

**TOUR PLANNER APPLICATION USING
MACHINE LEARNING**

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

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APPROVAL

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We hereby declare that, this project has been done by us under the supervision of **Mr. Nahid Hasan, Lecturer, Department of CSE** 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

Tourism is a fast-growing industry and is the most demanding for psychological and physiological health. With the advancement of this sector, machine learning can improve both the financial and punctuality of tourists. Most tourists are curious about the destination and budget estimation. To help tourists with proper destination choice and budget calculation, we have proposed an application with machine learning. The application generates predictions based on real user data we have collected and uses algorithms to give the best experience. To generate the most accurate results, complex algorithms were implemented, such as Random Forest, Naive Bayes, Decision Tree, and K-Nearest Neibert (KNN).

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CHAPTER 1

INTRODUCTION

1. Introduction

The tourism sector is one of the most popular and biggest sectors in the world. Nowadays, people are very interested in traveling. In particular, the younger generation today plans to travel; they want to discover new things, and tourism is an appropriate means of achieving their objective. People can see some of the environmental and cultural wonders of the world through tourism, which also reveals our common values. Tourism helps economies grow and enables communities to prosper. In order to dedicate quality time with their families, people normally prefer to spend their holidays at some amazing places with loved ones. But sometimes this can't happen so smoothly because of the lack of a proper plan. Occasionally, people couldn't find the appropriate destination and other guidance on the basis of their budget. And because of this, they have to face a lot of difficulties and bear extra costs. Occasionally, people couldn't find the appropriate destination and other guidance on the basis of their budget. In this research, we've evaluated the tour's route, expense, and other details. We have done this analysis with a machine learning algorithm and made a prediction on the basis of some input information so that people can find their suitable destination. We present a mobile application that is an implementation of our analysis. Here we will suggest the location on the basis of user input such as budget, number of tourists, traveling time, transport, etc. By using this application, users can find their ideal tourist spot on the basis of their preferences. This will help them to make proper plans for their journey and will provide some guidance. This tour planner application's goal is to make people's travel less stressful, more comfortable, and affordable. In third-world countries, most people are now accessing mobile phones, and they want to avail themselves of all sorts of information and planning through their mobile phones. The extensive use of smartphone tourist applications enables users to seek directories or programs that align with their priorities and obtain real-time information. Individuals can access their trip information and select the location by utilizing this application.

1.2 Motivation

One of the most well-liked trends right now is travel. At this time, we can handle any type of work easily. When we make a tour plan, we face many problems like selecting a place, accommodation problems, how much money we need, proper guidelines, etc. At this time, most people are busy with their work. When a student, couple, or family makes a tour plan, they face many problems and don't make a proper tour plan. Some days ago, me and my friend suddenly planned a tour from Dhaka to Sajek, but we didn't know how to make a proper tour plan. We didn't know how we were going to sail or how much money we needed. We faced many problems when making a tour plan. Anyhow, we manage every site very roughly. We start our journey. We came from Khagrachari. We faced a travel problem. Chandergari is the local tourist transport. Chandergari was full of 12 people, but we were only four. So, we needed 8 people, and we also didn't know how to get from Khagrachari to Sajek. Anyhow, we solved the problem and reached the Sajek. We faced many problems because our tour was not properly planned. Then we thought we could make a tourist application and solve travelers' problems. In our tourist application, we provide many facilities, like making a proper tour plan, proper guidelines, proper direction, accommodation facilities, etc. When our tourist application was published, people helped when making a tour plan. This time, every tourist can easily make a tour plan. We gathered ideas from many other people who frequently take vacations and spoke with them before deciding to create a tourist application. People need new travel sites, which means such mobile applications will be in high demand nowadays. So, we think we should make a tourist app and our apps will be more helpful than making a tour planner.

1.3 Rationale of the Study

Economic growth is mostly driven by the tourism sector. Additionally, there is a chance for cultural exchange. Tourism has a huge potential for foreign currency earnings. A nation's balance of payments (BOP) can be helped by tourism. Employment may result from the tourism sector. The Tour Planner with machine learning provides users with all the information and guidance they require to plan and execute their tour without any issues.

Through this, we will suggest tourists' locations and people can easily find any details. This will encourage them to make frequent visits. Easy tour planning is such a blessing that people will be able to make their plans within a moment. The main purpose of this research is to include a platform where users may look up regions to travel to based on their preferences. This application will have all the essential features that a tourist requires in order to have the best possible trip. If individuals can explore locations by using this application, they will be able to make tour plans as they want. It will develop the business in the tourism sector and will provide financial support to our country. The government will be able to take the needed steps to maintain resource management and make tourist locations more authentic. Our tourism sector will expand day by day, and it will create direct and indirect employment opportunities. By analyzing all of the aspects, it is clear that the tourism sector has a great impact and potential on our economic growth and our social and environmental development.

1.4 Research Questions

Numerous queries could be brought up in relation to this research. A collection of questions was taken from various people to condense this study. The answers to these points will make our study's purpose absolutely obvious and eliminate any uncertainty.

What is the main goal of this study?

In Bangladesh, the tourism sector is a fast-growing industry. With more tourists visiting the country, the tourism industry's significance is currently expanding. Only one nation leads Bangladesh in terms of tourism inside the Asian continent, and that is Pakistan. If we want to expand more quickly, we have to improve the tourism industry's infrastructure. We have to adapt to technology in this sector. Our system is such an approach to making tour planning easy and giving the proper guidance for the tourists. It will reduce planning hassles and make travel easy.

What is the main justification for utilizing an app interface?

In this fast-paced world, mobile phones are one of the most commonly used technologies, and they are available all over the world. It makes the communication sector easier and quicker. People can now access the internet and can find any information about anything within a moment. It also enhances the use of software applications. We want to provide a software application for the users so that they can use our application to find the most appropriate tourist destinations and make their travel plans properly. Our app can be used by anyone with a basic understanding of mobile phones, the internet, and apps. They can access the app from the any corner of the world and obtain the needed information from the application.

Who are the targeted users for this application?

The tourism sector is now a widespread industry and it is expanding rapidly. Improvement of the transportation and communication sectors also increases the tourist numbers. Nowadays, people want to take their families, friends, and coworkers on vacation to a variety of tourist destinations. This application's target users are those who are more interested in traveling and discovering new places and cultures. Youth, who are also our target audience, are becoming increasingly involved in this subject, which is a significant change.

Why using machine learning?

Machine learning is a powerful method for making different predictions, and many different applications employ machine learning. A large amount of data is needed for implementing machine learning algorithms. A model should be built utilizing this data so that it can train itself and predict any outcomes. In our study, we collected data to

perform predictions. We collect data about tourist spots, travel time, total cost, satisfaction rate, etc. We build a model by using this data to predict the destination for the users. Here, machine learning is used to see the most accurate prediction.

Which services the application will provide?

Our software application performs prediction on the basis of given input by the users. It predicts which location would be more suitable for the user within his or her expected budget. It also shows the location details and other necessary information. A map is also integrated into the application, as is a database management system. Over time, we have a plan to integrate some more features, such as suggestions for transport booking, travel agencies, and packages, etc.

Why using various machine learning techniques?

Our prime objective is to provide consumers with location predictions that are as accurate as possible. To obtain the predictions with the highest accuracy score and the least amount of error, we employ a variety of machine learning methods. If we just use one method, it becomes difficult to tell whether our present algorithm is the best fit.

1.5 Expected Output

The biggest issue facing the tourism industry is selecting a destination within the expected limited funding. We will provide all the information with accurate predictions and requirements for a better tour experience. Therefore, the primary result of this project is to offer a method for locating a suitable location for travel. We will be able to recommend destinations to people by analyzing data to learn about their preferences in location, their spending limits, and other relevant information. To determine which machine learning algorithm predicts the location best, we will use a variety of techniques. To make the

system accessible by a user with just minimal knowledge of mobile devices and software applications, we will implement the algorithm in a software application and give it a user-friendly interface. We will manage and control a centralized database. Depending on the needs of the customer, we will offer a variety of transport services.

1.6 Project Management and Finance

Project management refers to the general procedure for planning, conducting, monitoring, and accomplishing any project. Along with resource management, risk assessment, and management, sensible budgeting, etc. Project management should be done in a proper way because the success of a project depends on its criteria. Additionally, we try to execute the entire project according to proper project management standards. Because realistic project planning is an essential first step, we first lay out a project plan to balance all the priorities. We remained firmly focused on the goals of our study. After choosing an issue, we attempted to identify its solution in order to generate an idea for our topic. In order to implement the algorithms, we preprocessed the data we had acquired. The best-fitting method is then included in the software program. Based on the information users enter regarding their willing tour specifics, this program forecasts the user's destination and provides roadmaps. A particular sum of money is required for the construction of the software system. Additionally, a minimum cost is needed for the database management process and other maintenance procedures.

1.7 Report Layout:

In order to make the research report more concise and useful for readers and researchers, it is divided into six main chapters.

Chapter	Description
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Chapter 1	Chapter 1 outlines the introduction of this research project. This research is about tour planning and guidance by using machine learning algorithms. This chapter describes the motivation of this study, the purpose of the study, relevant queries about this research, expected outcome, and management details with financial aspects.
Chapter 2	Chapter 2 highlights a brief description of comparable work based on this research study. It explains the context for this analysis, such as machine learning algorithms, classification details, comparative analysis, etc. Dimensions of the issue and the challenges we can face throughout the study are also included in the section.
Chapter 3	Chapter 3 contains detailed information about the study's subject, data collection and preprocessing procedures, the proposed system's methodology, and system architecture and requirements. The mathematical fundamentals of each deployed algorithm are described, along with an explanation of its actual position.
Chapter 4	Chapter 4 contains a comprehensive evaluation of the results for each stage's findings. It shows all the details about the experimental setup, analysis, and outcomes. The accuracy of the implemented algorithms, best accuracy score and classification report are also explained.
Chapter 5	Chapter 5 presents the impact of the study in the social and environmental sectors with issues of ethics. It also discusses how to make this research project sustainable.

Chapter 6	The future scope of this research project is depicted in Chapter 6, where it is barely mentioned as the growth of this research study. The final chapter of the study report provides a helpful conclusion and provides a brief summary of the research's main findings.
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CHAPTER 2

BACKGROUND

2.1 Preliminaries/Terminologies

Li, Zhaorui, et al.'s technique recommends routes by learning how other tourists have previously traveled in the city. Given that the tourist's path is a unique variation of time sequence, they viewed such a route as a special language, and therefore such a suggestion process as a unique translation process. As a result, they employed a sequence-to-sequence (seq2seq) model to continue such learning and perform the recommendation task. Sun, Shao long, et al.'s research shows combining tourist volume series with Baidu Index and Google The index may greatly increase forecasting accuracy and robustness analysis. Tasfiqul Ghani et. al. worked on implementing Linear Regression. This algorithm is used to find the ideal location for the user which is displayed by the application. They have used Dijkstra's algorithm to find out the efficient shortest path and route for the users. Sentiment classification of online review shows SVM and N-gram approaches showed higher accuracies than the Naive Bayes strategy, according to the results. The difference between the algorithms was especially significant when the training data set was as small as 40 or 100 reviews. All three techniques were able to achieve accuracy levels of more than 80% when training data sets comprised 500 or more reviews. Nesreen Kamel et. al.'s analysis on Tourism Demand Forecasting shows, to explore the effect of time, it is needed to additionally include the time index as an input variable resulting discovery of GRNN, KNN, SVR, and GP are more stable approaches, as seen by their low standard deviations across the 20 runs but GRNN was the only method that achieved three highly accurate forecasting's, one good forecasting, and only one reasonable forecasting. KNN, MLP, GP, and RBF did not achieve any forecasting accuracy.

