ANALYSIS OF A VEHICLE DRIVER FOR ACCESSING THEIR DRIVING PERFORMANCE AND ENHANCING ROAD SAFETY

Field of Invention:

[0001] The present invention is related to Computer Science field.

[0002] Behavior analysis and optimization, specifically related to the use of telematics technology to collect and analyze data on driver behavior.

[0003] User Security with applications in Road Safety.

[0004] Use of machine learning algorithms and other advanced analytics techniques to generate insights and feedback on driving habits.

Background:

[0005] This idea of developing a comprehensive system that is based on continuous analysis of driver's driving behavior to analyze both his safety skills as well as driving skills was originated after reading a research paper based on the asymmetric relationship between driving and safety skills which concluded that these are two distinct attributes contributing to road accidents and drivers with high levels of driving skills but low levels of safety skills are more prone to accidents than drivers with low level of both driving and safety skills.

[0006]   Existing driver monitoring systems often focus on basic parameters such as speed and location, providing limited insights into the actual driving behavior. The proposed system builds upon the advancements in telematics technology,

data analytics, and machine learning algorithms to provide a more comprehensive and accurate assessment of driver behavior.

[0007] The background of the project recognizes the need for an intelligent driver behavioral analysis system that goes beyond traditional monitoring solutions. By leveraging cutting-edge technology and analytics, the system aims to revolutionize road safety, mitigate accidents caused by reckless driving, and promote a culture of responsible and safe driving practices.

Objects of Invention:

[0008] Following are the objectives of the present disclosure:

1. *Enhancing Road Safety*: By analyzing and promoting safer driving practices, the system aims to reduce the number of accidents caused by reckless behavior and improve overall road safety.

2. *Improving Driver Awareness*: Through real-time feedback and personalized coaching, drivers will become more conscious of their driving habits, fostering a proactive approach to road safety.

3. *Fleet Management Optimization*: The system's insights will empower fleet managers to make informed decisions regarding driver training, route planning, and vehicle maintenance, leading to cost savings and enhanced efficiency.

