Ambulance App: Recommendation of Hospitals using Machine Learning Techniques

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Abstract—The aim of this project is to develop an ambulance booking app using ML model that will allow users to quickly and easily request emergency medical assistance and details of the hospital nearby. The app will be made using Android Studios which is used to develop the UI (in XML) and functioning of the app(in Java). Iterative Model which is basically used to redesign and retest the app until the final application is made according to the objectives. The app will provide a simple and efficient way for patients to contact ambulance services during an emergency, ensuring that they receive timely and appropriate medical care. The proposed app will be designed to address the challenges of accessing emergency medical services in India. The ultimate goal of this project is to improve emergency medical services in India by providing quick access to medical assistance. The app will include features such as GPS tracking, real-time updates on ambulance location, and emergency contact information for users to quickly reach out to family and friends.

Index Terms—ML, FireBase, AndroidStudio

I. INTRODUCTION

In the developing technical era, the traffic in each city has been incremented at a more noteworthy degree, in some cases, it is even uncontrollable. This circumstance is normal in each city with an increment of the vehicle on the street every day. Growing traffic can't be halted however we can control utilizing various Technologies. This condition has an unmistakable impact on everyday life and different exercises of the general public. In the current era, almost every service is turning over to smartphones and mobile applications . This is because the quick and efficient services are playing major roles. Even in medical and health care services quick responses and management is required. In the current ambulance system major issues are searching for an ambulance and giving the location details, finally ambulance availability at emergency situations . Due to these problems ambulance delay happens and this leads to the loss of human lives at huge cost. The delay of the ambulance usually starts when the user has to find ways to check the availability of the ambulance and to find the exact location of the ambulance to the user as fast as possible. So, proper information should be handled and provided to the ambulance drivers in order to prevent any delay for ambulance services. The main objective is to reduce the call time of the operator and to request an ambulance, to reduce the number of fraud calls and to allow ambulance drivers to locate the requested user by accessing their current GPS location.

LITERATURE SURVEY

Literature Survey-1
Title Design and Feasibility Analysis of an Artificial Intelligence Based Mobile App for Emergency Ambulance Methodology For UI design Adobe Xd is used and to connect with server they have used HTTP post and HTTP get ways which connects automaton with server mistreatment php. Java and XML were mainly used to program the application. For the server connection PHP is used and to store the data MySQL is used. In the AI part they have used the Google maps API to find the route

Overview A list of precise methodologies has been used to make EMS BD a reliable and user-friendly mobile application. They have used the built in GPS of the android phone to get the location of the users and get the latitude and longitude of the user in real time and save them in the server and map it in the connected user's application. This application is dedicated to Android users only. Numerous tools and necessary expert advice were considered at each step of this application development.

Literature Survey-2
Title Mobile-Based Medical Emergency Ambulance Schedul-ing System
Methodology The software is integrated with GPS function-ality using google maps scheduling algorithm of First Come First Serve (FCFS) and the Dijkstra 's algorithm is used. The FCFS algorithm, the queue of patients 'requests aretreated based on the principle of first to book first to be attended to. The Dijkstra 's algorithm which is offered by the Google Maps is applied to compute the shortest route from one village to another irrespective of whose request is first. Idea is implemented using Google's Android Studio while incorporating Java JDK and XML. The choice of the technology is due to the flexibility it offers in both software design and development.
Overview Patients in need of medical attention unavailable in the rural area of residence can have access to ambulance transportation quickly.

Live track the ambulance and request the same.

Reduces long queues in hospitals and long waiting periods for an ambulance via location-based services.

Literature Survey-3
Title Machine Learning for Predictive Modelling of Ambu-lance Calls
Methodology The authors used a dataset of ambulance calls from a one-year period, developing two neural networks: a forward model that achieved 80 ./. accuracy in predicting if an ambulance was needed, and a backward model based on clustering latent variables. Further research includes increasing the dataset size, exploring more input and response variables, and implementing GAN models for missing data.
Overview The use of CNNs made it possible to identify significant correlations between intermediate and high-level features
in the data.

The backward model provided insight into the decision-making process of the network

The authors plan to extend their analysis by adding additional contextual information and using GAN models to correct for missing variables

Literature Survey-4
Title Ambulance Service Using Android Application
Methodology To track ambulance location, they used method based on Rest FUL. Android studio(IDE) is used for development of project. Google's Firebase for Database. IDE-Integrated development environment. It is an alternative for eclipse android development tools. Thus, Android studio

helps us in creating, running, and debugging Android applications faster and easier.

Overview This application is only for Android users. Once accident occurs user has to send their location then the user's location will be pin pointed on the Google map and even the ambulance which is nearby the user will be pin pointed on the map , once the patient is on board the ambulance location is pointed and it will send to the admin this location will be shared to ambulance driver and then the list of hospitals are pointed out on the map which helps the admin to choose the nearby hospital to take the patient on time.

