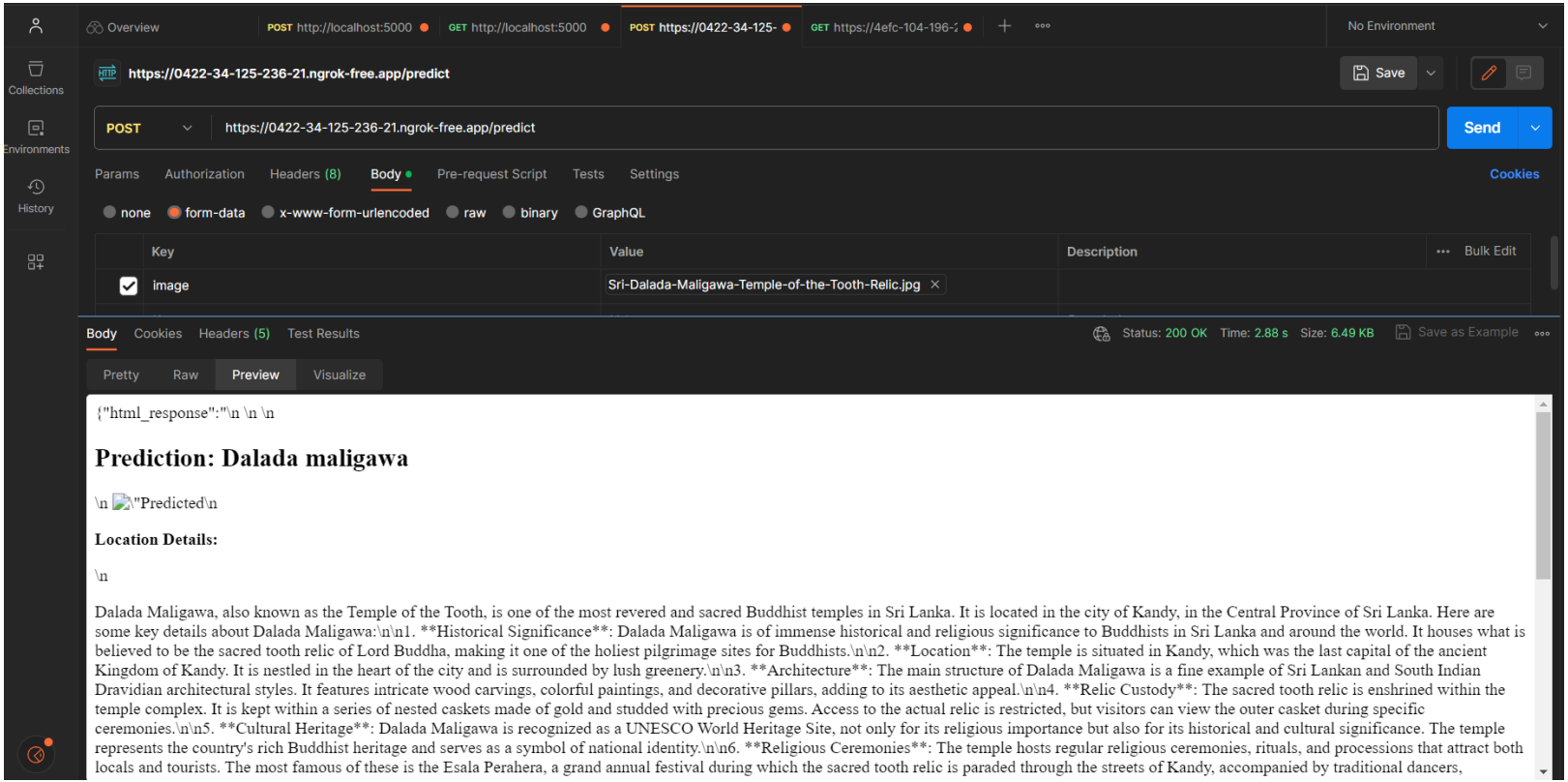


Results and Achievements

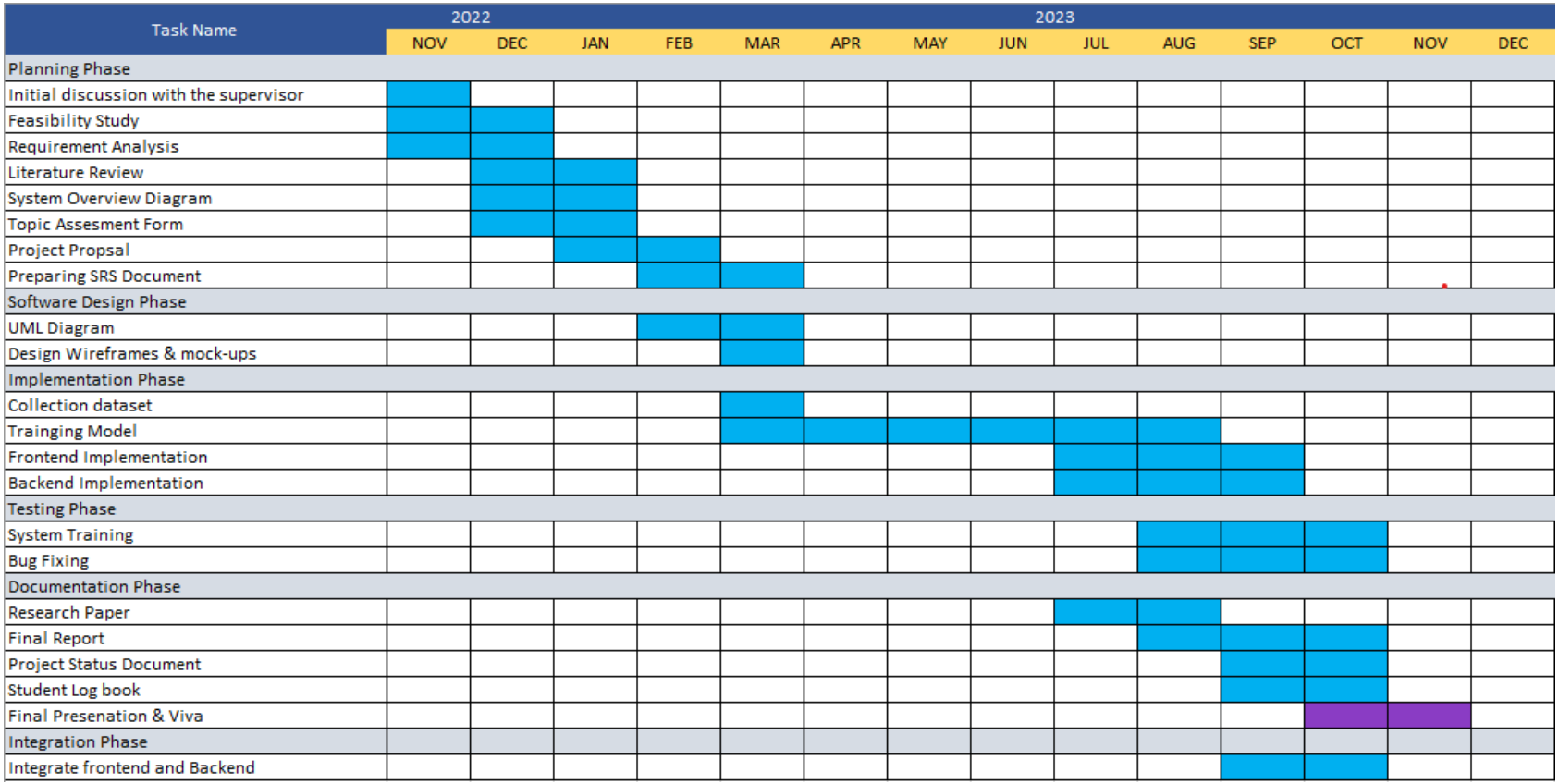




Results and Achievements



Gantt Chart



Task Name	2022		2023											
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Planning Phase														
Initial discussion with the supervisor														
Feasibility Study														
Requirement Analysis														
Literature Review														
System Overview Diagram														
Topic Assesment Form														
Project Propsal														
Preparing SRS Document														
Software Design Phase														
UML Diagram														
Design Wireframes & mock-ups														
Implementation Phase														
Collection dataset														
Trainging Model														
Frontend Implementation														
Backend Implementation														
Testing Phase														
System Training														
Bug Fixing														
Documentation Phase														
Research Paper														
Final Report														
Project Status Document														
Student Log book														
Final Presenation & Viva														
Integration Phase														
Integrate frontend and Backend														

References

[1] D. Buhalis, "Smart Tourism Destinations Enhancing Tourism Experience Through Personalisation of Services," p. 14, 2015.
[2] Santos-Júnior, Adalberto; Mendes-Filho, Luiz; Almeida García, Fernando; Manuel Simões, José;, Smart Tourism Destinations: a study based on the view of the stakeholders, p. 23, 2017.
[3] N. Godewithana, K. Jayasena, C. Nagarawaththa, P. Croos, B. Harshanath and J. Alosius, "Historical Places & Monuments Identification System," 2020.
[4] B. M. a. M. T. M. M. Etaati, "Cross Platform Web-based Smart Tourism Using Deep Monument Mining," 2019.

Demonstration

IT19192024 | JAYAWARDHANA E.H.K

B.Sc.(Hons) in Information Technology Specializing in Information Technology

Personalized location recommendation and service recommendation refers to the development of a system that provides relevant location and location-based service recommendations according to their specific travel preferences such as Location type, district, weather type, category, and budget.

From this system, the tourist can choose a place he wants to go to, after entering his preferences into the system, the best place is recommended according to his preferences.