4. *Wide Adoption*: Designed to be adaptable to various vehicle types and easily integrated into existing fleet management systems, the project seeks to facilitate global adoption across diverse transportation sectors.
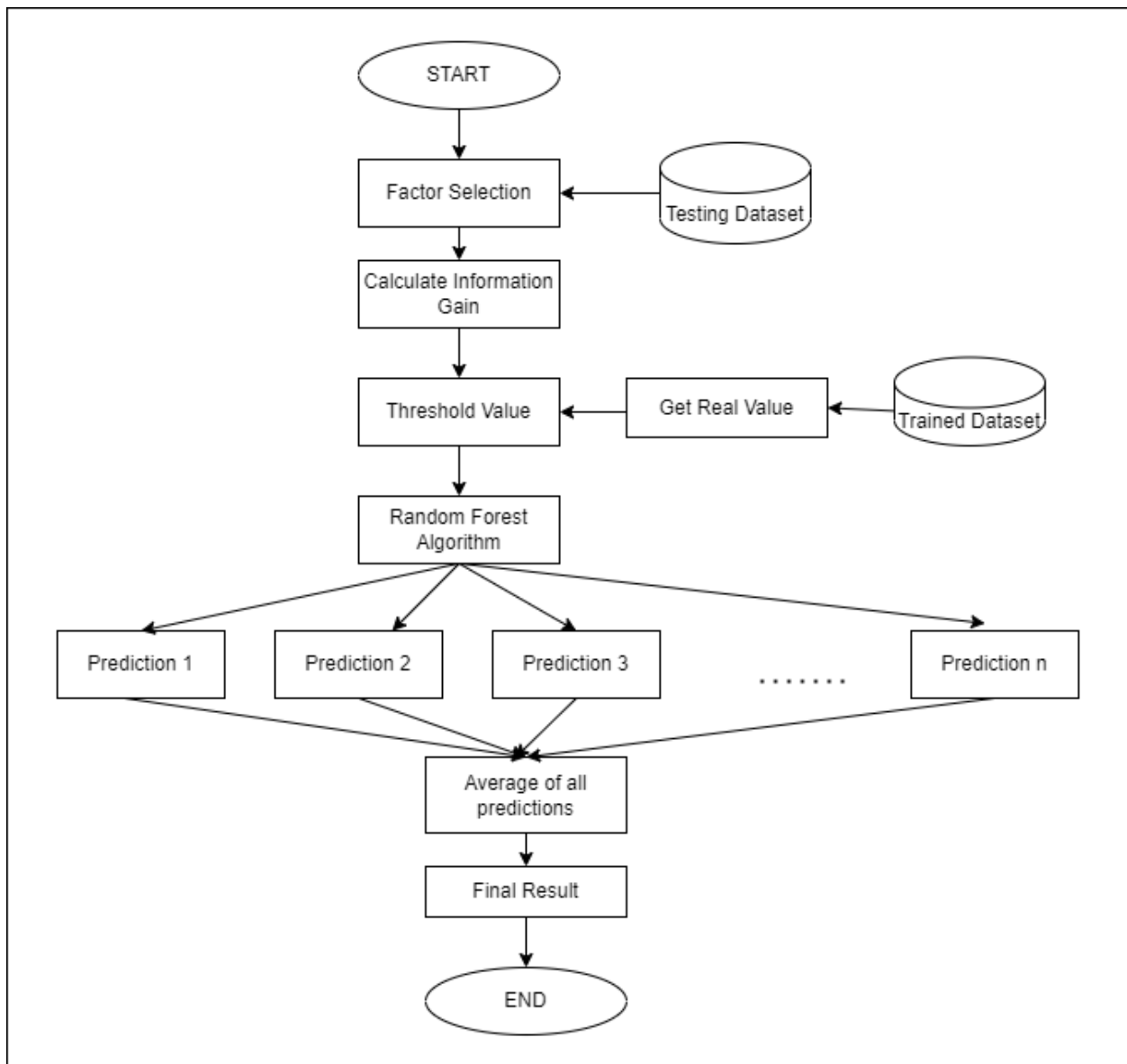
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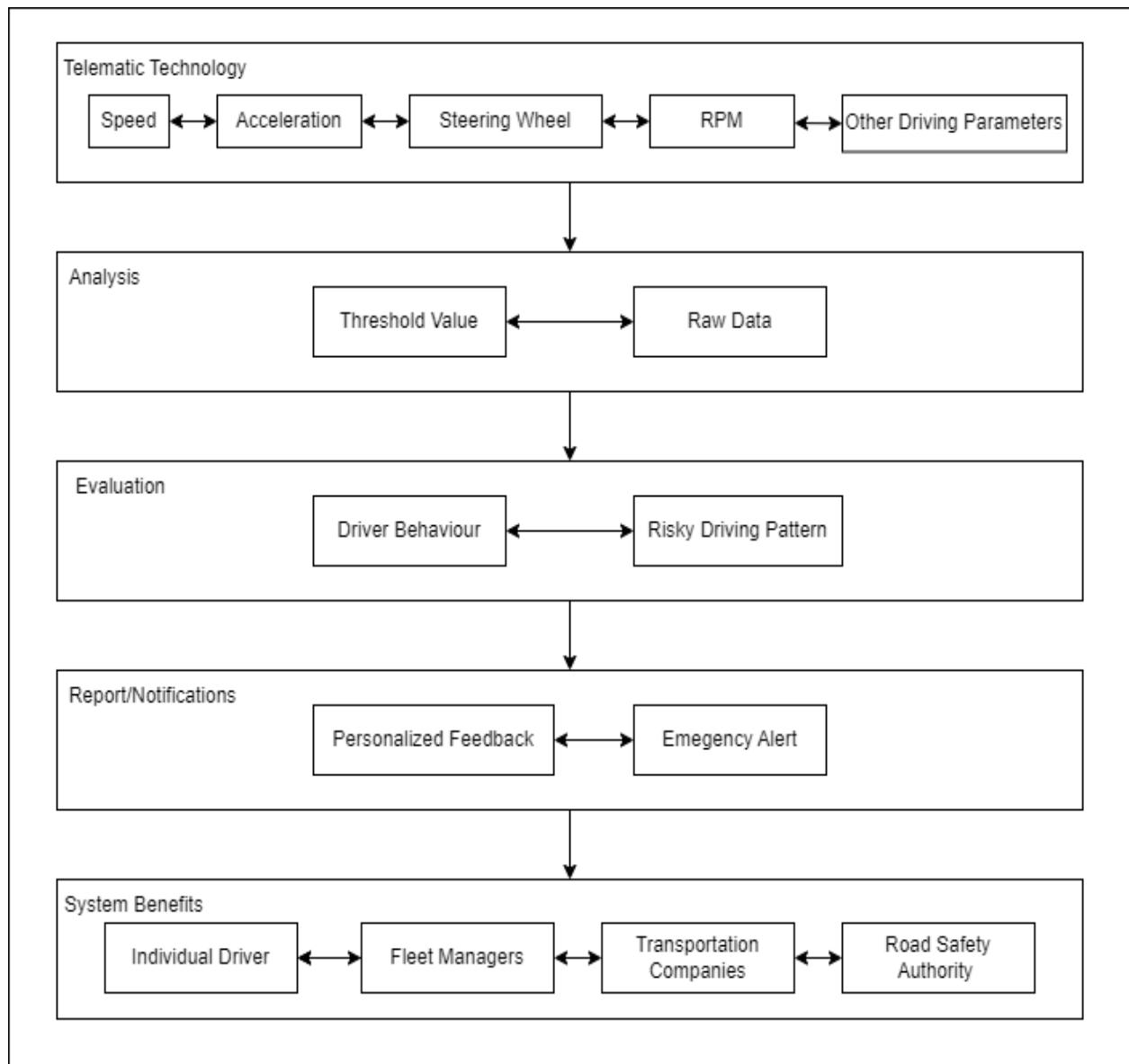