2.2 Related Works

Nesreen Kamel et al. analyzed Tourism Demand Forecasting by Using Machine Learning Methods had some similar works because they used machine learning methods like Multilayer Perceptron Neural Network (MLP), Radial Basis Function Neural Network (RBF), Generalized Regression Neural Network (GRNN), K Nearest Neighbor Regression (KNN), Classification and Regression Trees (CART), Support Vector Regression (SVR), Gaussian Processes (GP), and GRNN, KNN, SVR, and GP gave stable and accurate results compared to other algorithms.[1] Li, Zhaorui, and colleagues investigated A machine learning approach for tour recommendation based on users' historical travel experience They presented LearningTour, a technique that recommends routes by learning how other tourists have previously traveled in the city. Given that the tourist's path is a unique variation of time sequence, they viewed such a route as a special language, and therefore a unique translation process. They employed a sequence-to-sequence (seq2seq) model to continue such learning and perform the recommendation task. Although their approach is quite effective, for new cities they cannot provide assistance due to a lack of previous data.[2] TourGuru is a web-based application that lacks machine learning and gives tourists accommodations, travel services, and guidelines. It is helpful in many ways, but it cannot give a real prediction about the tour location. [3] Bokun is another web-based application that mostly helps tourists through accommodations in various tourist locations. Although they help tourists, they cannot give the proper recommendations and predictions about the estimated cost and enjoyment. [4]Inspirock is the most relatable work because they use a variety of machine learning-based bots to assist tourists in planning and managing their tours. They are working with a huge dataset to achieve the highest possible accuracy.[5] Dewangan, Anjali, and Rajdeep Chatterjee showed tourism recommendations using a machine learning approach where they described various models such as Time Series Model, Artificial Neural Network (ANN) Model, ARIMA Method, and SOM Architecture Methodologies. MAPE showed better calculation performance in regression analysis, assisting the machine learning algorithms on tourist arrival rate.[6]

In this paper, they discovered search engine queries as a new source of data that may be utilized to anticipate tourism demand in this article. In this study, they suggested a forecasting framework that leverages machine learning and internet search indexes to anticipate visitor arrivals for major Chinese sites, and compared its forecasting performance to Google and Baidu search results, respectively. They confirmed the Granger causality and cointegration link between the internet search index and Beijing tourist arrivals. Their experimental results indicate that, when compared to benchmark models, the proposed kernel extreme learning machine (KELM) models, which combine tourist volume series with Baidu Index and Google Index, may greatly increase forecasting accuracy and robustness analysis. They simply utilized Beijing as a benchmark; we will use our viewpoints to deliver a solid outcome for every particular tourist attraction.[7]

Tourism recommender systems have grown in popularity as a tool for arranging and planning travels. Isabel Cenamor et al. build planning for tourism routes using social networks. Three primary sub-services feature the PlanTour architecture. The Tourist Plan Manager (TPM), Viewer, Automated Planner. TPM gets the PlanTour planner's inputs. The following are the inputs to PlanTour: the place or location the user will travel; when s/he will be eligible, period to travel and depart the location; and potentially additional limits and desires. The Automated Planner module automates the planning process by utilizing several metrics. MiNube is a tourism networking site where users may obtain motivation from other users to plan their next trip's destination, make a list of POIs for the desired state or region, and share their experiences with others. Google Maps is a map service with a powerful visual interface that can be accessed from any system or application. In PlanTour, TPM handles TTDPs by constructing planning activities that are provided to an automated planner based on data retrieved from minube services. The domain and the problem files are used to model planning tasks in PDDL. [8]

Tasfiqul Ghani et. al. worked on a smart tourist guidance system based on machine learning. They build a mobile application that provides guides to the users on the basis of their preferences. They have used a built-in GPS tracker to check users' location and check real-time databases to suggest the appropriate location and details. They create their UI

design with Adobe XD, front-end part using XML, back-end code using JAVA, PHP for server-side language, and MySql for the database. For using location they have used Google map API. In the machine learning part, they have implemented Linear Regression. This algorithm is used to find the ideal location for the user which is displayed by the application. They have used Dijkstra's algorithm to find out the efficient shortest path and route for the users. Before the execution of the application, they have done some testing to find out errors or vulnerabilities. From all means, this application functions perfectly in all Android forms with almost no downtime. [9]

Mahdis Banaie Dezfouli et. al. analyzed A Novel Tour Planning Model using Big Data. The major goal of the work is for the user to select spots of interest and to plan tours based on the information acquired from the tour planning big data. Tourists must choose the pathways which have the most areas of interest among the frequent trips depending on time and budget constraints while arranging a tour. The tourist business may gain detailed insights into travelers' demands, as well as the reasons for their contentment and values, by utilizing big data. Smart tourism - applies to collect numerous data, effectively organize, filter, evaluate, and use massive amounts of data for the design of tourist industry, services, and commercial innovations, in addition to enhancing the ability of the business. The implementation of mobile tour schedules increases the revenue of tourism organizations and the level of service quality, according to strategic planning studies. The goal of this model is to develop a source and a destination that is based on the users' preferences and restrictions, and that explores the most POIs while decreasing expense and hassle, leading to greater client satisfaction. [10]

Nowadays, some possible applications include efficiently extracting opinions or reviews from travel forums, as well as merging automatic review mining with search engines to provide valuable information about search results for opinions on specific travel destinations. Qiang Ye et al. explain here the sentiment classification of online reviews of travel destinations. They have applied the Naive Bayes model for sentiment classification, support vector machines for sentiment classification, and an N-gram-based character language model for sentiment classification to a corpus of reviews about travel

destinations, techniques, and the world's top seven most popular travel destinations. The SVM and N-gram approaches showed higher accuracies than the Naive Bayes strategy, according to the results. The difference between the algorithms was especially significant when the training data set was as small as 40 or 100 reviews. All three techniques were able to achieve accuracy levels of more than 80% when training data sets comprising 500 or more reviews. [11]

Intelligent tourists' information systems by using machine learning are analyzed by R. Sai Ganga et. al. Here the main aim was to create an adaptive, accessible, and user-friendly information system that learns from the users' inputs over time and gives personalized suggestions. This experiment was done by using GSM arena's testing. They have explained various existing methods named Semantic web applications, Geodata handling, DSS system, GPS tourist guide. They have proposed a method that works with data framework and NLP. The users can interact with the front end of the system, which is linked to the database and the NLP framework via the backbone support application. Three major parts of this application are data framework, NLP, AI part - machine learning, and information investigation. The collected information is then processed to machine learning and data analysis, with the results being delivered back to the user via the support application's front end. [12]

We carefully examined related works and proposed a better and more effective method of assisting tour planning by utilizing machine learning algorithms to provide the most accurate recommendations.

2.3 Comparative Analysis and Summary

Bokun is an all-in-one website designed to keep your tour and activity business organized and attract more online reservations. This Software for tour operators was developed by Trip advisor and born in Iceland. It also creates an online booking platform or begins accepting reservations on your current website. It has access to our exclusive worldwide

supplier and reseller network and total bookings made on Expedia, Viator, GetYourGuide, and other websites. [4]

Inspirock is a trip planner website where users can set the input as their preferences and the platform shows the maps and location details. It shows a proper trip plan based on the city of countries. It shows route, day by day plan, where to stay and checklists also. [5]

Big Data was used by Mahdis Banaie Dezfouli et al. to evaluate a novel tour planning model. The user's ability to choose points of interest and to organize tours using data from the tour planning big data is the main objective of the work. Depending on time and financial restrictions, tourists must select the frequent trips that offer the most interesting pathways while planning a tour. The objective of this model is to create a source and a destination based on the preferences and constraints of the users, which explores the most POIs while reducing cost and effort, resulting in a higher customer experience. [10]

Our method will assist the user in finding the ideal location for them because it is based on the popular tourist destinations in Bangladesh. The user will see destination information as well as other crucial elements so they are properly informed about the travel destination, route, map, etc.

2.4 Scope of the Problem

Most people when making a tour plan face many problems. So, we decided to publish a tourist application. This tourist application helped people to make a tour plan easily. Nowadays traveling is one of the most popular trends. Our tourist application gives many facilities. Our tourist application gives proper direction, selected proper tourist places, proper time selection, and booking facilities. When a user opens the application, he is faced with some questions. After submitting the input of those questions, the user will see the proper details about tour planning. This time our application provides tour date time, and

some selected tourist places. All facilities are given by our app. This application's main goal helped tourists.

People are very interested in traveling. Nowadays, younger people are making tour plans and discovering many things. Our application has some rules and regulations, like a user selecting only 12 tourist places. This tourist application is only available in Bangladesh. Bangladesh has many tourist places. Day by day, we are seeing more and more tourist places. We suggest they move from cheap places to high places within their fixed amount. Lots of people have the desire to travel, but they don't have any proper plans to do it. Through our app, we offer users a perfect tour plan to fulfill their dreams.

The tourism business will be one of the fastest growing industries if our applications operate flawlessly. In terms of development, these industries will be crucial.

2.5 Challenges

In our solution, finding the best algorithm to perform prediction was the most challenging part because of the unstructured data we had to work with. The majority of popular machine learning algorithms did not produce expected results that we could reliably predict, but some did, and working with these is the current challenge. Collecting usable data is another challenge, as the results are completely dependent on the dataset we have collected. We tried most of the techniques we could to get the most reliable information for our dataset. We conducted a survey based on recent tour experiences to eliminate outdated pricing and interests. Maintaining a large dataset as it grows with users is a challenging task. Furthermore, processing newly added data into the system is another hassle.

Our other challenge is to draw a user's interest and gain trust. As there are some applications with similarities to us, increasing users and giving better service is going to be challenging. Making our application as simple as possible and also giving users the best experience is a great responsibility for us. Synchronizing the ever-changing weather through our system will be much more difficult, which, in fact, will impact the predicted

result, differentiating our user's experience. Adding a payment system and linking accommodation and transportation facilities to our system will add benefits to the users but also challenge our system for service and security. Managing estimated tour costs will increase prediction failure because price increases are unpredictable in our working dataset and sector.

With so many challenges ahead, we are proposing the most effective solution to overcome this and make our application sustainable and useful, which will benefit the entire tourism industry.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Subject and Instrumentation

Research is a proper examination of the data that makes room for the development of fresh ideas for concepts, questions, and understandings. Research's primary goal is to dive into the unexplored and reveal new possibilities. South Asia and Southeast Asia have grown in popularity as tourist destinations during the past several years. Bangladesh has great potential to make our tourism sector more successful so that it can contribute more to our economy. However, there are several issues that people face during the planning and implementation of a tour. Therefore, we decided that we should create a system to solve this issue. Our system is built on methods for machine learning. An intuitive software program with a machine learning algorithm has been developed so that users may input their information for a tour and receive information about the destination and route.

3.2 Data Collection Procedure

For this analysis, data is one of the most important elements. We gather information through Google forms and on printed paper. A Google form was circulated to our familiar members around us. We go to people and collect information from them hand in hand, but this process is lengthy and troublesome. We used Google forms because it was a hassle-free process. For this, we prefer the younger generation, especially varsity-going students, because they are very interested in traveling and exploring new things. We took university classes and collected the answers to our research questions from students.

