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FEEDVIEW- A Cross-Platform Machine Learning Analytic App

Mr. Rushikesh Solanke[1], Mr. Ramkrishna More[2], Miss. Prerana Pagar[3], Prof A.R. Jain[4]
[1, 2, 3]*UG Scholar, Project Guide[4], Department of Information Technology Engineering, Pune Vidyarthi College Of Engineering, Nashik, Maharashtra*

Abstract: ***Machine learning is a field of study that looks at using computational algorithms to turn empirical data into usable models. The machine learning field grew out of traditional statistics and artificial intelligences communities. thus, it's very important to assay this data in order to root some useful information and to develop an algorithm based on this analysis. We developed a feedback oriented multi-platform application to gather data from a mobile device and it's designed to create a survey for road transport and cars safety. It's a simple way to give a feedback or report for the concern department. Car companies will no longer have to wait for their car's owner to create a complaint, with this app dealer or service team can directly contact the owner of the car for the issue with the resolution they may be facing. Road development department no longer need to do physical surveys with the data collected from multiple user's they can directly take required actions. The smartphones have multiple assembled-in sensors each having a specific function which helps the device perform efficiently. To collect data our experiments will use the smartphone accelerometer and gyroscope. These sensors can potentially be used to gather required data.***
Keywords: Component, Machine Learning, Algorithm, Sensors, Network

I. INTRODUCTION

The machine learning field grew out of traditional statistics and artificial intelligences communities. From the efforts of mega corporations such as Google, Microsoft, Facebook, Amazon, and so on, machine learning has become one of the hottest computational science topics in the last decade. Currently, large volume of data is available everyplace. Therefore, it's very important to analyse this data in order to extract some useful information and to develop an algorithm based on this analysis ML provides computers the ability to learn without being explicitly programmed. A feedback oriented multi-platform application designed to bring about a check-up for road transport and car safety. A simple way to give a feedback/ report for the concern department. Car companies will no longer have to wait for their car's owner to create a complaint, with this app dealer/ service team can directly contact the owner of the car for the issue with the resolution they may be facing. Road development department no longer need to do physical surveys with the data collected from multiple user's they can directly take required conduct. A simple way to give a feedback/ report for the concern department. Car owner no longer need to communicate in person or online or by walk- in, he/ she can just share the details with just one click. Road development department no longer need to do physical checks with the data collected from multiple user's they can directly take required actions. Data extraction can be done using machine learning algorithm but also there's an efficient way to do is by using google analytics via firebase which can effectively collect sensor data whenever required as instructed, although this data process requires access over internet and certain permissions within device and collecting data is one of them, although with user consent this is possible and easier rather using algorithm to mine data which could take more time to process into a log file. The rest of this paper is structured as follows. Section II details related work and their main limitations. Section III presents the proposed solution. Section IV presents the solution prototype, and the data collection tool. Section V presents the evaluation of the proposed solution prototype. Section VI presents the data extraction tool. Section VII presents our main conclusions.

II. PROBLEM DEFINITION

The main reason of building the application- based sensor data mining tool and visual report tool is to provide help with the problem reporting faced by people travelling everyday while travelling to various locations.

1) *Case 1:* As of now there's no such tool or way to report issues with the government bodies which can fix issues on highway with having a physical presence at every certain spot, by using this tool road development department can directly determine which road is having pits, traffic issue, and other issue, by obtaining user data and processing this data to get exact details to fix issue.
2) *Case 2:* This data can also be used to provide feedback for car companies that can analysis what's the most common issue faced by the users with their car models and then can on further testing these issues can be solved. for e.g.- Suspension Test in cars, mileage, vibration's, etc.

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III. LITERATURE REVIEW

In Feb 2021, EltonF. deS. Soares, CarlosA. deM.S. Quinella, and Carlos AlbertoV. Campos developed a Smartphone- Based Real-Time Travel Mode Detection for Intelligent Transportation in which Intelligent Transportation Systems include all transportation modes, aiming to improve the efficiency of transportation in many situations. Relating the transportation mode of users is a crucial performance and quality demand for ITS. Real- time discovery could allow cost and latency reduction for ITS operations since all the processing can be made within smartphone bias and actions can be taken fleetly, as the information will always be up to date. In this paper, we propose a real- time trip mode discovery approach that applies supervised machine learning (ML) on location data uprooted from smartphone sensors.

In 2018, Amari Vaughn, Paul Biocco, Yang Liu, Mohd Anwar North Carolina A&T State University developed a project work on Activity Detection and Analysis Using Smartphone Sensors. It includes the use of machine learning algorithms on smartphone sensor data could have numerous applications in finance, healthcare, entertainment, etc. In this research, we develop mechanisms to gather sensor data and study how the data can be used to separate patterns in user physical movements. In this research, multiple behaviours were distinguished using sensor data.

For our experiments, we center on three classes of human exertion which are walking, standing, and running. Included in our data is the sensor input while the device is sitting in a stationary position. To descry the device motion, our trials will use the smartphone accelerometer and gyroscope. From the data collected through an operation, we create a point set which consists of linear acceleration, normal acceleration and angular acceleration of the device.