Literature Survey-5

Title Jeevan Jyoti Mobile Application for Ambulance ServiceMethodology The technologies used to build the proposed system are Android Studio along with google map API, Parse Server, Blynk Cloud, ESP2866 NodeMCU, DHT11 Temperature Sensor and Pulse Sensor. Overview Nowadays mobile applications have a lot of advantages than any other system because everyone keeps the mobile application on their fingertip. Whenever any app is needed, people can open and access it, so mobile application is more advantageous today. So mobile application is good idea for ambulance booking for both emergency and non- emergency type services. This application much more beneficial in medical emergency services because with its help, whenever patient(s) are being brought to the hospital, then they can be given quick treatment or efficient Medical care in minimum time because of given symptoms and medical report while booking as well as their bio-stats such as heartbeat, pulse rate and body temperature rate will also be transferring to the hospital. So, Hospital/Doctor can prepare beforehand for the incoming patient with the help of these information

Literature Survey-6

Title Leveraging Machine Learning Techniques and Engineering of Multi-Nature Features for National Daily Regional Ambulance Demand Prediction Methodology Each ambulance call in the dataset corresponds to an incident, which has the following characteristics: time of incident, ambulance origin station, incident classification, incident subclass, patient

incident subclass, patient's emergency status, patient's year of birth, ambulance destination hospital, patient location common name, patient location postal code, patient location street, incident location latitude, incident location longitude, and gender. For the dataset, the design with a approach involving a Feature Engineering stage and a prediction stage using a Machine Learning Predictor. Machine learning models considered are Regional Moving Average. This method estimates the next-day demand at a region simply by taking the average of the daily demand values over the past 7 days at this region. Linear Regression. This method is a popular regression method that finds the best-fit hyperplane across the multi-feature data samples. Support

Vector Regression (SVR). SVR is a support-vector machine that performs regression by finding a hyperplane, Multi-layer Perceptron (MLP). This method is an artificial neural architecture that has been explored and demonstrated in [19] to be an improvement over the traditional ambulance demand prediction method.Radial Basis Function Network (RBFN). We also consider the Radial Basis Function (RBF) network, a variant of the artificial neural network (ANN), for comparison.Light Gradient Boosting Machine (LightGBM). LightGBM [26] is one of the most efficient and high-performing gradient-boosting decision tree methods.The error metrics used in the experiments are weighted absolute percentage error (WAPE), mean absolute error (MAE), and mean squared error (MSE) Overview The paper provides a comprehensive overview ofhe latest AI techniques and their applications.It highlights the challenges and prospects of AI in different domains, including healthcare, education, and finance.The paper is written in a clear and concise manner, making it accessible to readers with varying levels of technical expertise.

Literature Survey-7

Title Machine Learning For Risk Assessment In Emergency Care: A Data-Oriented Survey

Methodology The research discusses how risk assessment using machine learning (ML) in emergency care might enhance patient outcomes and lower costs. The various ML methods that can be applied in emergency care are described by the authors, along with the benefits and drawbacks of each. Additionally, they talk about the difficulties of applying ML-based risk assessment in emergency treatment. The paper makes a significant contribution to the area of ML-based risk assessment in emergency care overall. It is simple to understand because of how well organised and clear the authors' writing is. Both researchers and medical professionals can benefit from their thorough overview of current research in this field.

Overview he researchers had to choose a subset of relevant information to examine within their scope, therefore the publication might not fully address all recent research or developments in ML-based risk assessment in emergency care.The study might only be read by a small group of people because it might be of greater interest to researchers or medical professionals who are explicitly interested in ML-based risk assessment in emergency care.

Literature Survey-8

Title AMBULANCE SERVICE APP

Methodology The technology used to build the system is android studio which include everything you need to build any type of Android apps.

Overview The objective of this app is to provide a user friendly places. In the modern technology, there is no app available for phone users in Pakistan, which helps them to apply for an ambulance.So there should be an android based ambulance system through which we could improve ambulance system. So we have tried to enhance the capability of a team system by linking an android app with based on web platform in which user can check its request's status and admin

maintains thing and view user's work. It will be a free of cost app.

Literature Survey-9

Title An Efficient Application Model Of Smart Ambulance Support (108) Services

Methodology he technology used is android studio,WAMP server,arduino ID.

Overview This app proposes and focuses on the pulse rate and body temperature monitoring system that is able to monitor the condition of the patient.This helps to provide proper assistance even in the rural areas.

Literature Survey-10

Title Prediction Model of Deep Learning for Ambulance Transports in Kesennuma City by Meteorological Data Methodology to confirm their association, we performed classically statistical analysis.we made prediction models for daily ambulance transports using meteorologi- cal and calendarial factors and evaluated their accuracies to test the utility of the DL-based models.