3.2.1 Data Preprocessing:

After receiving the data, I notice that it contains a lot of jumbled information, such as numbers and strings, unnecessary spaces, and missing values. The dataset has 1200+ records and 8 attributes. One attribute has a lot of classes, and its value is also strings. That's why we dropped this attribute. The variable tourist spot has 11 classes. The format of the data was not machine-readable. Some attributes have string values, and we convert those strings to numeric values by using the label encoder method to feed the data. We remove all missing values and replace some values. We change the same categories for each string value to address case-related conflicts. People will be able to visit historical places and will know about our glorious history.

3.3 Statistical Analysis

All statistical facts and representations are reflected by statistical analysis. Confusion matrices, precision, recall, f1 score, and support are displayed here.

3.3.1 Heat map

Multivariate data that is graphically represented as a matrix of columns and rows is known as a heat map. The association between various numerical variables can be described using heat maps, which can help highlight patterns and abnormalities. Figure 3.1 shows the heatmap of our data.

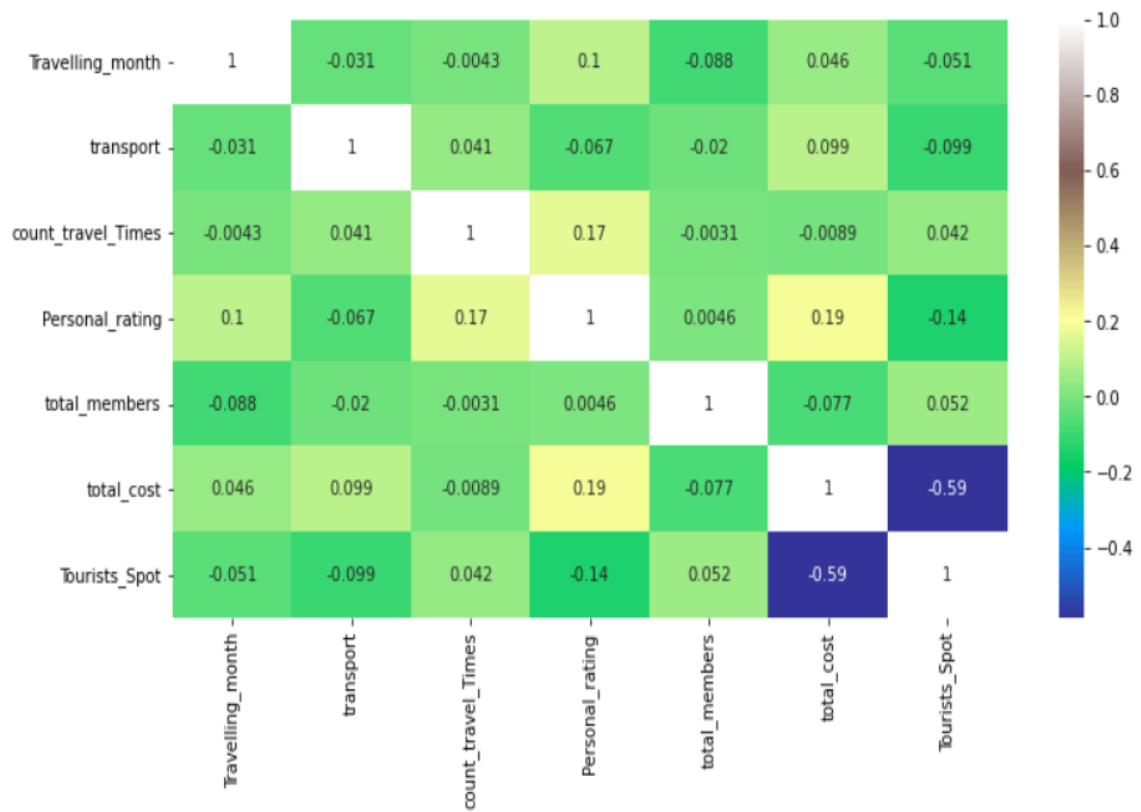


Figure. 3.1. Heatmap

3.3.2 Count Plot

To display the counts of observations in each category bin using bars, we use the seaborn count plot () method. Figure 3.2 represents the count plot of our information.

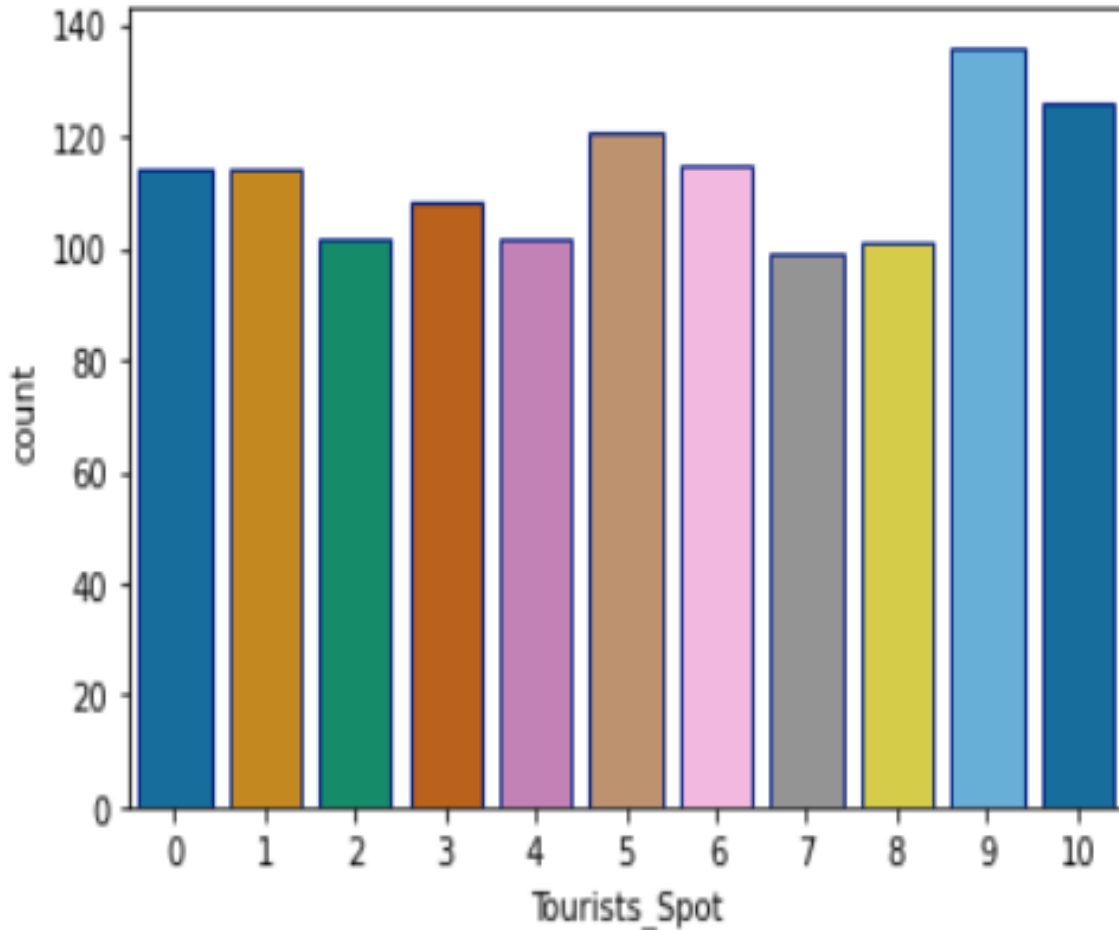


Figure. 3.2 Count plot

3.3.3 Cat plot

Cat plot is used for creating categorical plots onto a Facet Grid using a Figure-level interface. This feature gives users access to a number of axes-level functions that illustrate the relationship between a numerical variable and one or more category

variables using a variety of visual representations. Figure 3.3, 3.4 shows the cat plot on the basis of the given variable.

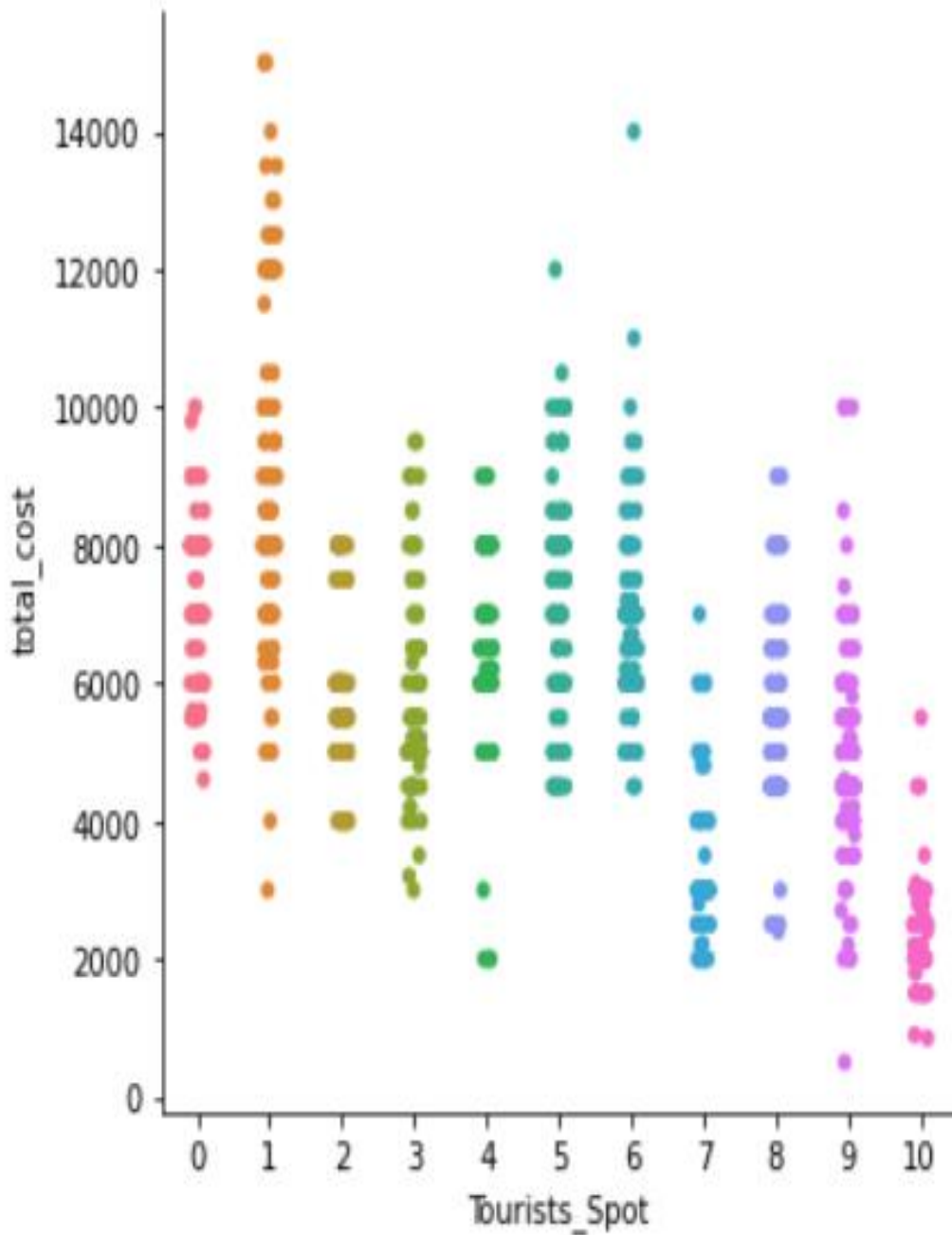


Figure. 3.3 Cat plot (Tourists_spot, total_cost)