In 2015, Arash Jahangiri and HeshamA. Rakha, Member, IEEE developed a project on Applying Machine Learning Techniques to Transportation Mode Recognition Using Mobile Phone Sensor Data. This paper adopts different supervised learning styles from the field of machine learning to develop multiclass classifiers that identify the transportation mode, including driving an auto, riding a bike, riding a auto, walking, and running.

Methods that were considered include K-nearest neighbour, support vector machines (SVMs), and tree- based models that comprise a single decision tree, bagging, and random forest (RF) methods. For training and validating purposes, data were attained from smartphone sensors, including accelerometer, gyroscope, and gyration vector sensors. K-fold cross-validation as well as out-of- bag error was used for model selection and validation purposes.

Several features were created from which a subset was identified through the minimum redundancy maximum relevance method. Data obtained from the smartphone sensors were found to provide important information to distinguish between transportation modes.

IV. MOTIVATION

The main aim of this project work is to create an application that can track sensor activity to further process and analysis and process and then display by creating a report for respective sources. Every sensor is perfecting designed to obtain the most optimistic reading and provide with utmost accurate reading and these reading when processed in large no and give a perfect opinion/ Answer to whatever the question/ problem arises. A simple way to give a feedback/ report for the concern department. Car owner no longer need to contact in person or online or by walk- in, he/ she can just share the details with just one click. Road development department no longer need to do physical surveys with the data collected from multiple user’s they can directly take required actions.

V. PURPOSE

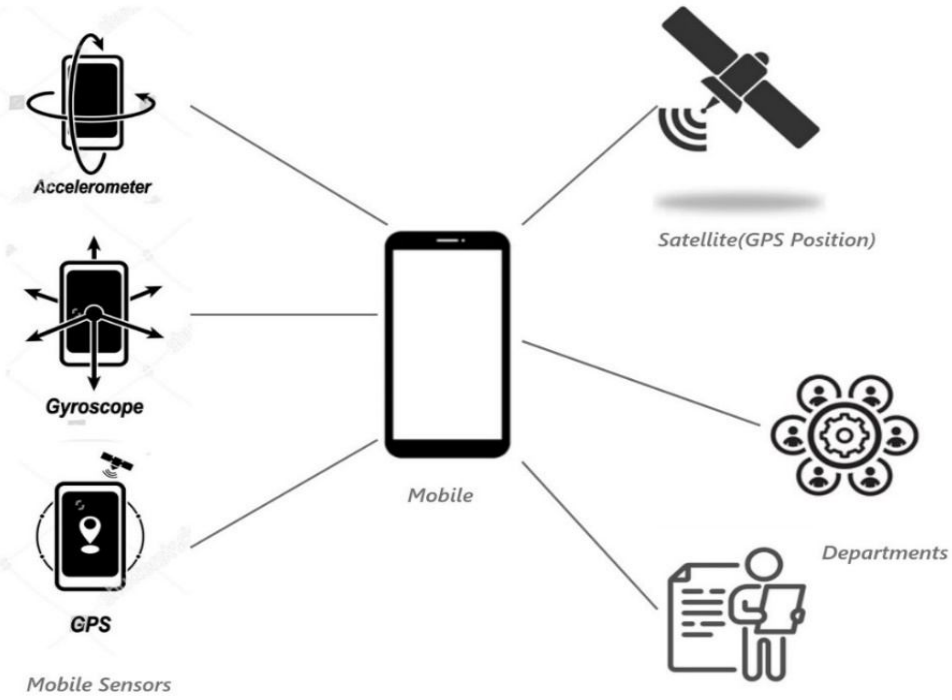
The objective of the project is that we've a multi sensors gadget that we use in our day today life i.e., our smartphone as we know that our smartphone have many sensors like accelerometer, light sensor, gyroscope, barometer, motion detector etc. we got an idea that what if we can use our smartphone as a tool to test the condition of the road or to test the specifications of a car or to find where there's further traffic We can each do this by taking the data that sensors collected and train a machine learning model that predicts whether the road is good or is the cars suspensions are good and many more. The main aim of this project work is to create an application that can track sensor activity to further process and analysis and process and then display by creating a report for respective sources. Every sensor is perfecting designed to obtain the most optimistic reading and provide with most accurate reading and these reading when processed in large no and give a perfect opinion/ Answer to whatever the question/ problem arises. The smartphones have multiple erected-in sensors each having a specific function which helps the device perform efficiently. These sensors can potentially be used to detect events or gather data about human activities

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VI. ARCHITECTURE

Systems architecture is the conceptual model that defines the structure, behaviour, and more views of a system. A system architecture can consist of system components and the subsystems developed, that will work together to implement the overall system. In our project we've are going to fetch the date from the sensors which are present in the mobile phone. Along with the data we're having GPS module which is in- built in the phone so that we know that on which road the user is travelling. After Visualization the feedback will be sent to respective departments like Road Safety, Automobile R&D etc.