Research Question

- There are many ways to identify places and services in the tourism industry based on technology. but tourism industry not fully digitalized.

- difficult to choose the places and services according to their preferences.

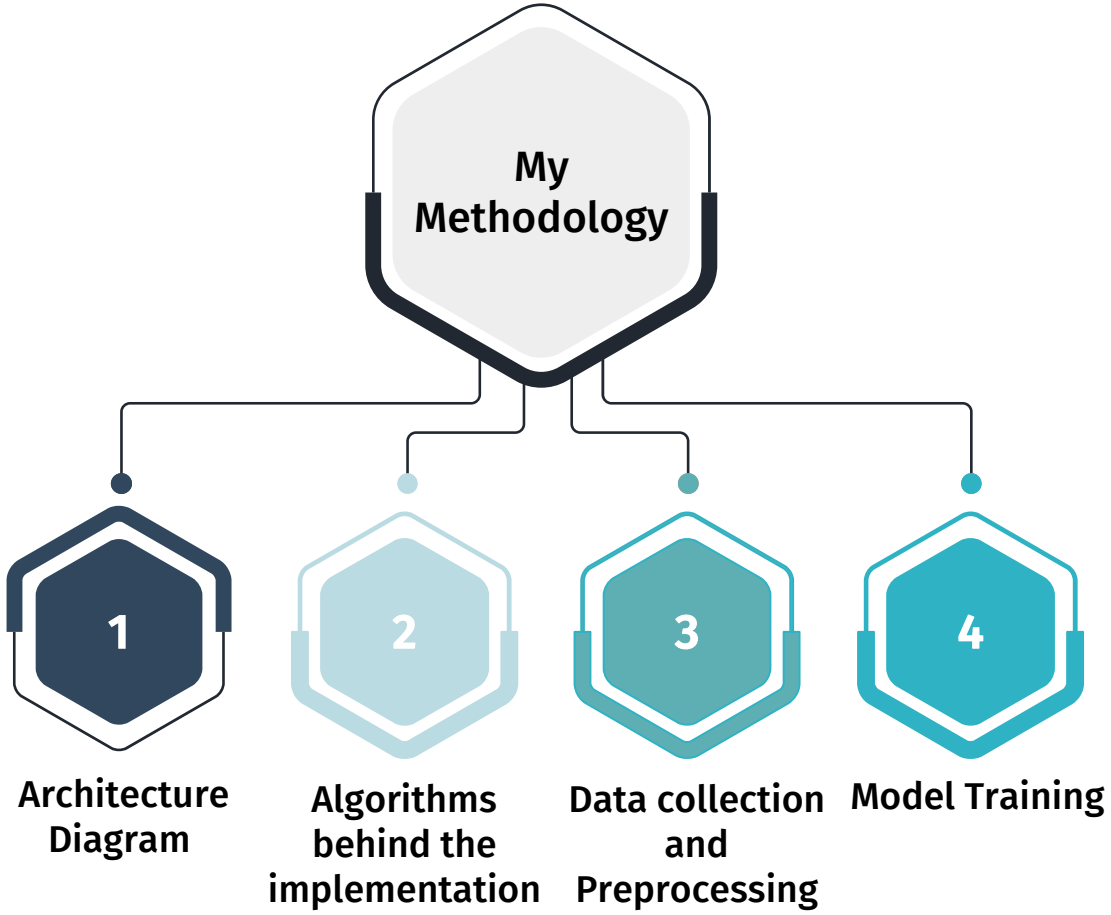
- Even if there is smartphone, does not recommend relevant location and location-based services that meet preferences such as Location type, district, weather type, category, and budget.

- This shows a need to provide recommendations based on data from personalized style, budget, category, preferences and behavior.

Specific and Objectives

- **SPECIFICS** - Personalized location recommendation and service recommendation is the provision of relevant location and location-based services tailored to their specific travel preferences such as Location type, district, weather type, category, and budget.

- **OBJECTIVE** - Provide a customized experience for tourists by providing them with relevant options in real time and making the recommendations more accurate and effective.


My Methodology
1
2
3
4
Architecture Diagram
Algorithms behind the implementation
Data collection and Preprocessing
Model Training

Algorithms behind the implementation

- Random Forest Regressor : An ensemble learning technique based on decision trees, often used for regression and classification tasks.

- According to my data set, I got high accuracy from the Random Forest Regressor algorithm, so I used Random Forest algorithm.

Data collection and Preprocessing

- Loading the dataset from a CSV file ('Personalized_Locations.csv') using Pandas.
- Checking for missing values using a heatmap from Seaborn.
- Converting categorical features like 'District', 'Budget', 'Type', 'Weather Type', and 'Category' into numerical values using custom mapping functions.
- Applying Label Encoding to the 'Name' column to convert it into numerical values.
- Splitting the dataset into training and testing sets (80% train, 20% test).
- Standardizing the feature values using Scikit-Learn's StandardScaler.

Model Training

- The code train model (Random Forest Regressor) on the preprocessed data.
- It calculates and prints the accuracy score for each model using the test dataset.
- It uses Mean Squared Error as the evaluation metric to compare the real and predicted values.
- It saves the trained Random Forest Regressor model using Pickle.

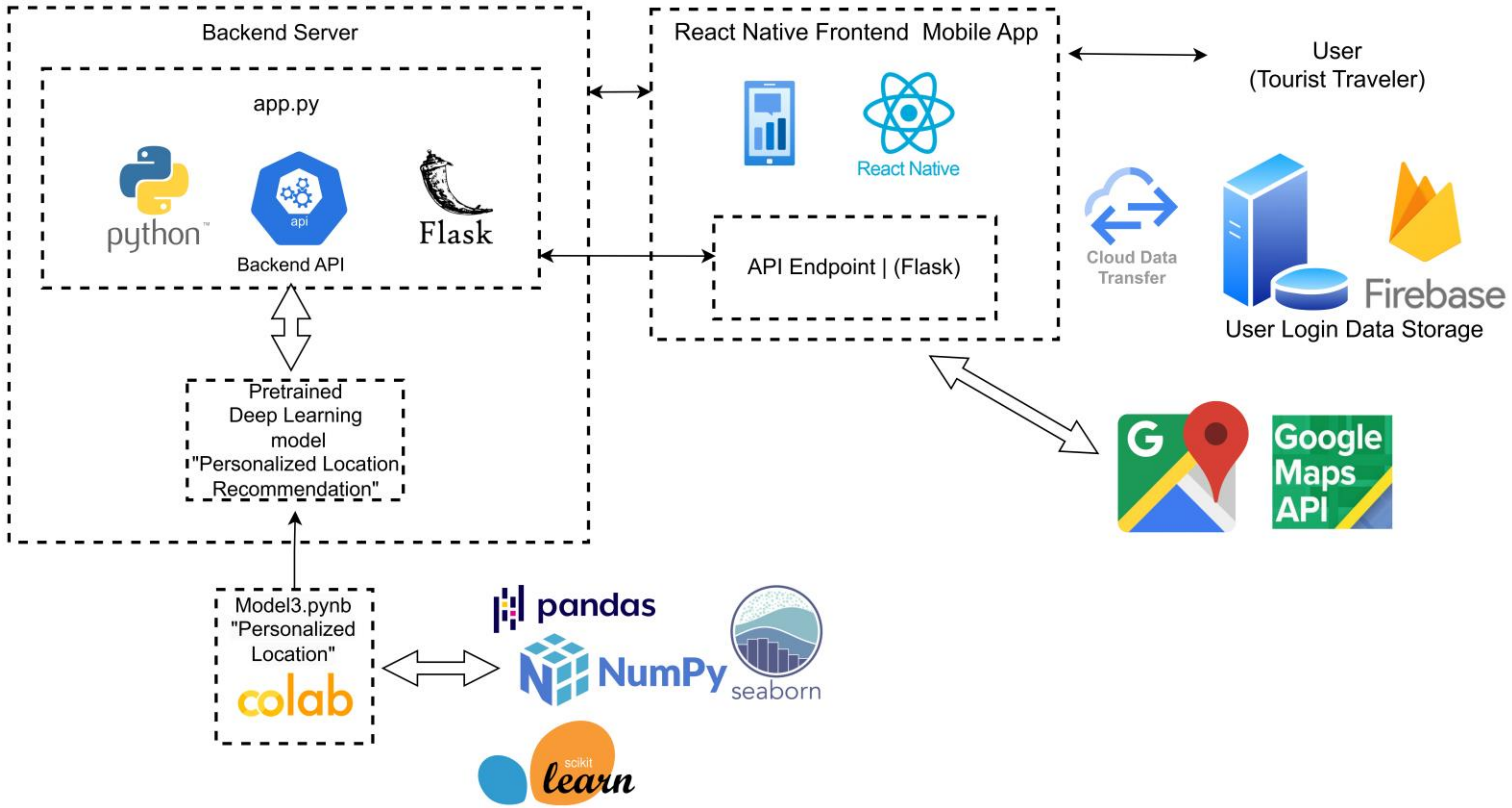
Methodology

- **Random Forest Regressor**, on the other hand, is an ensemble model that combines multiple decision trees to capture complex nonlinear relationships in the data. It's known for its flexibility and ability to handle a wide range of data patterns.