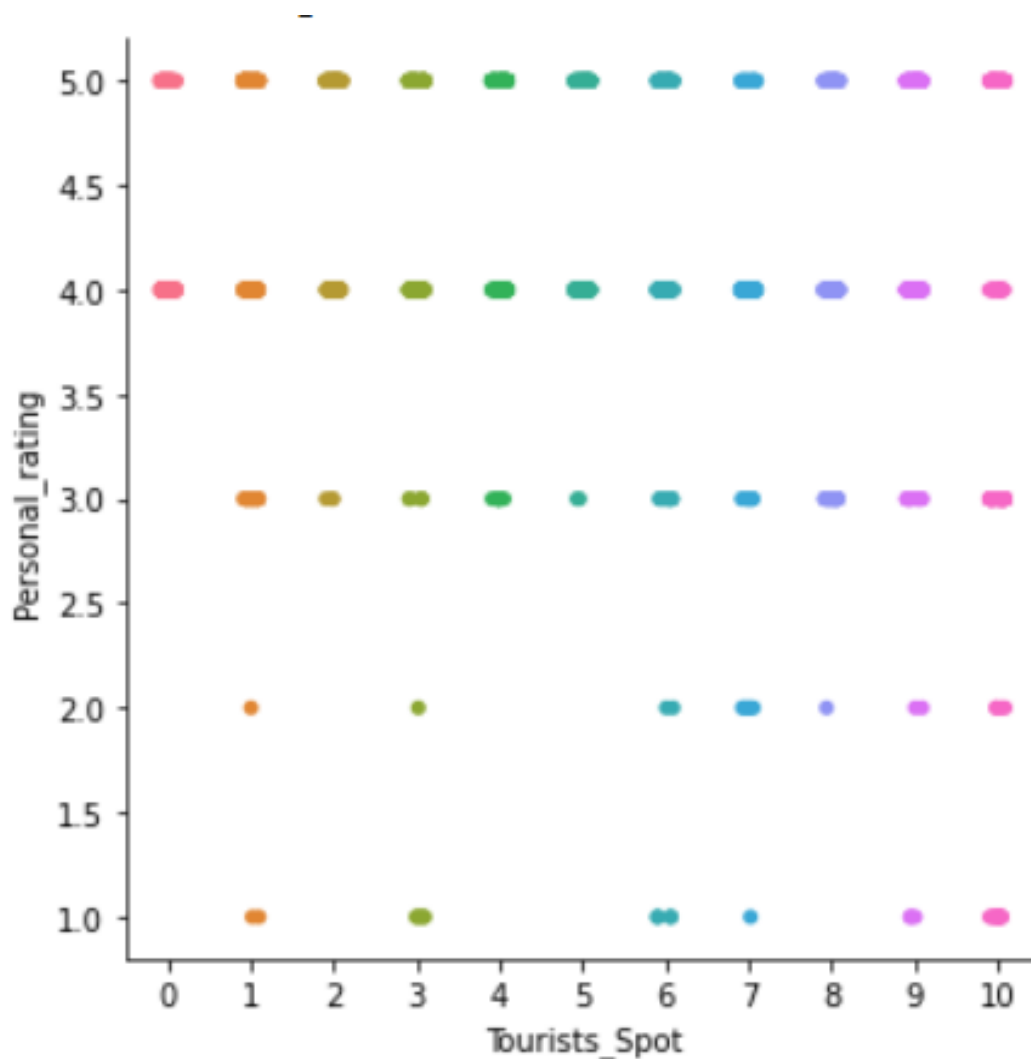


Figure. 3.4 Cat plot (Tourists_spot, personal_rating)

3.3.4. Confusion Matrix

The confirmation of the true dependent outcomes depends on the confusion matrix. The performance of a classification model is examined using the $N \times N$ matrix known as the confusion matrix. The confusion matrix evaluates the precision of the machine learning model. An algorithm creates a model that highlights any mistakes as a result. Binary equations will make it simple to assess accuracy, memory, and correctness.

Understanding the four fundamental components that are used to calculate different assessment systems is crucial. In Figure 3.5, 3.6 and 3.7, the confusion matrices for each approach are displayed.

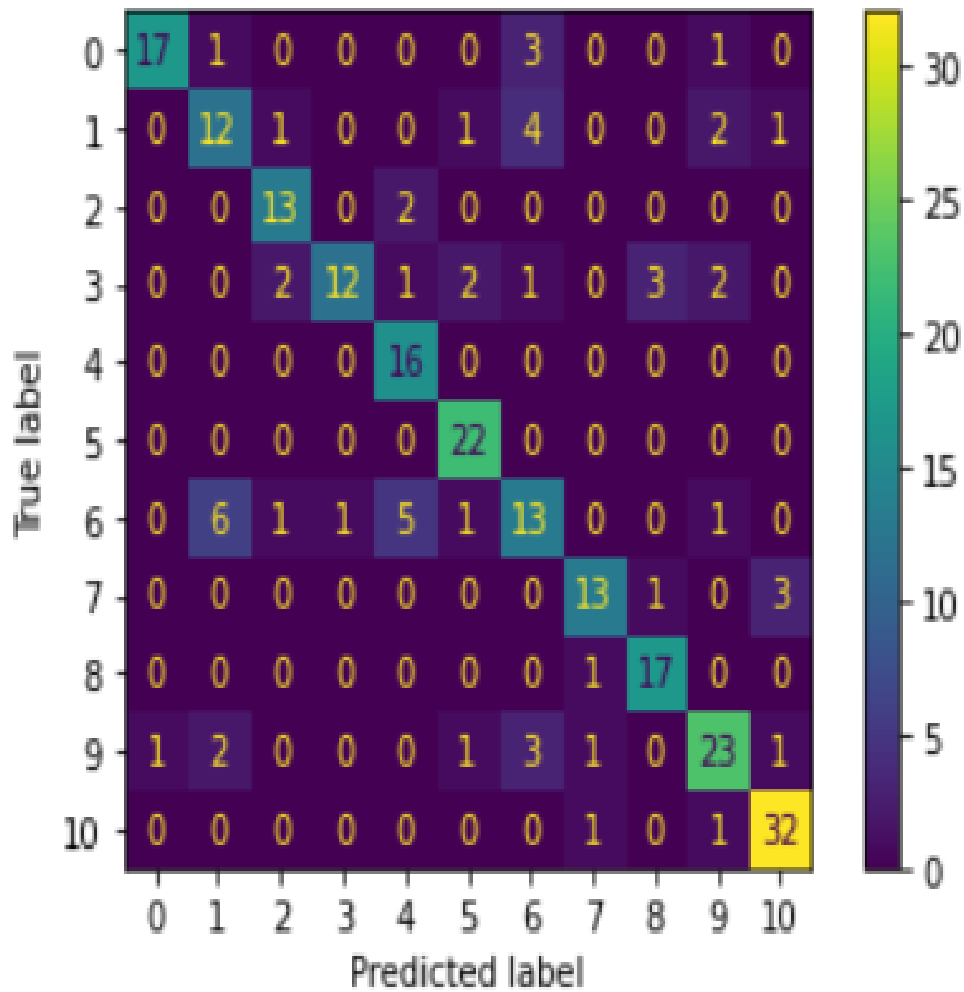


Figure. 3.5 Confusion Matrix (Decision Tree Algorithm)

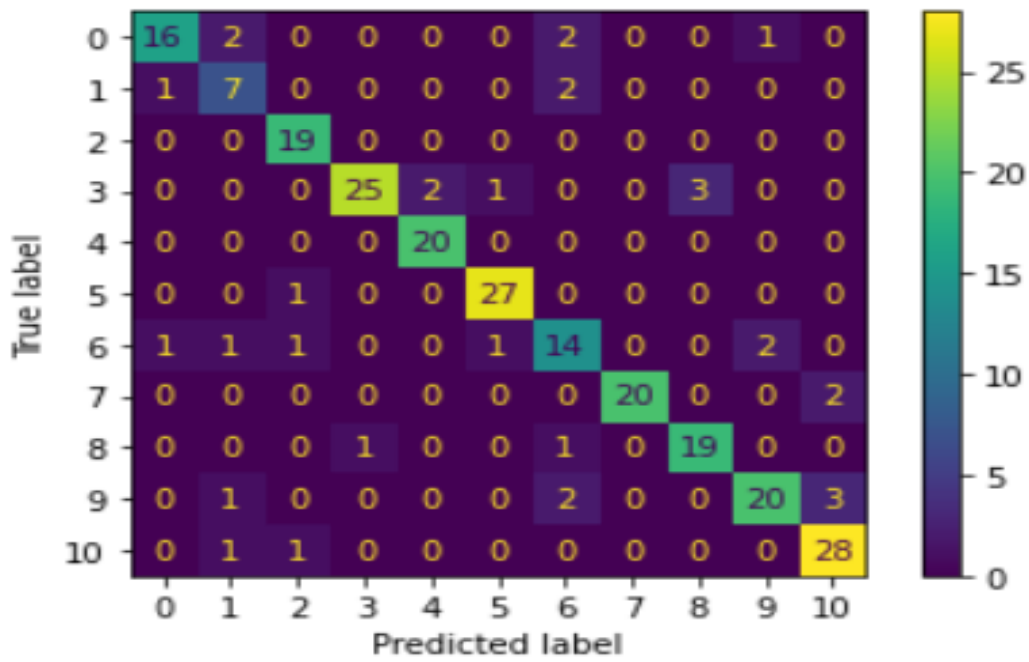


Figure. 3.6 Confusion Matrix (Random Forest classifier)

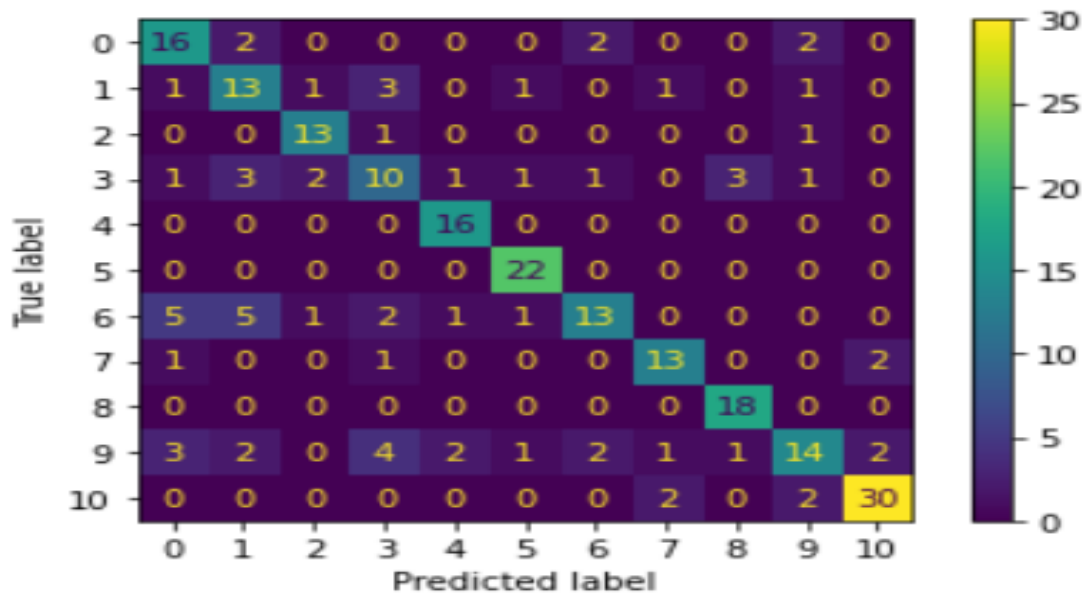


Figure. 3.7 Confusion Matrix (K-nearest neighbor)