Overview With the aging population in Japan, ambulance transport increases, which exhausts the health care system.Therefore, the prediction of the ambulance transports is needed to save the limited medical resources.Therefore, they have herein produced the prediction models for ambulance transports, incidences of cardiopulmonary arrests (CPAs) or traumas using the DL framework, Prediction One (Sony Network Communications Inc., Tokyo, Japan)15 with meteorological and calendarial data, and tested the utility of the DL-based models. The relation between ambulance transports and meteorological parameters by polynomial curves were statistically obtained, but their r2s were small. On the other hand, all DL-based prediction models obtained satisfactory accuracies in the internal cross-validation. The areas under the curves obtained from each model were all over 0.947. Conclusion: We could statistically make polynomial curves between the meteorological variables and the number of ambulance transport. We also preliminarily made DL-based prediction models. The DL-based prediction for daily ambulance transports would be used in the future, leading to solving the lack of medical resources in Japan.

II. PROBLEM STATEMENT

The current emergency medical services system is often slow and inefficient, resulting in delayed response times and decreased chances of survival for those in need of urgent medical attention. There is a need for an ambulance app that can quickly and accurately dispatch nearby ambulance services to the location of the emergency.The current challenges are delayed response times, Inefficient communication of hospitals details, Limited access to information about medical history, current health conditions, and Inaccurate location tracking of ambulance locations. Overall, the ambulance app should

aim to improve the speed and efficiency of emergency medical services by providing accurate location tracking, streamlined communication, and access to critical information

III. DESIGN AND METHODOLOGY

A mobile application that the users can use for booking an ambulance, by this user can send accident location to admin then admin get address of received GPS coordinate from the user side. This location will be shared to the ambulance driver .Then ambulance driver will reach the spot. Then Ambulance driver will send notification to admin and then admin will send location of near by hospital to the driver where he has to reach. The driver can clear signal for upcoming ambulance route by changing red to green signal Diagram explains the flow of the application. Here user will send an accident spot location to the admin this location will stored in database then admin will get an nearby driver location after this admin will share an accident spot location to driver. After reaching the accident spot driver will send an notification to admin then driver can retrieve the hospital location. The driver can control the signal in the upcoming ambulance route.
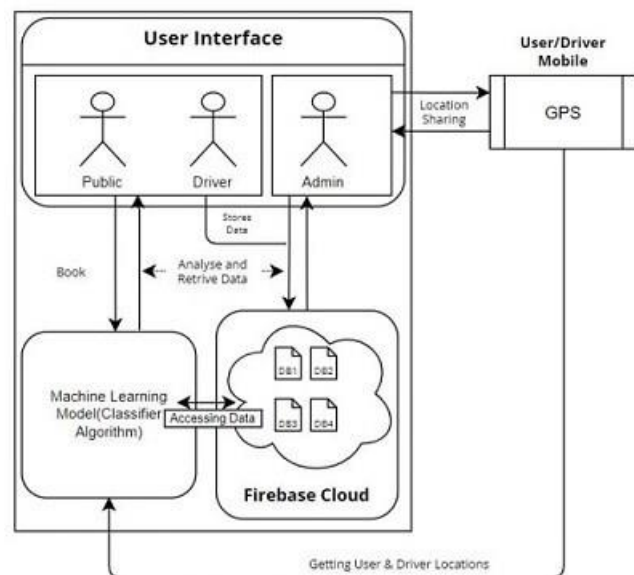
Java or Kotlin. And for designing we can use XML which is exclusive markup language.

B. FireBase

Google's Firebase is a collection of backend cloud com-puting services and application development frameworks. It supports a range of applications, including Android, iOS, JavaScript, Node.js, Java, Unity, PHP, and C++. It also hosts databases, services, authentication, and integration.
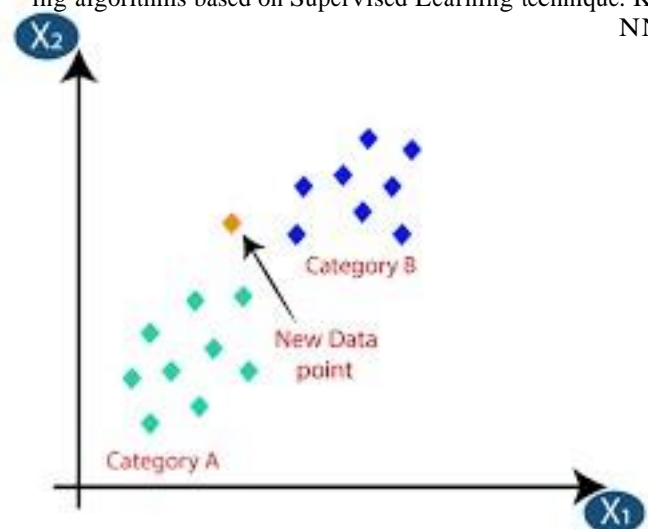
V. MACHINE LEARNING ALGORITHMS

USED A. K-Nearest Neighbor(KNN)

K-Nearest Neighbour is one of the simplest Machine Learning algorithms based on Supervised Learning technique. K-NN

algorithm assumes the similarity between the new case/data and available cases and put the new case into the category

IV. SOFTWARES

USED A. Android Studio

Android Studio is a software development tool used for creating Android applications. It is available in Windows, Linex, and macOS. In this Android studio, we can code using

that is most similar to the available categories. K-NN is a non-parametric algorithm, which means it does not make any assumption on underlying data.