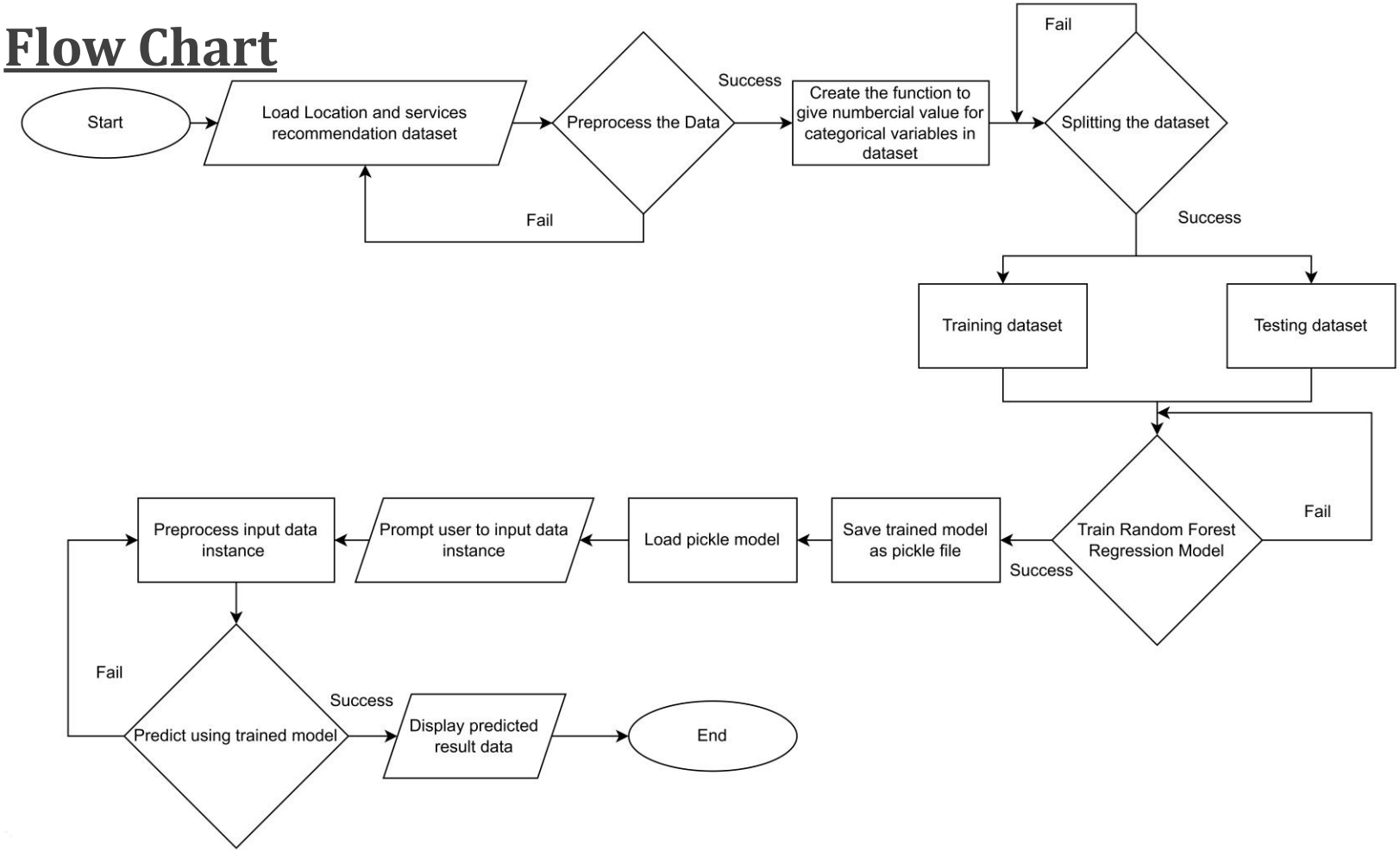
- According to my data set, I got high accuracy from the Random Forest Regressor algorithm, so I used Random Forest algorithm.

- Personalized recommendations are based on data collected from previous travelers' preferences and behaviors, making them more accurate and effective.

Components Architecture Diagram



Flow Chart

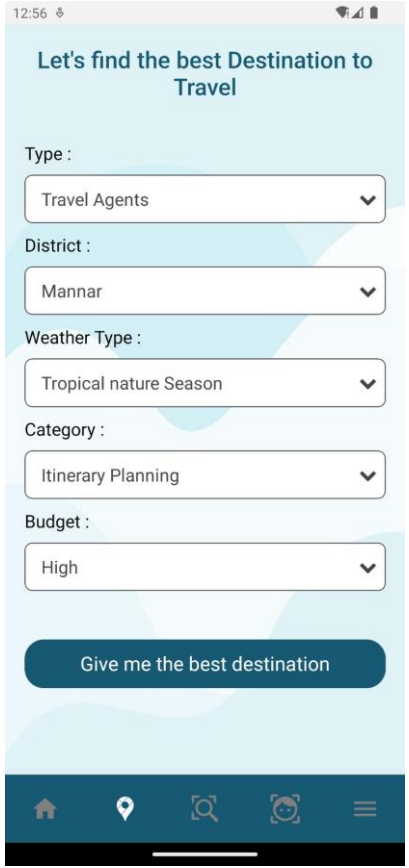

Start
Load Location and services recommendation dataset
Preprocess the Data
Success
Fail
Create the function to give numbercial value for categorical variables in dataset
Splitting the dataset
Fail
Success
Training dataset
Testing dataset
Train Random Forest Regression Model
Fail
Success
Save trained model as pickle file
Load pickle model
Prompt user to input data instance
Preprocess input data instance
Predict using trained model
Fail
Success
Display predicted result data
End

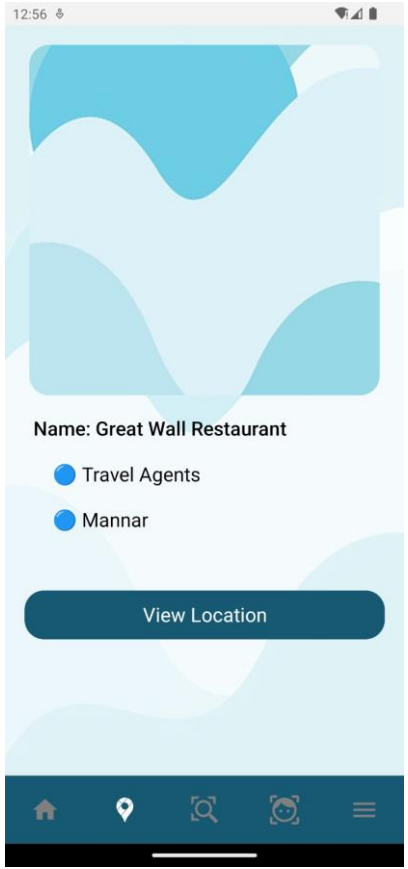
Technologies

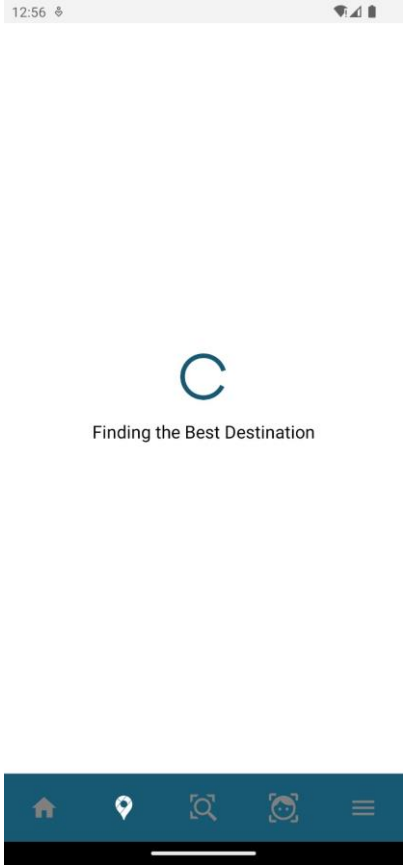
- Python
- Fire Base
- TensorFlow
- Flask
- React Native
- Google Map API