3.3.5 Classification Report

Table 3.1. Classification Report for Decision Tree Algorithm

Class	Precision	Recall	f1-score	support
Bandarban	0.70	0.67	0.68	21
Cox's_Bazar	0.64	0.56	0.60	25
Khagrachari	0.95	1.00	0.97	19
Kuakata	0.86	0.95	0.90	20
Rangamati	0.74	0.92	0.82	25
Saint_Martin	0.86	0.72	0.78	25
Sajek	0.38	0.39	0.38	23
Sitakunda	0.90	1.00	0.95	18
Sundarban	0.88	0.94	0.91	16

Sylhet	0.64	0.52	0.57	27
Tanguar_Haor	0.97	0.97	0.97	29
accuracy			0.77	248
macro avg	0.77	0.78	0.78	248
weighted avg	0.77	0.77	0.77	248

Table 3.2. Classification Report for Random Forest Classifier

Class	Precision	Recall	f1-score	support
Bandarban	0.89	0.76	0.82	21
Cox's_Bazar	0.66	0.76	0.70	25
Khagrachari	0.90	1.00	0.95	19
Kuakata	0.89	0.85	0.96	20

Rangamati	0.96	0.96	0.81	25
Saint_Martin	0.86	0.76	0.48	25
Sajek	0.63	0.43	0.97	23
Sitakunda	0.95	1.00	0.94	18
Sundarban	0.94	0.94	0.81	16
Sylhet	0.77	0.85	0.98	27
Tanguar_Haor	0.97	1.00	0.97	29
accuracy			0.84	248
macro avg	0.85	0.85	0.84	248
weighted avg	0.84	0.84	0.84	248

Table 3.3. Classification Report for K-nearest neighbor

Class	Precision	Recall	f1-score	support
Bandarban	0.50	0.67	0.57	21
Cox's_Bazar	0.53	0.40	0.45	25
Khagrachari	0.83	1.00	0.90	19
Kuakata	0.67	0.70	0.68	20
Rangamati	0.89	0.96	0.92	25
Saint_Martin	0.61	0.76	0.68	25
Sajek	0.33	0.26	0.29	23
Sitakunda	0.81	0.94	0.87	18
Sundarban	0.93	0.88	0.90	16
Sylhet	0.56	0.33	0.42	27

Tanguar_Haor	0.97	0.97	0.97	29
accuracy			0.70	248
macro avg	0.69	0.72	0.70	248
weighted avg	0.69	0.70	0.69	248

3.4 Proposed Methodology/Applied Mechanism

We identified the algorithm with the highest accuracy compared to other algorithms after examining the statistical data. Then, using the most precise algorithm possible, we create a smartphone application that enables users to provide correct recommendations for tourism attractions.

3.4.1 Machine Learning Techniques

Machine learning is a data analytics method that trains computers to learn from experience, just like people and other animals do. Without using a preexisting equation as a model, machine learning algorithms directly "learn" from data using computational techniques.

Unsupervised learning, which makes use of internal structures or hidden patterns in the input data, and supervised learning are the two methods used in machine learning. Supervised learning employs known input and output data to train a model to predict future outputs.

3.4.2 Classification

Machine learning's classification method consists of two steps: learning and prediction. The model is created using provided training data in the learning phase. The model is used to forecast the response given the provided data in the prediction step. One of the most well-liked and straightforward categorization techniques is the decision tree.

3.4.2.1 Decision Tree

In supervised learning, decision trees can be used to address classification and regression issues. However, they are most frequently used to address categorization issues. In this tree-structured classifier, internal nodes contain dataset properties, branches represent decision rules, and each leaf node represents the classification result.

Sum of Product (SOP) representation is what decision trees use. The Disjunctive Normal Form (DNF) is another name for the sum of products (SOP). Every branch in a class from the tree's root to its leaf node has the same class, and any branches that end in that class create disjunctions (sum).

The primary issue is choosing which attributes to take into account for the root node and each level of the decision tree. This is handled in a process known as "characteristics selection." To find the attribute that can be regarded as the root note at each level, we use various methods of attribute selection.

In order to achieve this, you must use the Decision Tree to build a training model that applies basic decision rules to forecast the category or value of input variables based on the training dataset.

$$\sigma = \sqrt{\frac{\sum_{b=1}^B (f_b(x') - \hat{f})^2}{B - 1}} \text{-----(i)}$$

3.4.2.2 Random Forest Classifier

The term "random forest" refers to an ensemble of several different decision trees that work together to perform tasks. The class with the most votes become the prediction made by our model after each tree in the random forest produces a forecast for that class. As a result of its versatility and simplicity, it is also one of the most widely used algorithms.

As the model grows trees, the random forest introduces more randomness. When dividing a node, the best feature from a randomly chosen collection of features is sought rather than the most important feature. In general, a better model has been produced due to the significant variation this causes.

3.4.2.3. K-nearest Neighbor

The k-nearest neighbors (KNN) technique is used to determine the likelihood that a data point will belong to one group or another based on which group the data points closest to it do.

An example of a supervised machine learning technique used to resolve classification and regression issues is the k-nearest neighbor algorithm. However, classification issues are its primary application.

It does not make any assumptions about the distribution of the underlying data, it is regarded as a non-parametric method. KNN, in short, seeks to identify the group to which a data point belongs by examining the data points around it.

In order to decide the class of an unobserved observation, KNN uses a voting mechanism. This indicates that the class that receives the most votes will be the class for the relevant data point.

$$(x_i, x_j) = \sqrt{(x_i - x_j)^2 + (y_i - y_j)^2} \text{----- (ii)}$$

3.4.3 Proposed System

After analyzing the statistical data, we found an algorithm to be the most practical way to achieve our goal. Our application takes input from the user. The inputs are then evaluated through a machine learning algorithm that finds the predicted result to be best for the user based on their preferred inputs. Our app will evaluate the user's expressions and send the report data to our server, from where we will try to improve our prediction accuracy, hence adding much more data to reach peak success. There will be a profile page where users can see their recent trips and rate their experiences. We will consider alternative suggestions if a user has already visited the predicted place. Accommodation and transportation suggestions will be given based on budget preferences, giving the most reliable experience from our end.

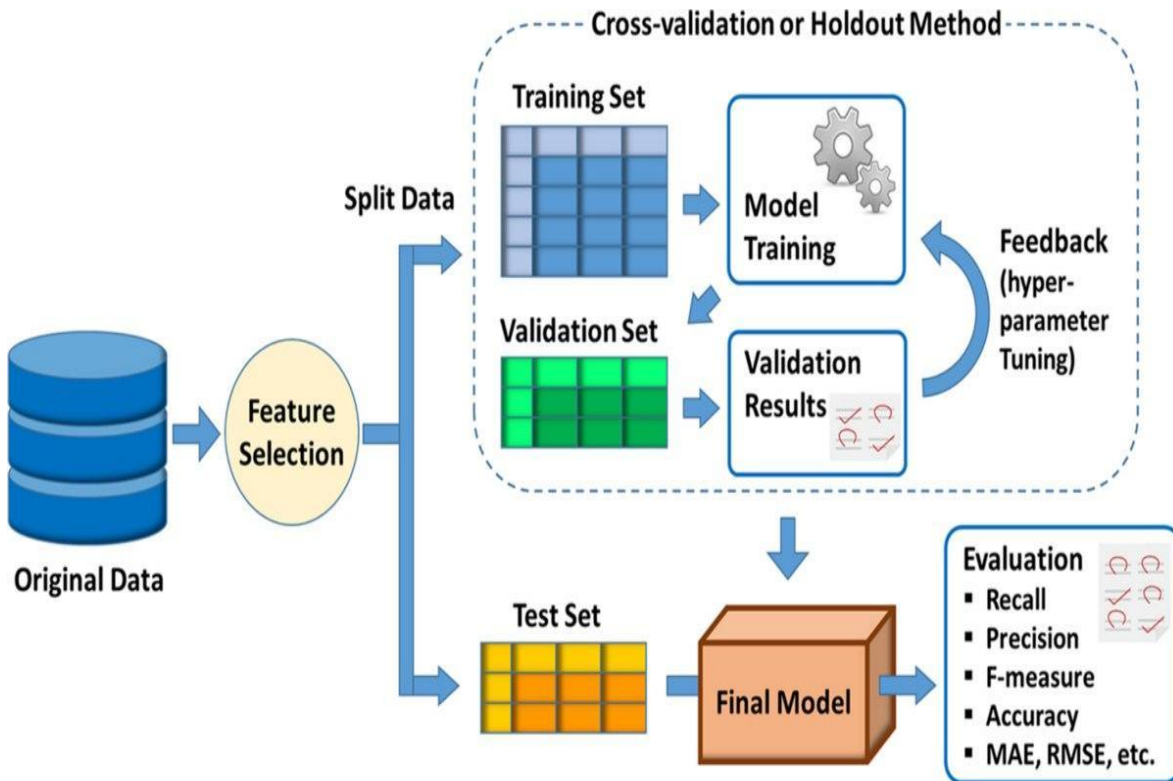


Figure. 3.8 Proposed System

Our application will feature Input from the user output result: Alternative suggestions Guidelines Booking and payment.

User profile

Our users will have distinct profiles of their own. It will monitor users' behavior over time. Associate profile picture, contact information, and history of recent travel will be shown on the profile menu. A profile bonus will be added through various discount offers.

User input

Users will fill in a form of their preferences, which will be evaluated to give a predicted suggestion. The form will use input data such as budget estimate, type of spot preference, and a number of members. Our advanced machine learning will predict results based on the given inputs. The inputs are the determinants of the system, we feed our machine learning system the intended preferences and take suggestions from the result. Budget estimation, time of tour, group members, personal preference etc. are token for the system, these inputs get as Strings and deliver them to our server-side. Finally, our best-fit algorithm predicts best suited for specific user.

Output result

Based on the users' input, machine learning-implemented output will appear on the result and suggestions page. A card view will appear with the result and a short description and will link to a detailed page of the documentary for our users' interest. Recycler View holds all the available tour places we stored as options, then with matching to our Machine Learning output, the result spot with its own Card View details pops up on the output page. Users then can explore details about the spot and can get some of the views stored there.

Alternative suggestions

With the predicted result, similar places will be shown in case the user wants a different place to explore. Similar to output results, alternative results will also have a short description and an overview. They are available with own descriptions and views.

Guidelines

To make the tour exciting and enjoyable, our application will provide destination-based guidelines with proper location services. To avoid inconvenience, best practice suggestions will be provided to notify our users.

Payment and reservation

The application will have accommodation and transportation facilities for the users. They can avail the facilities through online payment and confirmation, which will completely change the experience of traveling.

3.5 Implementation Requirements

To implement the whole project, we need:

- Machine learning environment
- Users' data
- Live server
- Mobile application
- Business mentors and investors or funding

Machine learning environment

A handful of machine learning tools with proper algorithms are needed to function properly. Based on the dataset, we need to evaluate the situation and predict output through various algorithms which should be dynamic as different algorithms can be beneficial to different situations. As we are implementing the advancement of machine learning, it is more suitable to use the best technology we have on our hands. We can use advanced machine learning environments, which will help us to apply various algorithms easily and help implement them on board.

Users' data

In our work, the most important asset is the dataset. It is the backbone of our project, as we cannot give results of our own. More data on hand could result in more accurate results. The data that we have collected is the learning book for our application. The more precise the data is, the more prestigious our predictions will be. Hence, users' data is a must requirement to implement the project. We collected raw data of our own from person to person, then filtered them to bring out the most accurate finishing we could.