B. Naive Bayes Classifier Algorithm
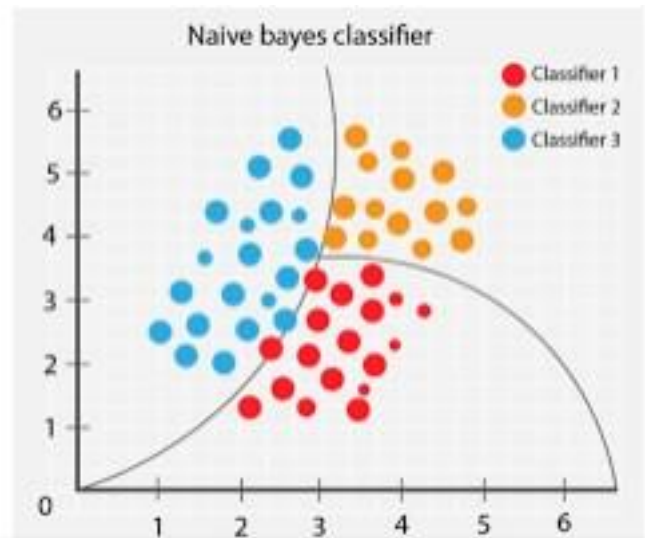
Naive Bayes algorithm is a supervised learning algorithm, which is based on Bayes theorem and used for solving classification problems. It is mainly used in text classification that includes a high-dimensional training dataset. Naive Bayes Classifier is one of the simple and most effective Classification algorithms which helps in building the fast machine learning models that can make quick predictions. It is a probabilis-tic classifier, which means it predicts on the basis of the probability of an object. Some popular examples of Naive Bayes Algorithm are spam filtration, Sentimental analysis and classifying articles.
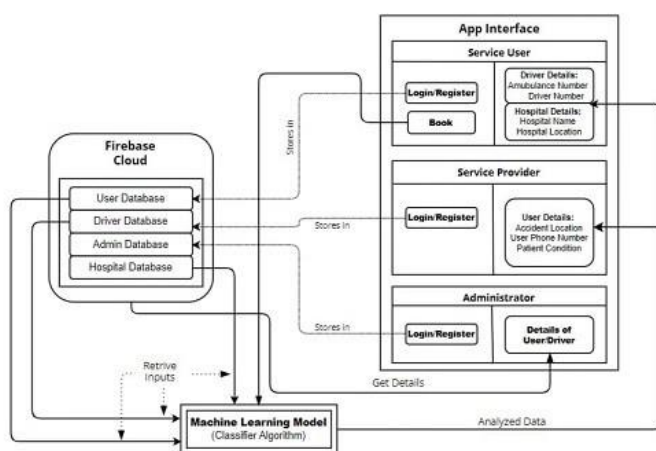
VI. PROJECT ELABORATIONS

Fig. 1. Architectural Design

Our project aims to develop an Ambulance booking application that aims to provide efficient and quick access to emergency medical services. This application has three login interfaces. One for service users, one for ambulance drivers and one for administrators. Our login system is designed to be secure and easy to use to ensure your privacy is always protected.

After logging in, the user sees a Request an Ambulance button. At the push of a button, it uses machine learning algorithms to determine your location and send a notification to nearby first responders. If the driver approves the request, the user can track the real-time location of the ambulance. Also, based on the patient's condition, the ML model will suggest the nearest hospital that targets the specific medical condition.

Also, our project aims to create fast and reliable services that can provide medical services in a short period of time. We believe that machine learning methods will help achieve this goal. We intend to keep all Google Firebase login, database and other related information secure. In short, our project aims to develop an efficient, reliable and easy-to-use ambulance booking application so that users' privacy is always stay protected..

CONCLUSION

Finally, our project Enables user to book an Ambulance and to get the details of the hospital and driver based on ML classifier and live tracking of ambulance can be done . We would like to conclude that our project on making Ambulance app for the emergency medication required cases. Wherein situation like covid, we had a lot of critical situations.And the other thing is, in cases of any emergency transfer of patient to other places ,this will come into picture to have a quick and better response and will help to minimisethedelay.

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