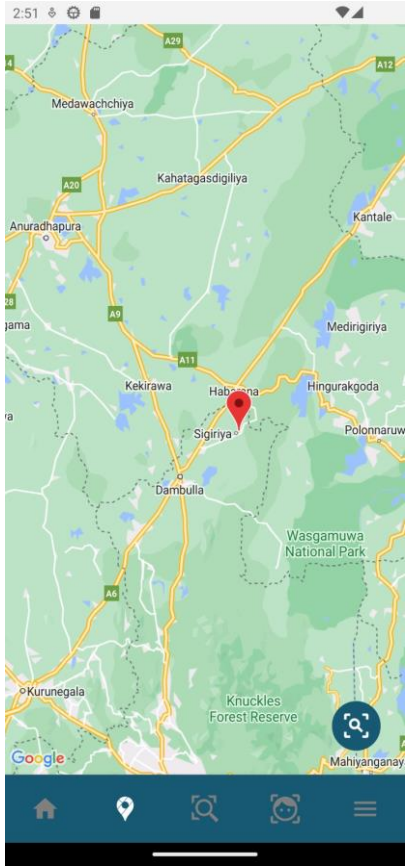
DATA COLLECTION

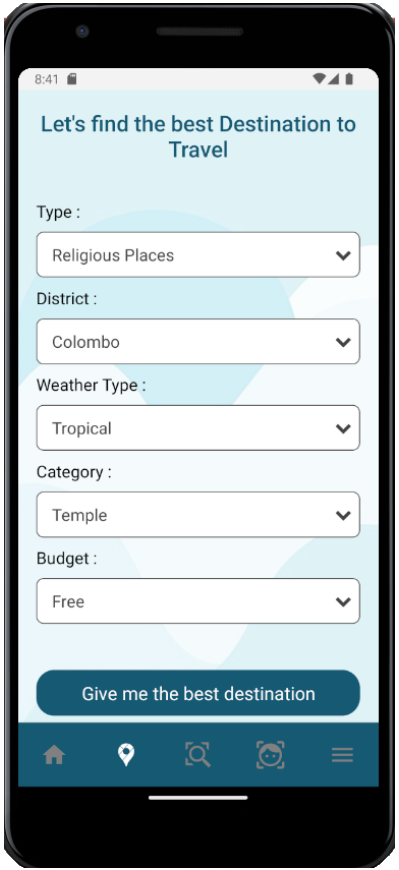
Results and Achievements

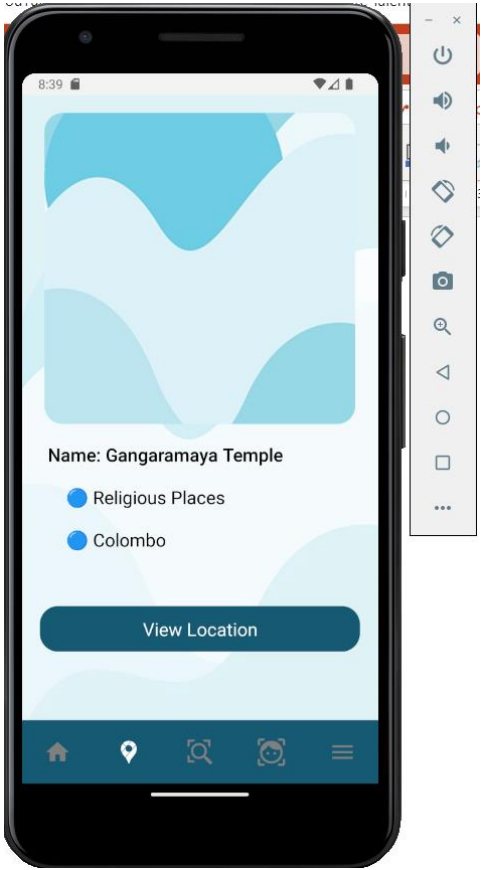


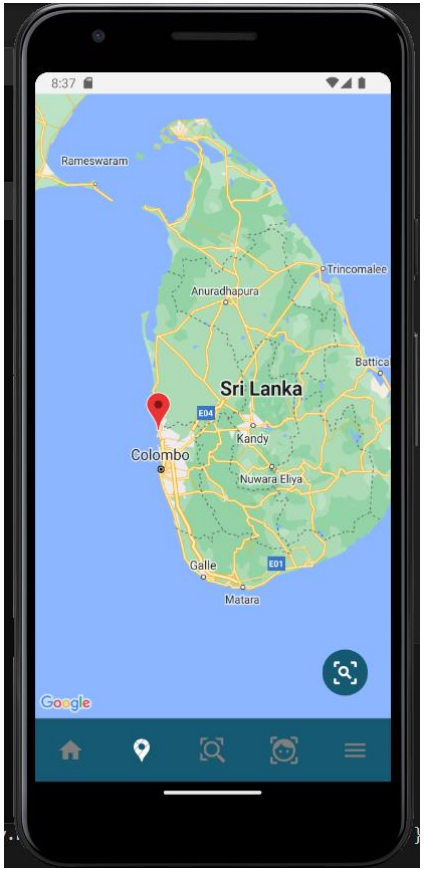




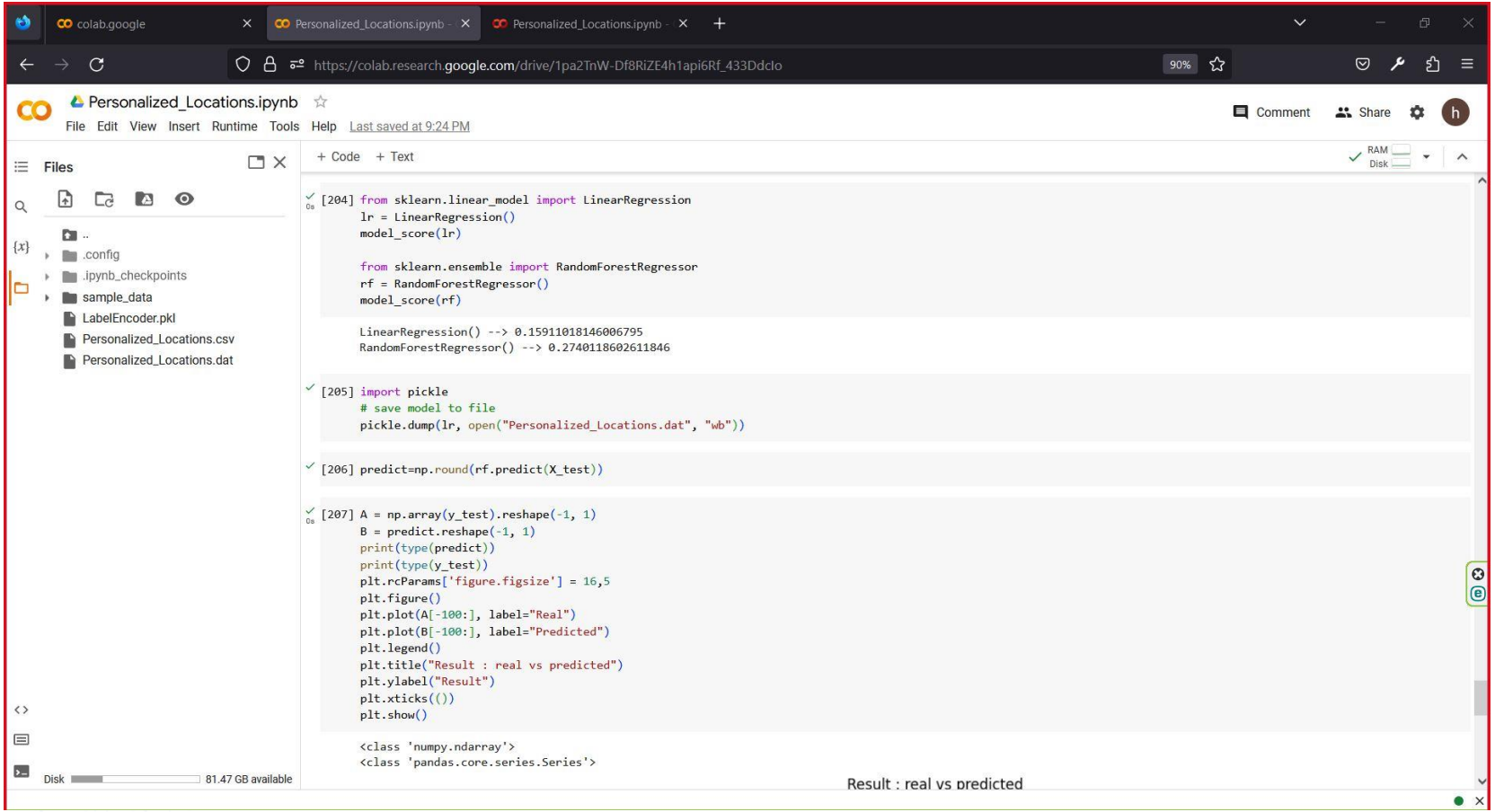



8:41
Let's find the best Destination to Travel
Type :
Religious Places
District :
Colombo
Weather Type :
Tropical
Category :
Temple
Budget :
Free
Give me the best destination

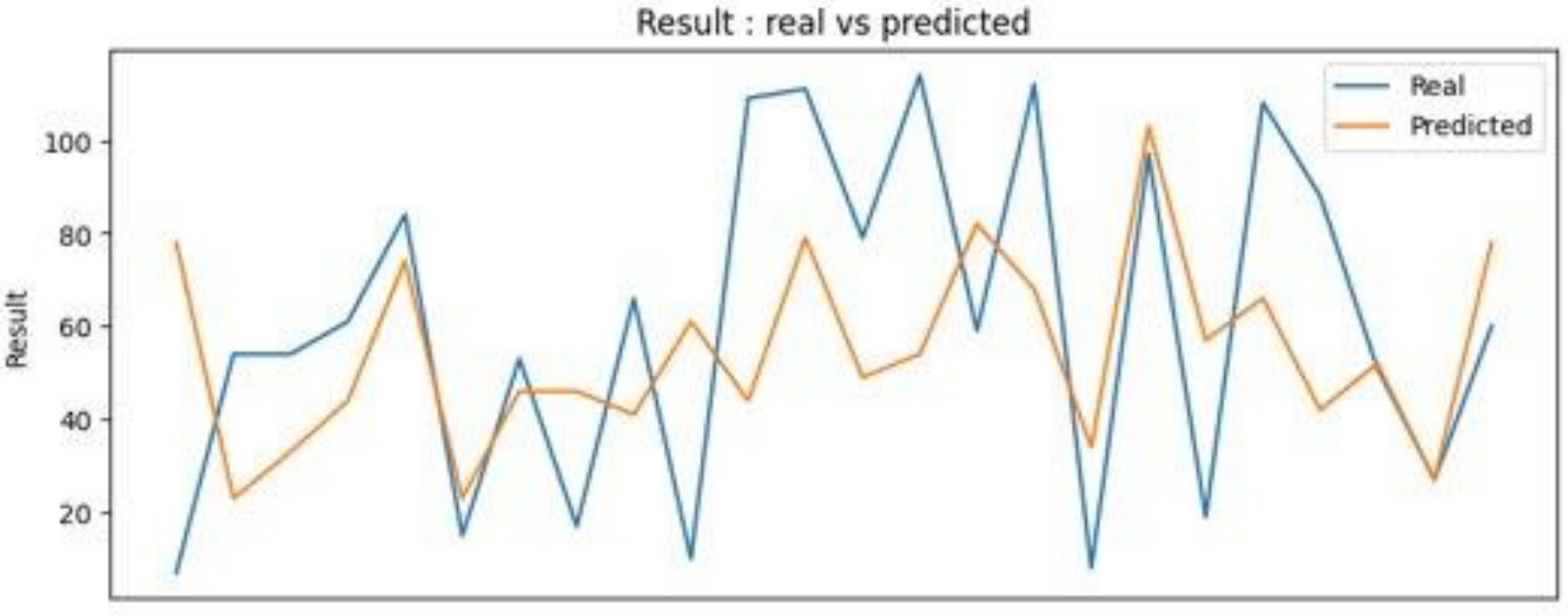

8:39
Name: Gangaramaya Temple
Religious Places
Colombo
View Location


8:37
Rameswaram
Trincomalee
Anuradhapura
Battica
Sri Lanka
Kandy
Colombo
Nuwara Eliya
Galle
Matara
Google