Live server

Operating the whole application needs continuous data retrieval. To engage with our users, live data fetching is mandatory. A live server could solve this problem, as data can be accessed whenever needed. This will help our application function properly and stay updated over time. We want to calculate all the algorithmic workload on server-side as this will help us make our application lightweight and portable to use. Also, data loss can be protected through this approach with live sync system.

Mobile application

Currently, most of us cannot think of our days without a smartphone, so we want to reach most of the users through mobile applications as it is easy to access and can serve everything we want. The application will be an all-in-one solution for our users. From best tourist spot suggestions to guide the whole planning process, from reserving accommodation to booking transportation, everything will be covered through one mobile application for users' convenience. From suggestions to booking, from on the road to the spot, from home to again back to home, we are well engaged to provide the best we can afford to help our users more on their comfort and finance. This could be a revolution of Bangladeshi touring system.

Business mentors and investors or funding

To kickstart the whole idea, we need some funding, which requires some form of investor. To make this beneficial both for operators and users, we need to control operating costs to

serve fluently. Moreover, this application targets the most demanding sector, in which investors could cut a great business profit.

CHAPTER 4

EXPERIMENTAL RESULTS AND DISCUSSION

4.1 Experimental Setup

To test our system, we have taken user data collection from person to person to ensure scalability. We divided the dataset into 70 by 30 percent where we took 70 percent of the data to train various models and the rest of the dataset was used in testing. In the application, we put the model in the background and took user inputs to experiment prediction. Every time, the inputs were distinct enough to test the entire application. For the application, we took devices of various Android versions and screen sizes to check the proper functionality across devices. The input request and output collection time measured thoroughly throughout various devices on varying connections and operating systems. We had to go with the best technology we have on hand, to get the best results we choose to go with these implication table (Table 4.1.)

Table 4.1 Technology list

Technology/Platform	Language	Environment
Android	XML, JAVA	Android Studio
Database	SQL	Firebase
Machine Learning	Python	Colab

We choose the Android platform to gain the most mobile device users. XML and JAVA work as the backbone of our application which provides the robust and fluent application experience. To store our data encrypted, we choose to go with Firebase as it provides all modern facilities and easy to maintain our valuable data. All the machine learning process is done through a powerful environment, Collab. We used Python to do all our machine learning operations.

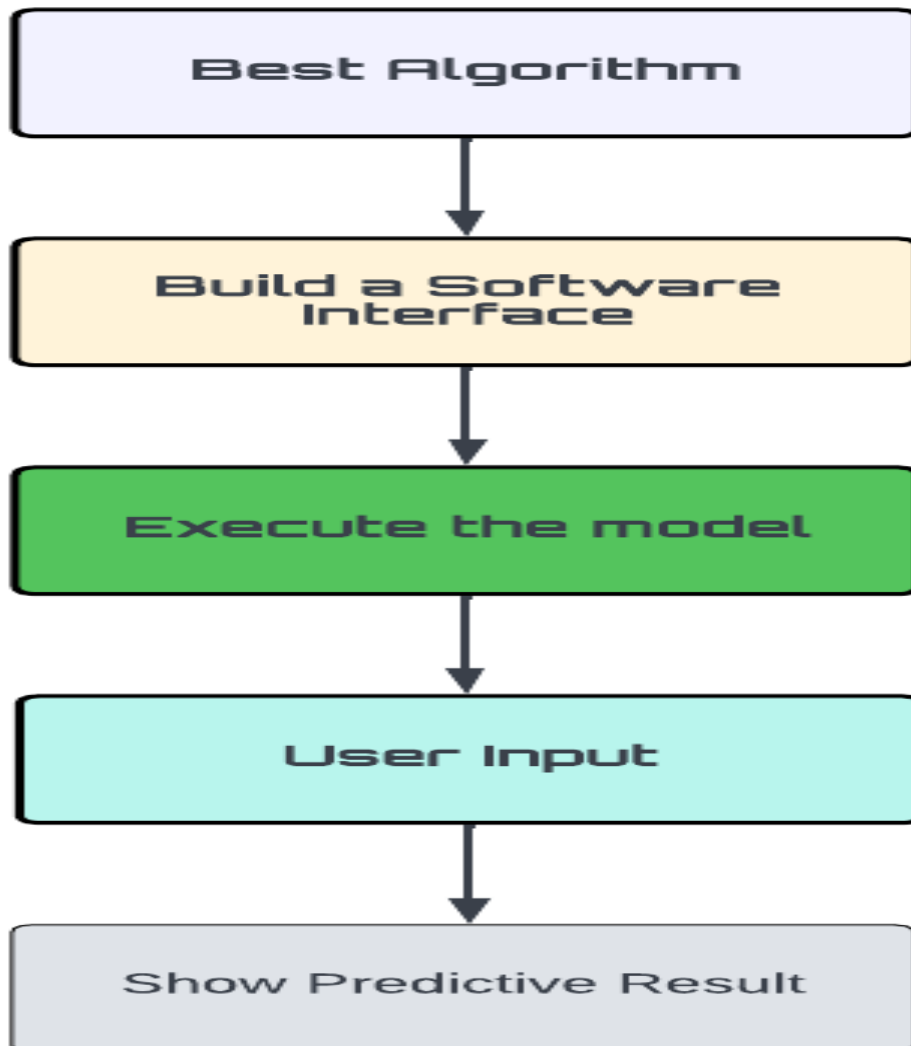


Figure. 4.1 Proposed Method to Web Interface

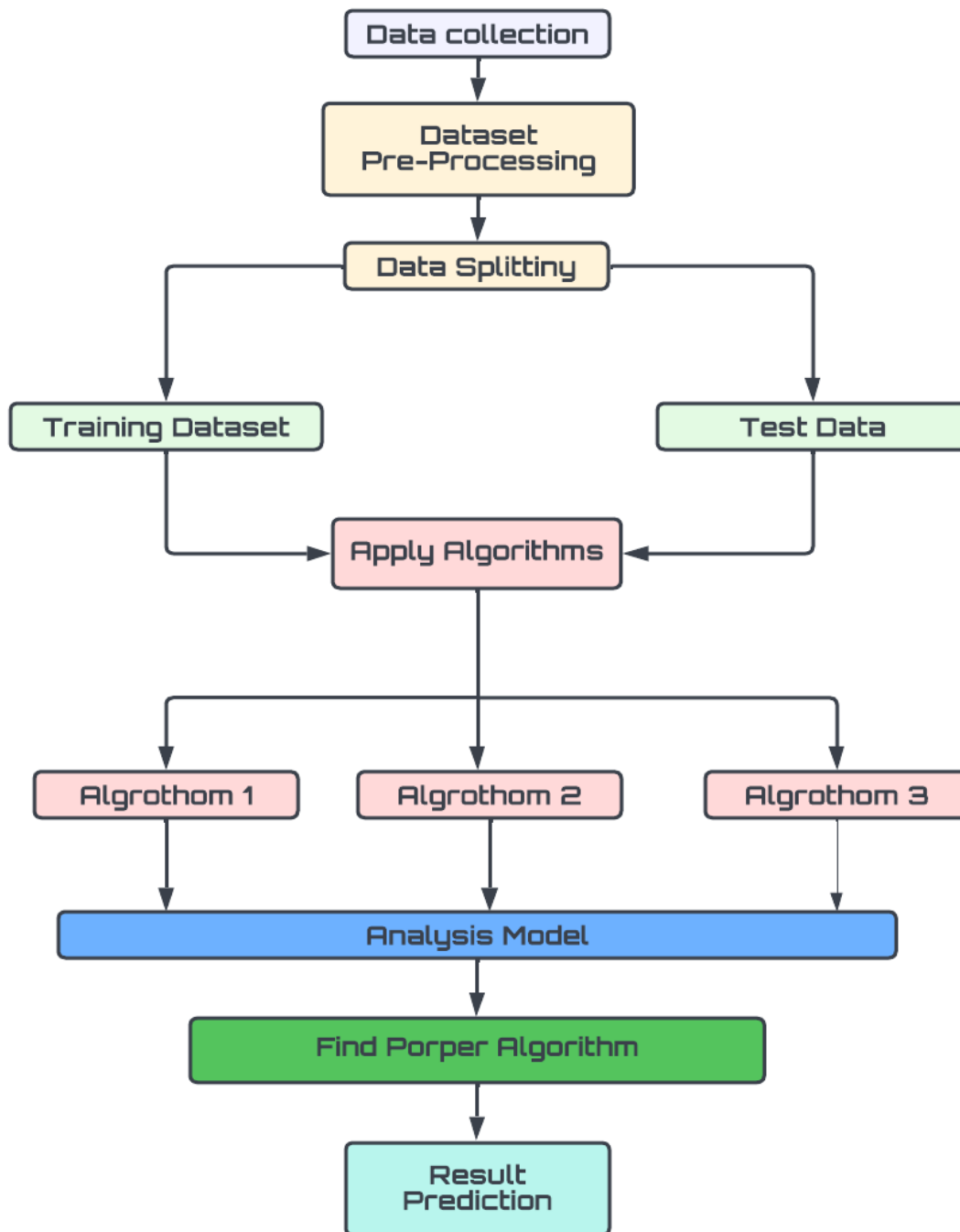
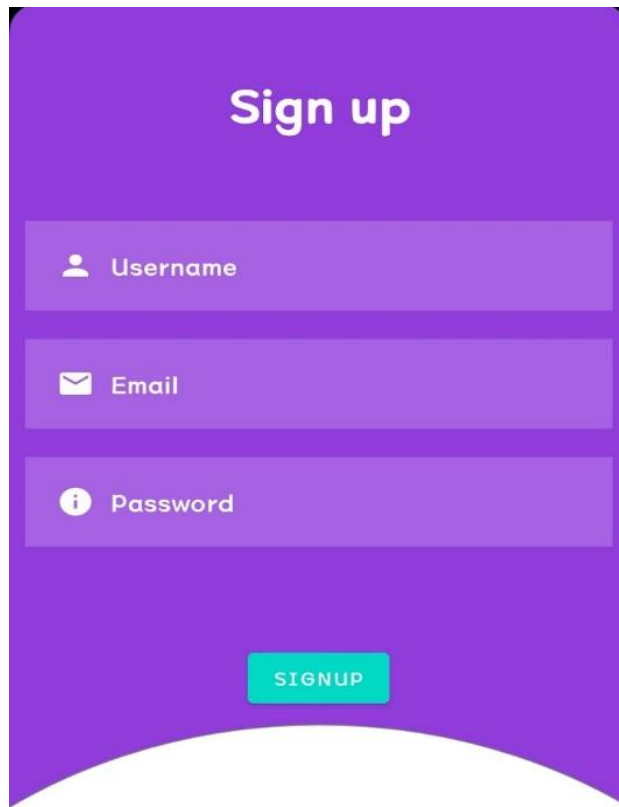


Figure. 4.2 Proposed Method to Predict diabetes Disease

We have used google Firebase(Figure.4.6) as secure database to create(Figure.4.3) and login(Figure.4.4) to account. The users directed to use valid email addresses to impose further activities. In case of forgetting password, a strong recovery option(Figure.4.5) implemented to give users freedom of use.