VII. ALGORITHM

Random forests or random decision forests are an ensemble learning method for classification, regression and other tasks that operates by constructing a multitude of decision trees at training time. For classification tasks, the output of the random forest is the class named by utmost trees. For regression tasks, the mean or average prediction of the individual trees is returned. Random decision forests correct for decision trees' habit of overfitting to their training set. Random forests generally outperform decision trees, but their accurateness is lower than gradient boosted trees. Still, data characteristics can affect their performance.

1) *Step 1:* In Random Forest n number of random records are taken from the data set having k number of records.
2) *Step 2:* Individual decision trees are constructed for each sample.
3) *Step 3:* Each decision tree will induce an output.
4) *Step 4:* Final output is considered grounded on Majority Voting or Averaging for Classification and regression respectively.

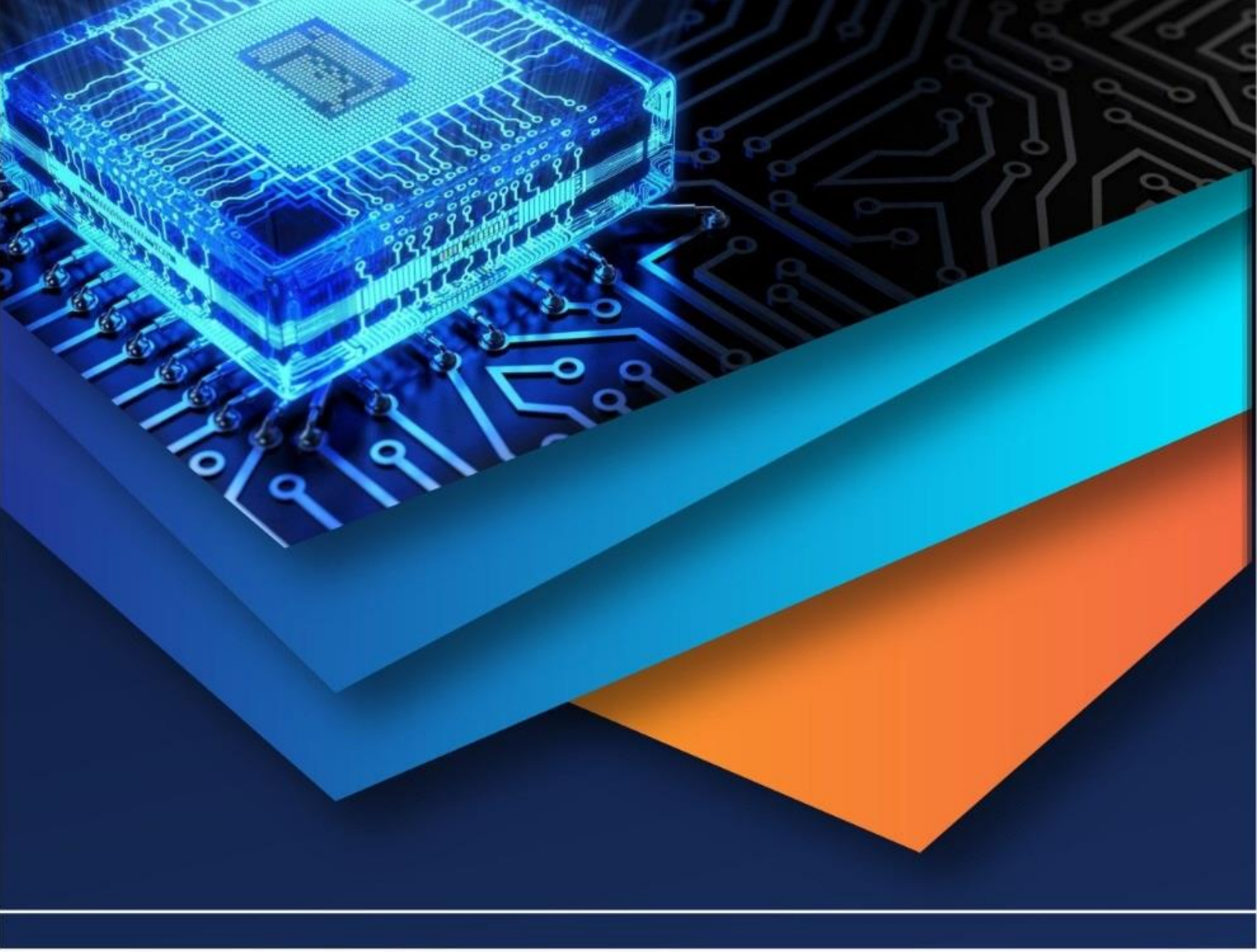
VIII. CONCLUSIONS

Our vision is to create an application that can collect data and provide to efficient, accurate and proper results in the form of report, where we need not to have any sort of hardware or need any other permission's. A user can create a report which can be collected from server and fetched to respected departments, which can help them process respective tasks easily without taking the hassle to review everyplace on site and also the car companies need not to test the car's several time when a lot of complaint's arrive to get the problem escalated and solved further. This is the most efficient way hassle free

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