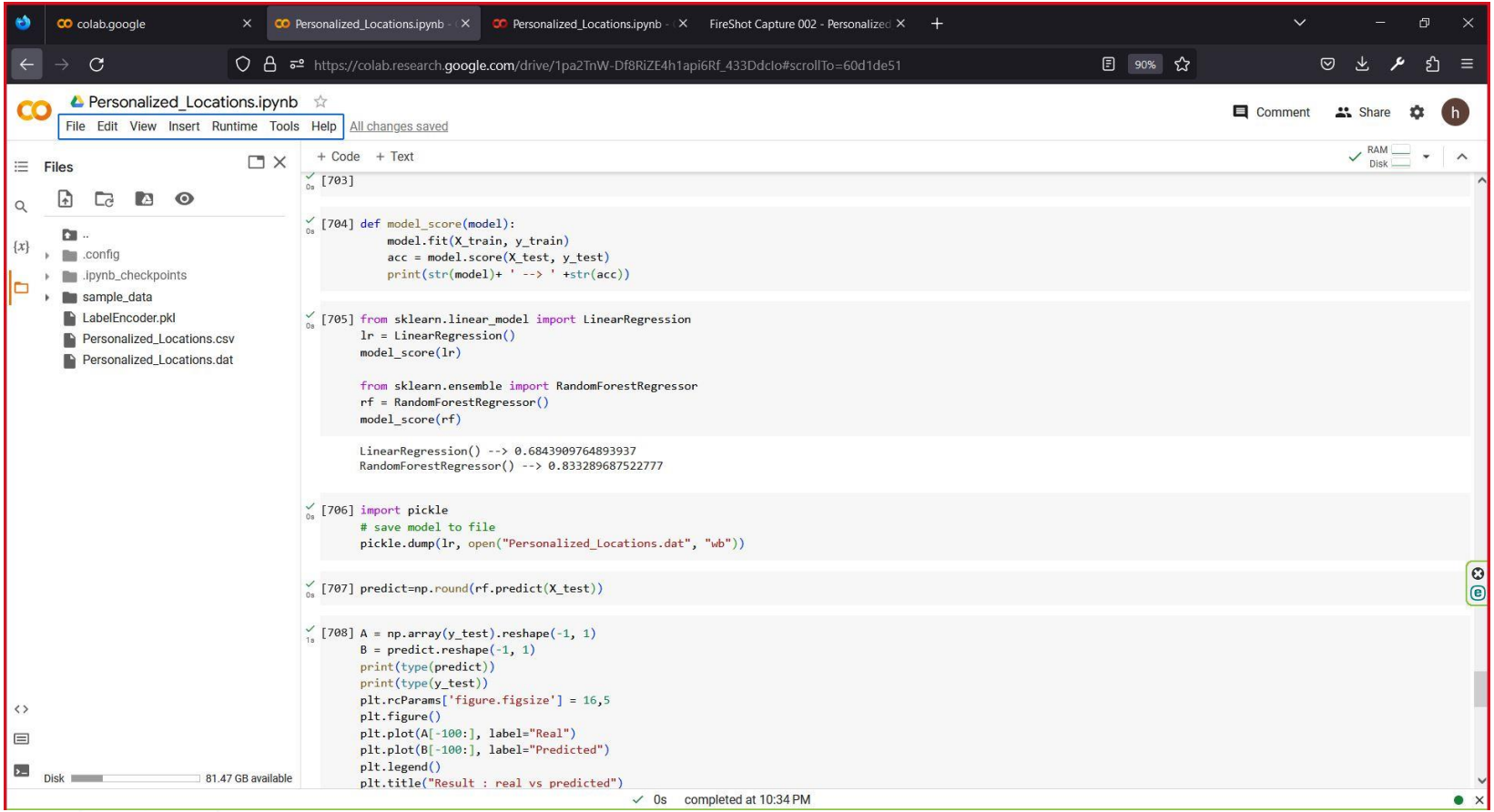
Results and Achievements



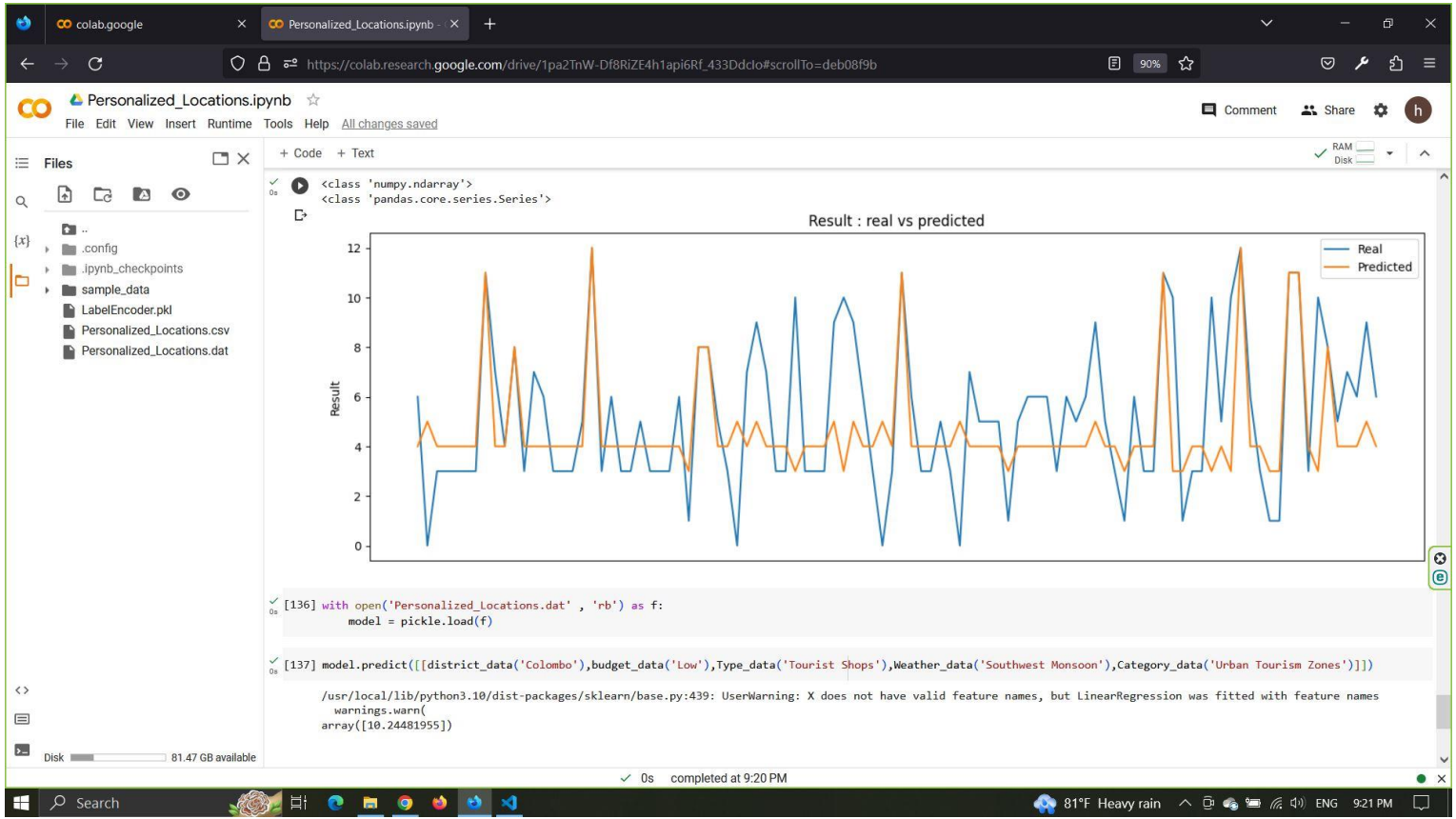
Results and Achievements



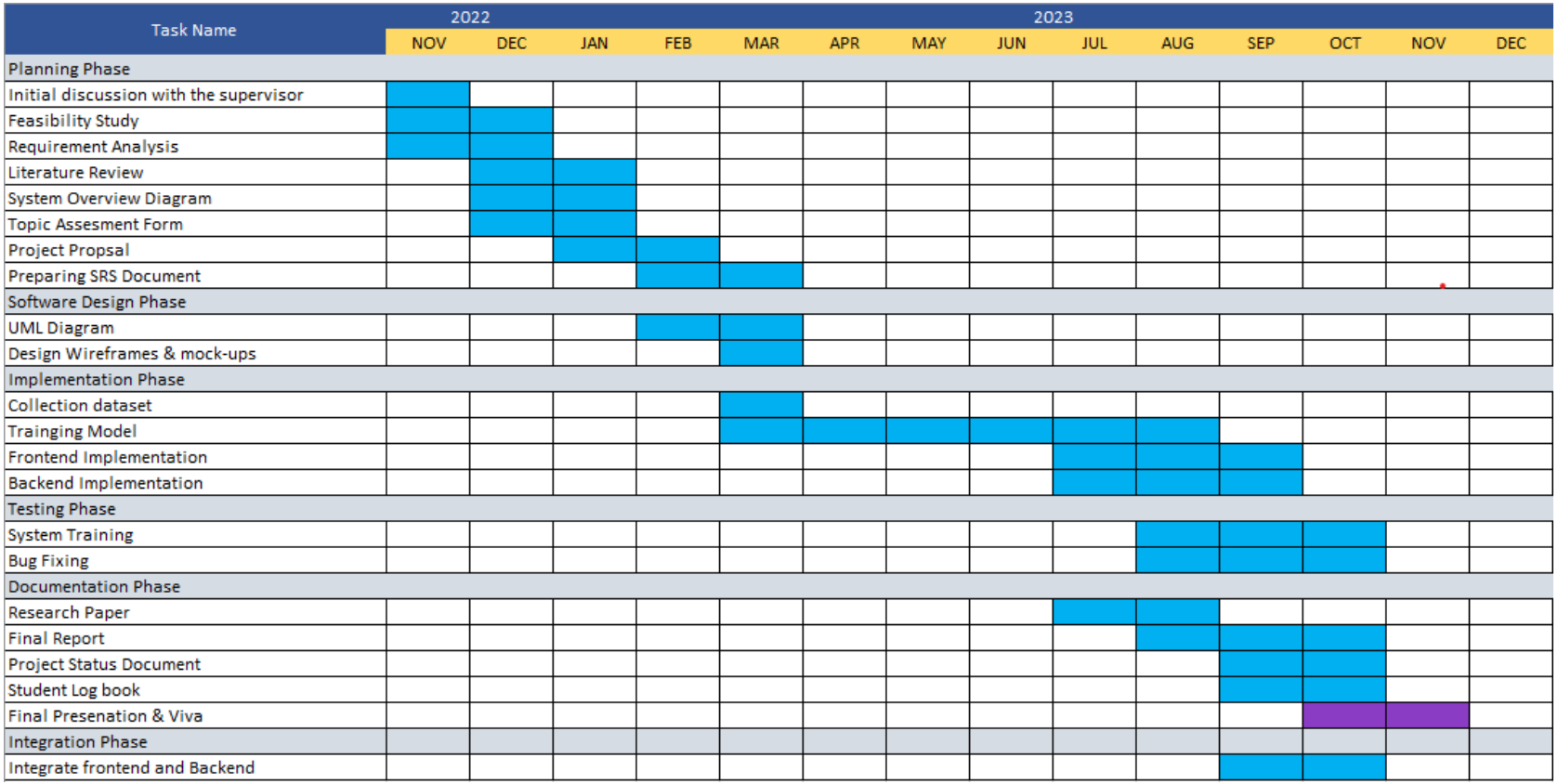
Results and Achievements



Results and Achievements



Gantt Chart



Task Name	2022		2023											
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Planning Phase														
Initial discussion with the supervisor														
Feasibility Study														
Requirement Analysis														
Literature Review														
System Overview Diagram														
Topic Assesment Form														
Project Propsal														
Preparing SRS Document														
Software Design Phase														
UML Diagram														
Design Wireframes & mock-ups														
Implementation Phase														
Collection dataset														
Trainging Model														
Frontend Implementation														
Backend Implementation														
Testing Phase														
System Training														
Bug Fixing														
Documentation Phase														
Research Paper														
Final Report														
Project Status Document														
Student Log book														
Final Presenation & Viva														
Integration Phase														
Integrate frontend and Backend														

References

[1] "history," [Online]. Available: https://www.sltda.gov.lk/en/history.

[2] A. Abeysinghe, "The Diplomat," 08 November 2022. [Online]. Available: https://thediplomat.com/2022/11/sri-lankas-tourism-industry-revives-despite-public-protests/#:~:text=Sri%20Lanka's%20tourism%20sector%20plays,needed%20revenue%20for%20the%20government.

[3] "wikipedia," 2021. [Online]. Available: https://en.wikipedia.org/wiki/Tourism_in_Sri_Lanka#:~:text=For%20centuries%2C%20Sri%20Lanka%20has,its%20size%20in%20the%20world%22.