Detailed pictures are: Figure (4.3 – 4.5)



The image shows a mobile application sign-up screen. The background is a solid purple color. At the top, the text "Sign up" is displayed in a white, sans-serif font. Below this, there are three vertically stacked input fields, each with a light purple background and a white border. The first field is labeled "Username" and has a small white person icon to its left. The second field is labeled "Email" and has a small white envelope icon to its left. The third field is labeled "Password" and has a small white information icon to its left. At the bottom center of the screen, there is a green rectangular button with the word "SIGNUP" in white, uppercase letters. The bottom edge of the screen has a white, curved cutout.

Figure. 4.3 Sign up page

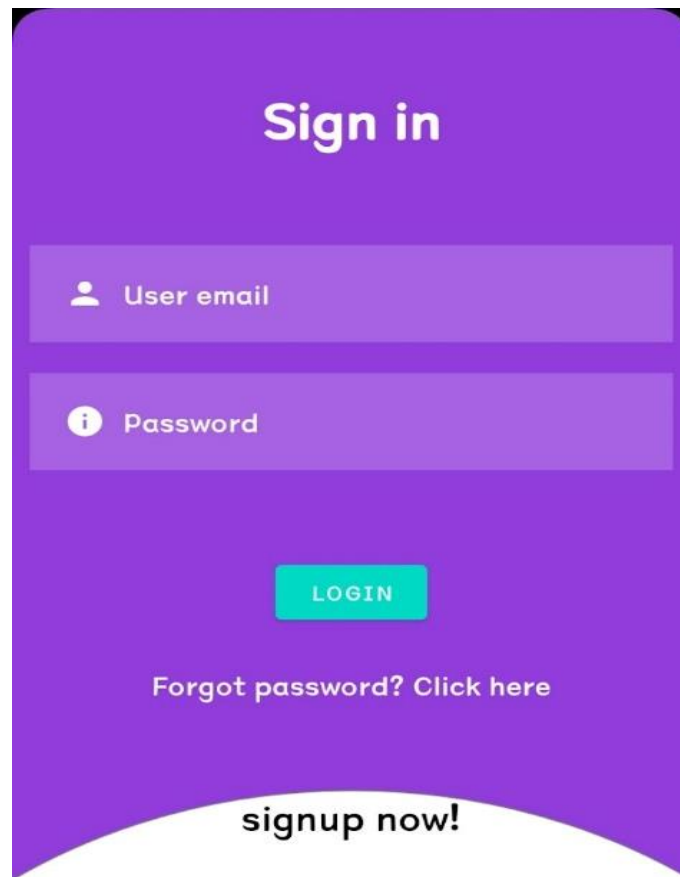


Figure. 4.4 Sign in page

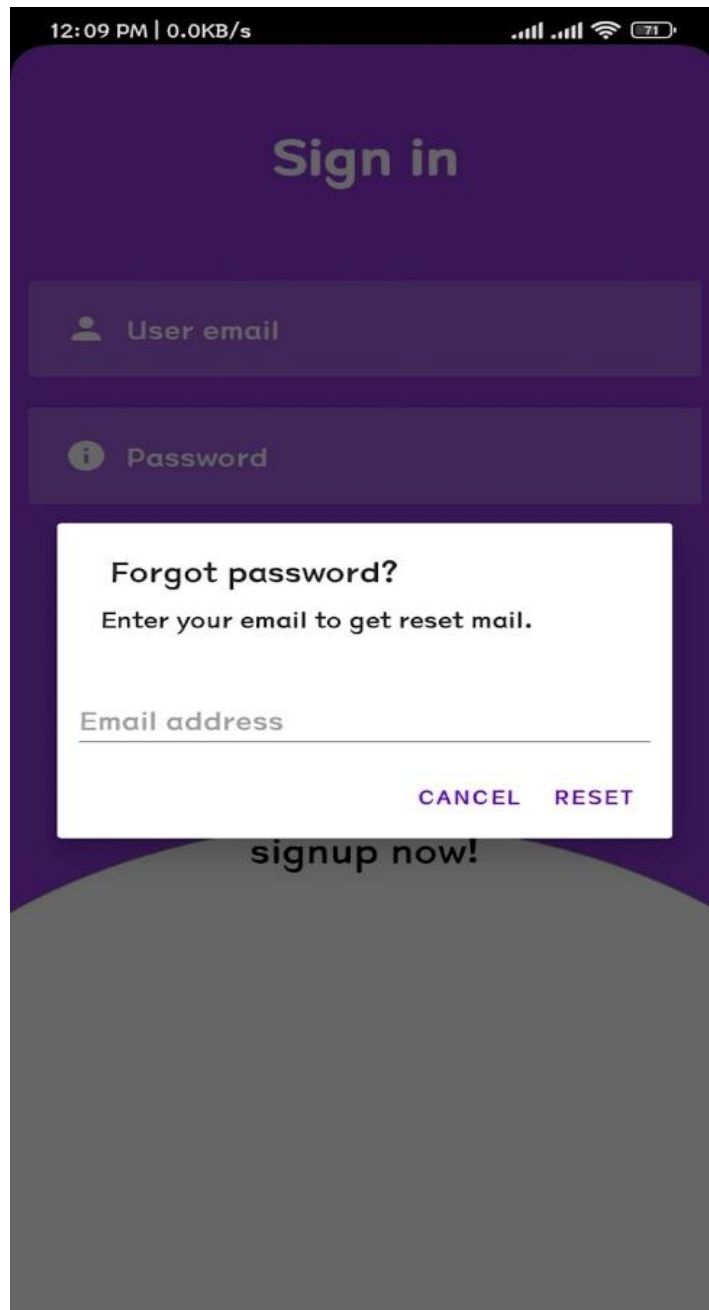


Figure. 4.5 Recover password page

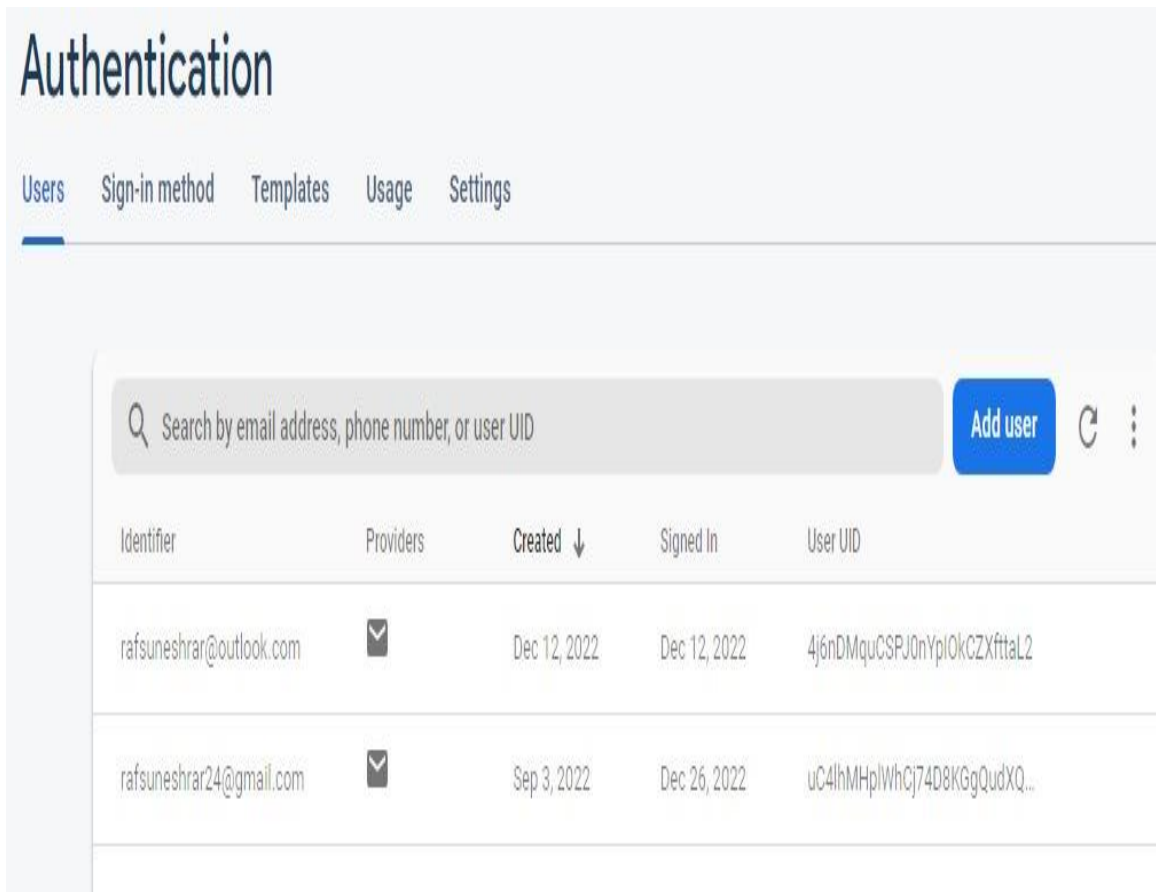


Figure. 4.6 Firebase authentication

4.2 Experimental Analysis

We recorded maximum 84% accuracy for an algorithm when it came to weather and budget predictions.

On our application side, the user interface was functional and fluid across the test devices. We implemented password recovery and email verification, which also gave the expected results from our testing. Our input form and all the buttons were responsive and gave our users a fluid experience. The result page as well as the profile page are updated on a frequent basis. As a result, no unexpected errors occurred. The input (Figure.4.7) and

output (Figure.4.8) result times were measured at only 10 milliseconds, which is a great success in our testing. This reminds me how well the core application is coded and how much effectiveness it shows. Application pages were clear and simple, so user mistakes not recorded as well.

Tourmate

Choose travel month

January ▼

Choose travel transport

Bus ▼

5

5000

LET'S TOUR

Tanguar Haor

Figure. 4.7 Input page

Tanguar Haor



Tanguar Haor located in the Dharmapasha and Tahirpur upazilas of Sunamganj District in Bangladesh, is a unique wetland ecosystem of national importance and has come into international focus. The area of Tanguar Haor including 46 villages within the haor is about 100 square kilometres (39sqmi) of which 2,802.36 ha² is wetland. It is the source of livelihood for more than 40,000 people. Bangladesh declared it an Ecologically Critical Area in 1999 considering its critical condition as a result of overexploitation of its natural resources.

[BOOK TOUR](#)

Figure. 4.8 Output page

4.2.1 Data Acquisition

The data for the set was gathered from a group of Daffodil International University students. For the model, more than 1200 data samples were employed. Table 4.1 provides an overview of the dataset.

Table- 4.2: Data Acquisition & Missing Values

Attribute	Data Type	Scale	Missing Value
Name	Nominal		0
Travelling Month	Nominal		0
Transport	Nominal		0
Total member	Numerical	person	0
Count Travelling Time	Numerical	times/year	0
Total Cost	Numerical	taka	0
Personal Rating	Numerical		0
Tourists spot	Nominal		0

4.2.2 Data utilization

It was simpler to manage the data of a computer system by independently coding each subject.

Figure 4.9 shows the description of our collected dataset. It shows the minimum, maximum values, total mean count and standard deviation of dataset. 25%, 50%, 75% are retrieved from dataset.

	Travelling_month	transport	count_travel_Times	Personal_rating	total_members	total_cost
count	1238.000000	1238.000000	1238.000000	1238.000000	1238.000000	1238.000000
mean	5.420032	2.384491	2.557351	4.260905	6.985460	5870.654281
std	4.016094	1.150369	1.403146	0.857101	4.489252	2318.304159
min	1.000000	1.000000	1.000000	1.000000	1.000000	500.000000
25%	2.000000	2.000000	2.000000	4.000000	4.000000	4500.000000
50%	4.000000	2.000000	2.000000	4.000000	6.000000	6000.000000
75%	10.000000	3.000000	3.000000	5.000000	8.750000	7500.000000
max	13.000000	5.000000	15.000000	5.000000	80.000000	15000.000000

Figure.4.9 (Dataset description)

4.3 Result Analysis

After going through the analysis of the outcome, all potential factors are calculated. Discover which algorithm did the best and which corner fared the worst compared to the others.