[4] A. Kontogianni and E. Alepis, "Smart tourism: State of the art and literature review for the last six years," Array, 2020.

[5] M. Figueredo, J. Ribeiro, . N. Cacho, A. Thome, A. Cacho, F. Lopes and V. Araujo, "From Photos to Travel Itinerary: A Tourism Recommender System for," 2018 IEEE Fourth International Conference on Big Data Computing Service and Applications, pp. 85-92, 2018.

[6] U. Gretzel, M. Sigala, Z. Xiang and C. Koo, "Smart tourism: foundations and developments," Crossmark, pp. 180-188, 2015.

[7] A. Savvopoulos, G. Kalogeras, A. Mariotti , C. Bernini , C. Alexakos and A. Kalogeras, "Data Analytics supporting decision making in the Tourism Sector," IEEE Xplore, 2019.

[8] H. Alghamdi, . S. Zhu and A. E. Saddik, "E-Tourism: Mobile Dynamic Trip Planner," 2016 IEEE International Symposium on Multimedia, pp. 185-188, 2016.

[9] C. Choi, M. Cho, J. Choi, M. Hwang, J. Park and P. Kim, "Travel Ontology for Intelligent Recommendation System," 2009 Third Asia International Conference on Modelling & Simulation, pp. 637-642, 2009.

[10] Prasadini Ruwani Gunathilake , "Machine Learning-Based Smart Tourist Support System (Smart Guide)," Springer, 2022.

Demonstration

IT20147846 | Thennakoon S.U.

B.Sc.(Hons) in Information Technology Specializing in Information Technology

Developing a system that analyze the emotional state of the user and suggest personalized activities according to their emotional state.

Background

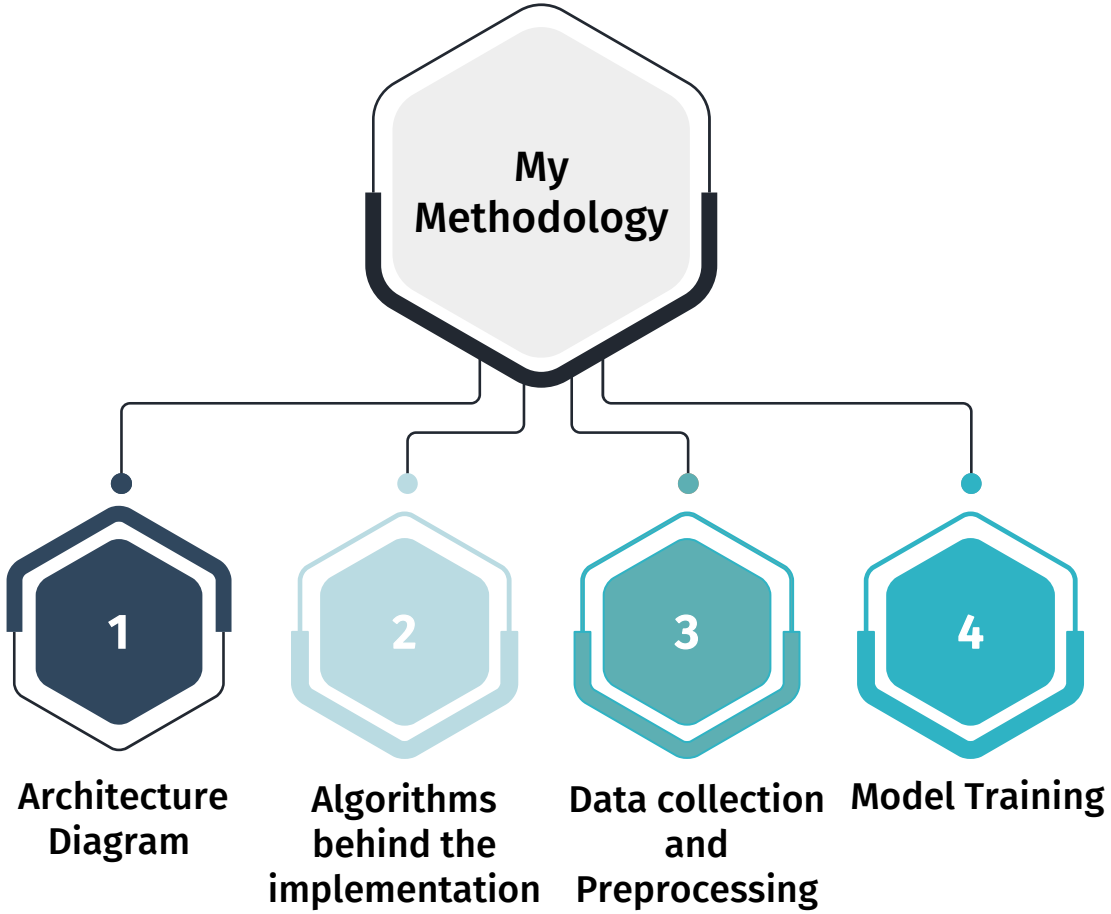
- Tourists in today's tourist business desire customized and unique experiences.
- Generic travel advice is no longer enough to suit the changing needs of tourists.
- According to tourism and technology research, personalized recommendations can significantly improve tourist satisfaction.

Research Question

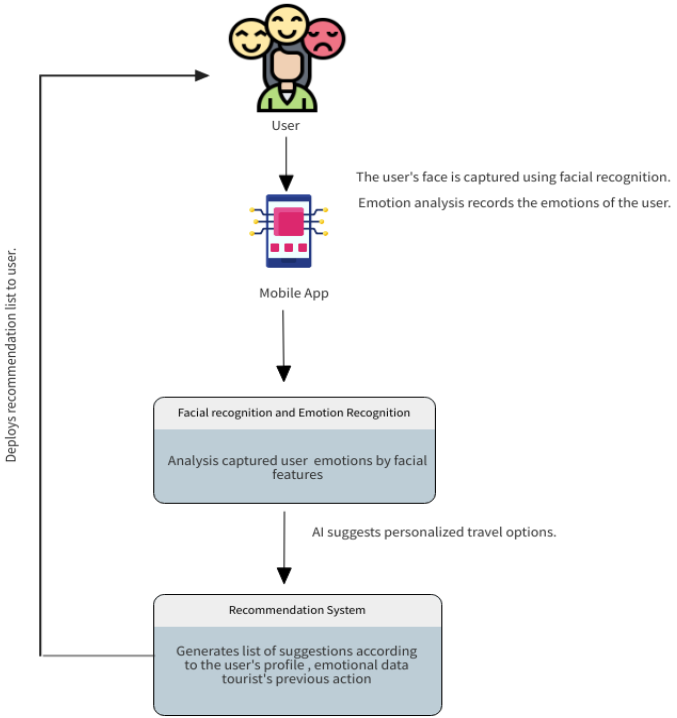
- Travel recommendations are often based on a generic set of preferences rather than individual emotional states.
- Traditional surveys or feedback mechanisms may not capture the real-time emotional state of the user.
- Users may have different emotional states during different stages of their travel experience.

Specifics and Objectives

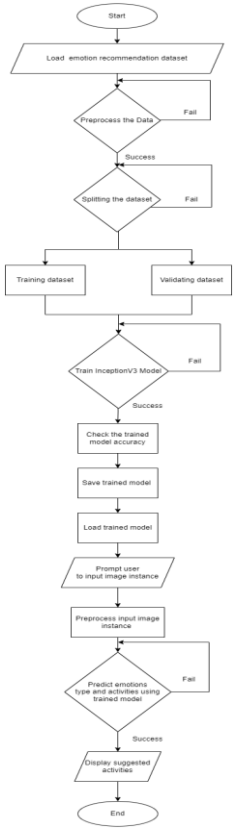
- Accurately identify the emotions of tourists through facial recognition technology and suggest activities and tips based on the emotional state of the user.
- Offer a range of travel options that cater to different emotional states.


My Methodology
1
2
3
4
Architecture Diagram
Algorithms behind the implementation
Data collection and Preprocessing
Model Training

System Architecture Diagram



Flowchart



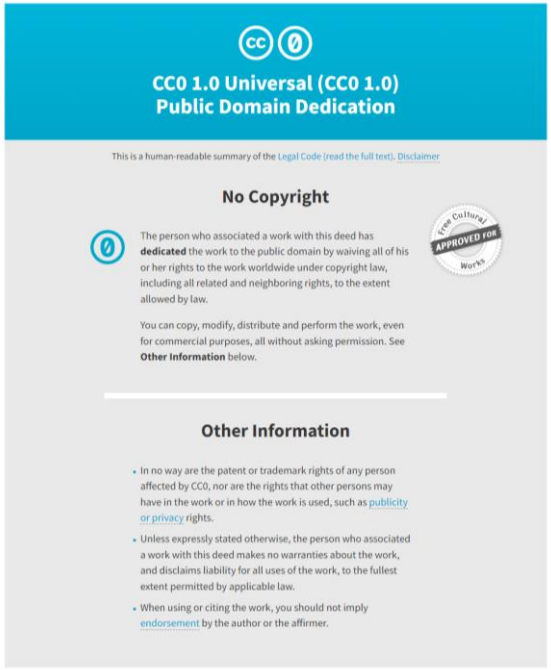
Algorithms behind the implementation

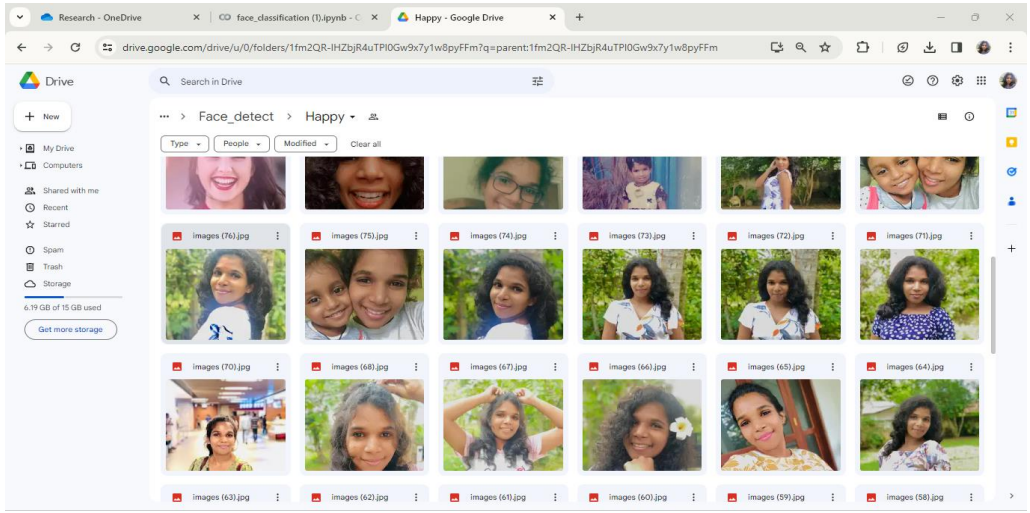
- The code mounts Google Drive to access a dataset containing images of facial expressions representing different emotions.
- It loads the data using TensorFlow's image_dataset_from_directory function.
- Data preprocessing will be performed using an ImageDataGenerator.
- InceptionV3 is used for feature extraction, followed by custom layers for regularization and classification.
- The model is compiled with Adam optimizer, categorical cross-entropy loss, and accuracy metric.
- The model is trained on the training dataset over specified epochs, and training history is recorded.

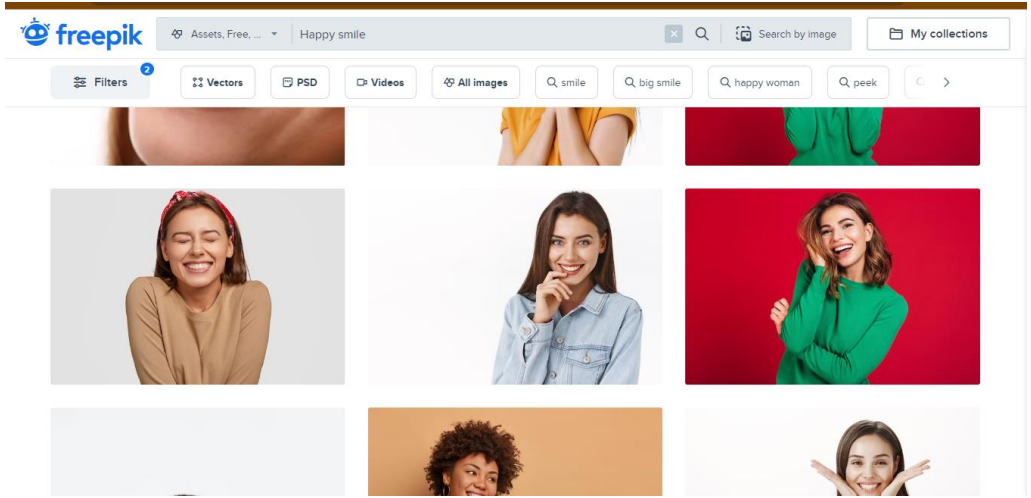
Data collection and Preprocessing

- Google Drive is used to load a dataset containing facial expression images.
- Data preprocessing will be happened using ImageDataGenerator which applied for rescaling, rotation, shifting, shearing, zooming, flipping, and data splitting.
- Batch normalization will be applied to stabilize and accelerate training by normalizing activations.
- Data is split into training and validation subsets using the validation_split argument.
- InceptionV3-specific preprocessing steps are handled internally by the model.

Data collection







Model Training

- The model is trained on the training dataset and validated on the validation dataset.
- Training occurs over a specified number of epochs.
- The training history, including loss and accuracy, is recorded.
- The code evaluates the model's performance on both the training and validation datasets.
- The trained model is saved to a file for future use.
- The code defines a predict_image function to make predictions on new images using the loaded model.