4.3.1 Accuracy

The most beneficial aspect of algorithms is their ability to generate precise and accurate measurements. Data is utilized to predict how effectively it will work. We apply Decision Tree, Random Forest Classifier and K-nearest neighbor algorithm to predict the accuracy of tourist's spot. In Decision Tree algorithm we find the training accuracy 99% and testing accuracy 77 percent. In Random Forest Classifier we get the training accuracy above 99% and the testing accuracy is above 84 %. In K-nearest neighbor we get the training accuracy

83 percent and testing accuracy is 70 percent. We clearly see that training accuracy is maximum in Decision tree and Random Forest classifier which is same and the lowest accuracy is in K-nearest neighbor. In testing accuracy, we get the maximum accuracy from random forest classification and get the minimum accuracy in KNN. So, we can say that among the three algorithms Random Forest classifier gives the better result than others.

4.4 Discussion

Our application in the experiment gave a functional result. The algorithm we have implemented can be replaced for better performance, but we have not found a better one yet. With current accuracy and application friendliness, we are finding tracks toward our goal. Our application will have user accounts that can keep track of users' activities through our application for individuals.

Our user interface is attractive to use to improve users' interaction. The input forms can store search data to be used for better results and to give personalized suggestions with intended accuracy. We have integrated easy access to the application through real-time authentication to restrict fake users, which can implicate prediction results. Data collection is held using person-to-person form submission to ensure authentication of raw data. We used various techniques to filter the dataset, which gave our algorithms the opportunity to improve accuracy. Alternative suggestions are also included in the application in case the predicted one is not exciting enough for the user. Giving a reliable travel experience will take great effort alongside users' trust in our application. We intend to add the most reliable and renowned travel services available to reduce tourists' Moreover, our application will be a single spot for everything a tourist needs, including the history of the destination.

With the most popular tourist spots, we intend to add places that are new, which will ultimately increase the tour experience. In the background of our application, a third-party server is being used, which will be a concern and to resolve that, we are hoping to work

further with this project and continue our research. Learning about our users' behavior and their places of interest could be suggested. Keeping in mind the size of the application compared to functionality is a real-world user's concern because we had kept that in mind while developing our application. In nature, weather conditions are another challenge for tourists, which is being considered in our research to give our users the most reliable, exciting, and compelling experience that we can. By adding some extra benefits to ease the planning of a tour, more and more users will be engaging with us, which we are looking forward to.

CHAPTER 5

IMPACT ON SOCIETY, ENVIRONMENT AND SUSTAINABILITY

5.1 Impact on Society

Nowadays, people don't have any time. They are running from birth to death. In this so-called modern society, people always search for a time-saving potion in every situation. In the matter of traveling, people want the best arrangement within their budget and time. They want it all possible. They want to feel free. They want to get relief from this cruel society and create a bond with mother nature. They want to be shocked and surprised. This time, the tourism app comes to our hands like the lamp of a genie.

Every region has a distinctive culture. The essential elements of regional cultures are traditional dress, architecture, monuments, songs, and dances. A person's life is positively affected by traveling to other cities or nations, which is always an adventurous experience. Learning about other cultures, customs, and traditions is made possible through this.

Cultural exchange between people from different places is another great positive social effect on society, and this exchange has become very easy with the help of tourism apps. Cultural exchange between people from different places is another great positive social effect on society, and this exchange has become very easy with the help of tourism apps.

1. Local people gained new roads, new sewage systems, new playgrounds, bus services, etc. as a result of tourism. These new resources enrich their standard of living. And this is one great example of the positive social impact of tourism, which has become easier with the help of tourism apps.
2. There are so many places where nature exposes herself to full beauty, but we didn't even know about those places until today. But the good news is, through our app,

- people will be updated every day about those places. They will learn about many extraordinary places to visit from time to time.
3. For the local community, the jobs generated by tourism can be a huge benefit. As the local population becomes more independent, the social economy likewise advances. Compared to those who are unemployed, people with work are happier and more socially isolated.
 4. Through tourism-related professional training and the development of business and organizational skills, locals can also strengthen their influence over the growth of tourism as well as their possibilities for employment and income.
 5. Several locations will encourage the resurgence of local traditions and arts. Setting up customary fairs, festivals, or museum displays could be one way to accomplish this. This could support traditions that have perhaps been extinct.

5.2 Impact on the Environment

Degradation of residences, trees, air quality, water, wildlife, and changes in natural resources are examples of environmental impacts due to tourism.

Many tourist spots have natural parks and preserves. Adventure-loving people come to visit and enjoy those resources. Travelers spend lots of money in many sectors of the city. This large amount of money can be used in many ways, such as managing the animals, with a focus on stopping rhino poaching. We can also use the money for conservation efforts.

Indirectly or directly, the tourism sector creates one in ten jobs worldwide. Even in rural or remote areas, due to tourism, people are getting good job opportunities. Women work in the tourism industry. Young people gain work experience for their future. The money that comes from tourism is used to improve the local infrastructure as well as to maintain

natural beauty. Our environment is gaining good moral value from improved infrastructure and services.

Environmentally sound tourism is essential. Therefore, many locations are concentrating on improving their natural resources in order to enhance tourism in an effort to draw in an increasing number of tourists. The government is also very important in this. If nobody can stop it, the governments may take these resources or devastate the area to create space for the construction.

Our app regularly spreads awareness about the importance of preserving unique, frequently endangered plants and animals. Our users were made aware of the environmental protection curriculum. Residents, as well as tourists from abroad and locally, are contributing to the awareness-raising effort regarding the value of environmental preservation.

5.3 Ethical Aspects

This research is all about making tourism affordable, secured and convenient for tourists. Through this we are also able to get attraction toward the most beautiful things of nature and introduce various cultures from one part to another. Ethically this is more of a voluntary work that we are doing, introducing more advanced technologies to the normal ways and letting people make the best use of these. Limiting the uses of poly and other harmful substances, we can ensure a better ethical use of our approach. As our system completely relies on online and procedure through the internet, all the limiting factors we were cautious about are eliminated which is a great relief. Most of tourists are not aware of polluting travel area, hence they tend to do these,

- Through wastes here and there.
- Rely on poly bags.
- Do not reuse bottles or bags.
- Leave used clothes or napkins everywhere.

- Tent to waste food and water.

To overcome this, we are willing to add instructions to motivate our users to help keep the planet clean, wherever they go. We will also show how their small practices can make a big difference keeping the environment healthy. Planting and keeping a clean banner will be a signature on our application.

On the ethical aspects, we take our users' privacy very seriously. As a result we do not store user data without their permission and we do not look after any of our user's profile information. To protect and give proper security we rely on encryption methods to always encrypt the user's data automatically. Moreover, none of the users can look through or find details of another, giving top privacy protection to our whole user base. As there are no harmful or cautious matters involved through the whole research work and we are happy to serve in the best way we can.

5.4 Sustainability Plan

Globalization is spreading day by day. As a result, people are becoming increasingly dependent on technology. They are using modern technology in every sector of life. So, when it comes to traveling, people want to use the easiest way to get things done, such as a traveling app.

So far, we have 12 travel destinations through the app. In the future, we hope to include the entire country of Bangladesh in our app.

Even when a trip is perfectly planned, some things get left out. For example, how to get to the destination, how much will it cost, what is the accommodation to reach the destination, what is the food arrangement, etc. We will gradually bring everything to our app to fix many issues. To ease the user's suffering, we will facilitate the purchase of train and bus tickets through our app. By adding a map, which way to go, where is the hotel or accommodation, and where is the food restaurant, we will deliver all these to the user's doorstep. We will even arrange to fix the guide. For the convenience of users, mobile

banking will be provided for payment in all travel-related matters. In terms of sustainability, this project might be used for a variety of future activities.

We are starting our app journey with many such future plans, hoping for the welfare of people. With the blessings of the almighty creator, we will move ahead with the hope of fulfilling our dreams and making the journey of Bangladesh and Bangladeshis easier.

CHAPTER 6

SUMMARY, CONCLUSION, RECOMMENDATION AND IMPLICATION FOR FUTURE RESEARCH

6.1 Summary of the Study

Life is brief and Our lives pass by so quickly. We wish to live fully in this uncertain life. This perfection might come from nature. And our app will help them get more in touch with nature. We first collect data from users. For example, the name of the place, how many people, amount of money, etc. Then, by analyzing this data through machine learning, we ensure the best and most convenient plan for the users. The algorithm used in machine learning to analyze data, we have used in our app. We use the possibilities of machine learning in our app to provide users with a well-designed tour plan. In this way, users get benefits by using our app. In the end, we wish for the prosperity of travelers and want them to stay safe and be kind to nature. We can only make traveling a secure and enjoyable experience with everyone's assistance.

6.2 Conclusions

Our tour plane app is to ensure that all travelers around the globe enjoy themselves without any hassle. To provide a limited way to appropriate the app's rules and motivation Our tour planner apps give us the proper tour plan. Users are mostly experienced in historical travel. The result of our experiments is based on real databases. Nowadays, tourism is developing thanks to technology availability, searching for all information for travel destinations. Our tourism app needs to focus on ML technology to develop a better service system. Research mainly contributes to tourism and technology.

In this study, a built-in model for tourism planning was proposed. This model makes a big data set consisting of different databases and important issues like weather, maps, tourist

profiles, and tourism. These algorithms not only respect user performance, such as cost and time. This model initially requires the user's priorities in tourist profiles. This model exists in a database that is integrated together. After data integration, generates tour plans. Finally, the selected tour plans will be given to users and tourists for feedback. We are implementing this model as a mobile application.

Our fundamental objective is to simplify tour planning, and our application will offer a suitable tour plan. The hassle for tourists will be reduced, and people would be allowed to take tours wherever they like.

6.3 Implication for Further Study

Our project will affect the tour experience directly. Through further study, our research work can get a better solution for routing and destination selection. Advance machine learning can reduce space waste and application size. The users' input data will affect the prediction, gaining more accuracy.

For users' payment reasons, we are willing to add banking services directly to our application for convenience. Further research can give us a proper estimation of the services that will be necessary in the near future. By cooperating with local banking companies, we can reduce the users' budget problems by giving more and more facilities at a discount. We will be able to rank the hotels in different locations by taking users' experience with particular hotels and then evaluating the service-to-price ratio, which is very helpful for tourists.

In addition to that, local food courts and restaurants will be evaluated based on the method applied to the hotel's evaluation. The mass transportation services that are considered safe for our users will be enhanced further through much research, which will implicate the whole experience of tourists. Along with local tourists, foreign tourists will also be helped

as all the information they need will be added in steps, meaning a smooth and enjoyable tour experience.

Destination-based guidelines will be able to guide tourists as it is mandatory to maintain when experiencing nature. For these services, a great time of observation and research is needed to get better results on the whole experience. Local businesses surrounding the tourist spots will gain a push on their way through the application's engagement. Furthermore, cultural and historical importance will be highlighted in our further research.

Better technology advancement will ensure better security and data protection. Additionally, our own server and hosting application data will help maintain operation convenience. Further engagement with tourist hotels can benefit both the hotel industry and tourists worldwide, improving the industry of tourism. We have a place for improvement and a vision to go beyond.

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