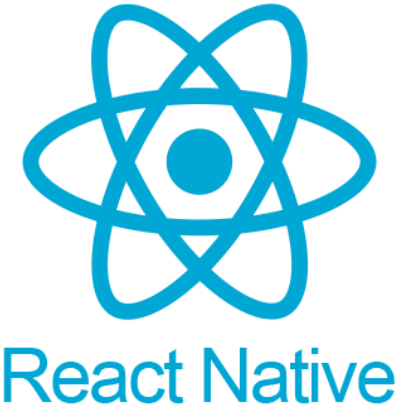
Backend & Frontend Technology Stack

Backend API

- Python
- Flask

Frontend Mobile App

- React Native
- Firebase



Results and Achievements

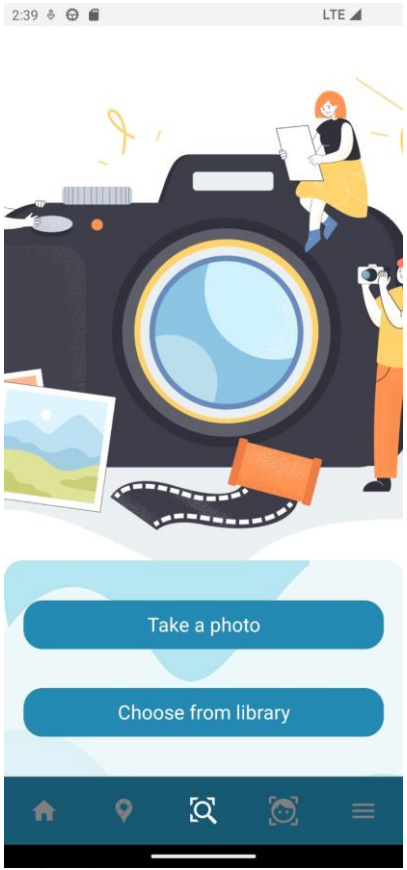
Identifies the Emotions accurately and
Suggest activities according to Emotion

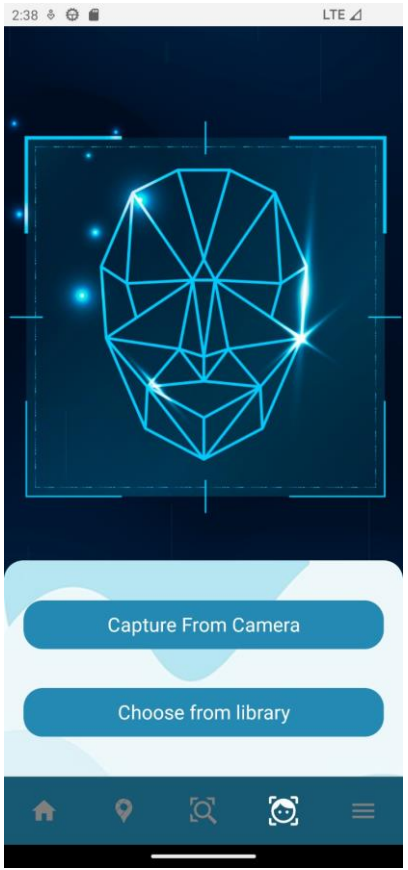
```
classes = ["Angry","Disguist","Fear", "Happy","Neutral", "Sad","Surprise", ...] # Define your class names here
predict_image('/content/drive/MyDrive/Smart_Travel_App/Face_detect/Happy/images (77).jpg', model, classes)
```

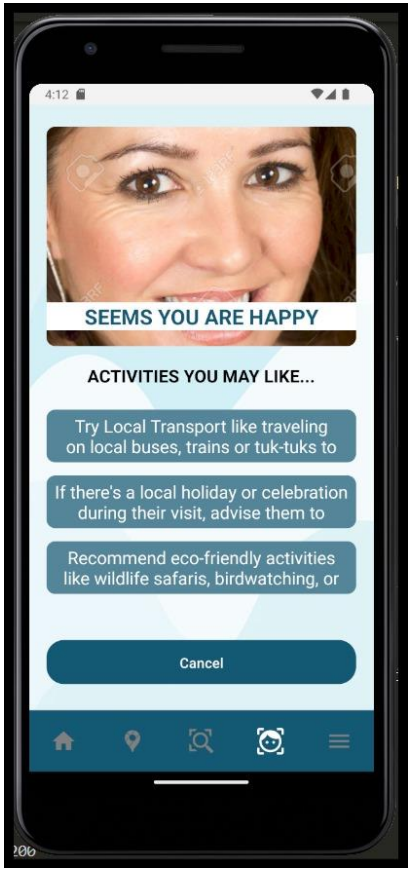
```
1/1 [==============================] - 0s 177ms/step
```

Predicted Class: Happy

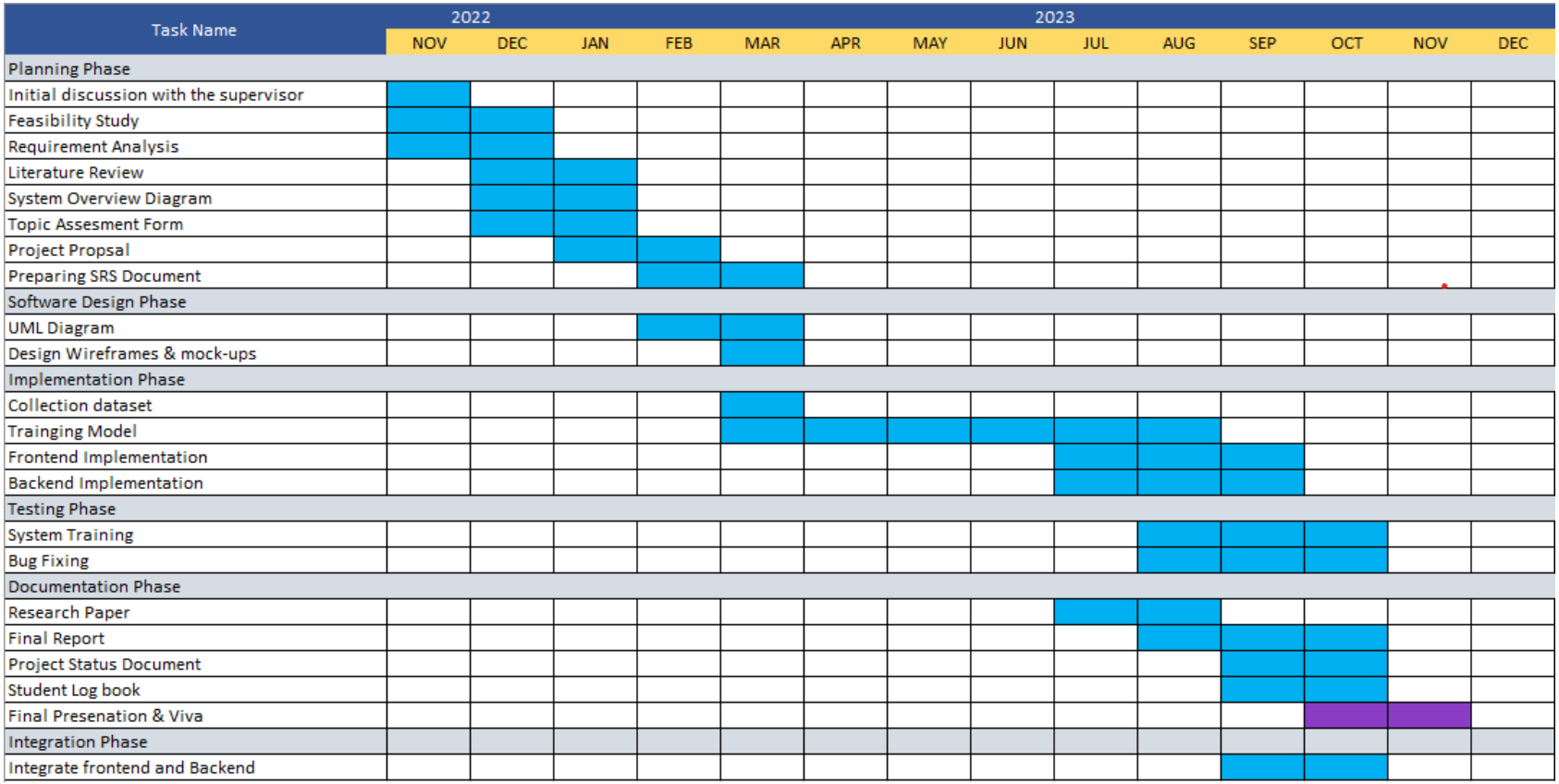
Results and Achievements







Gantt Chart



Task Name	2022		2023											
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Planning Phase														
Initial discussion with the supervisor														
Feasibility Study														
Requirement Analysis														
Literature Review														
System Overview Diagram														
Topic Assesment Form														
Project Propsal														
Preparing SRS Document														
Software Design Phase														
UML Diagram														
Design Wireframes & mock-ups														
Implementation Phase														
Collection dataset														
Trainging Model														
Frontend Implementation														
Backend Implementation														
Testing Phase														
System Training														
Bug Fixing														
Documentation Phase														
Research Paper														
Final Report														
Project Status Document														
Student Log book														
Final Presenation & Viva														
Integration Phase														
Integrate frontend and Backend														

References

- [1] S. M, "Industry 4.0 and lean management:," a proposed integration model and research propositions, vol. 6, no. 1, pp. 416-432, January 2018.
- [2] S. Ziyadin, O. Litvishko, M. Dubrova, G. Smagulova and M. Suyunchaliyeva, "Diversification tourism in the conditions of the digitalization," vol. 10, no. 02, pp. 1055-1070, February 2019.
- [3] X. Zheng, Y. Luo, Z. Xu, Q. Yu and L. Lu, "Tourism Destination Recommender System for the Cold Start Problem," KSII Transactions on Internet and Information Systems, vol. 10, no. 8, pp. 3192-3212, August 2016.
- [4] E. T. S and V. C, "Understanding Personalization of Recommender System: A Domain," vol. 13, no. 15, pp. 12422-12428, 2018.
- [5] WTO, "A Practical Guide to Tourism Destination Management," World Tourism Organization, 2007.
- [6] B. Cvetkovic, R. Szeklicki, V. Janko, . P. Lutomski and M. Lustrek , "Real-time activity monitoring with a wristband and a smartphone.," Information Fusion, vol. 43, pp. 77-93, 2018.
- [7] L. Santamaria-Granados, J. Mendoza-Moreno, A. ChantreAstaiza and M. Munoz-Organero, "Tourist Experiences Recommender System Based on Emotion Recognition with Wearable Data," Sensors, vol. 21, p. 7854, 2021.
- [8] L. Santamaria-Granados, J. Mendoza-Moreno and G. Ramirez-Gonzalez, "Tourist Recommender Systems Based on Emotion Recognition," A Scientometric Review, vol. 13, no. 2, 2021.

Demonstration