Fig 1: Algorithm Process Flowchart

Fig 2: Process Flow-graph

Claims:

[0009] Following are the claims of the invention:

1. A system for intelligent driver behavioral analysis comprising:

- Onboard sensors for capturing real-time data on acceleration, speed, steering behavior, and rotational movements of a vehicle.

- Data collection devices for collecting and storing the captured data.

- Analytics module for processing the captured data using machine learning algorithms.

- Feedback generation module for providing personalized feedback and recommendations to drivers based on analyzed data.

2. The system of claim 1, wherein the machine learning algorithms analyze the captured data to identify patterns and indicators of risky driving behavior, including aggressive acceleration, harsh braking, and improper lane changes.

3. The system of claim 1, wherein the feedback generation module provides real-time feedback to drivers through visual or audio interfaces within the vehicle.

4. A method for enhancing road safety and driver performance using the system of claim 1, comprising:

- Capturing real-time data on driving parameters from the onboard sensors.

- Processing the captured data using machine learning algorithms to evaluate driver behavior.

- Generating personalized feedback and recommendations based on the evaluated driver behavior.

- Providing the feedback and recommendations to drivers to improve their driving skills and promote safer practices.

5. The method of claim 4, further comprising providing insights and analytics to fleet managers for optimizing fleet operations and implementing targeted driver training programs based on the evaluated driver behavior.

Technology Used:

Hardware components:

- Sensors
- Camera

Software Components:

- Python (Programming Language)
- SVM / Random Forest (Machine learning algorithm)
- Data Analytics Tools
- Database System

Abstract:

[0010] The project focuses on the development of an Intelligent Driver Behavioral Analysis System aimed at enhancing road safety and promoting responsible driving practices. Leveraging telematics technology, onboard sensors, and

advanced analytics, the system collects real-time data on driving parameters, including acceleration, speed, steering behavior, and rotational movements.

[0011] Through sophisticated machine learning algorithms, the system analyzes the collected data to evaluate driver behavior and identify patterns associated with risky driving habits. Personalized feedback and recommendations are then provided to drivers, enabling them to improve their driving skills and adopt safer practices on the road.

[0012] The system also offers valuable insights to fleet managers, allowing them to optimize fleet operations, implement targeted training programs, and mitigate risks associated with driver behavior. By fostering a culture of responsible driving, the system aims to reduce accidents caused by reckless behavior and contribute to overall road safety.

[0013] The abstract highlights the system's core components, its capability to analyze driver behavior, and the provision of personalized feedback. It emphasizes the system's potential for enhancing road safety, improving driver performance, and enabling fleet managers to make informed decisions for a safer and more efficient driving environment.

End Users:

[0014] Following are the end users of the invention:

- Drivers
- Government Agencies and Road Safety Authorities

- Fleet Managers and Commercial Vehicle Operators

- Insurance Providers

Advantages:

[0015] Following are the advantages of the invention:

- The invention will reduce road accidents and enhance road safety remarkably.

- It will analyze enormous amounts of data using efficient machine learning algorithm.

- It will help government agencies and road safety authorities to keep a check on the drivers.

Summary:

- The system utilizes telematics technology, onboard sensors, and advanced analytics.

- Real-time data on driving parameters such as acceleration, speed, and steering behavior is collected.

- Machine learning algorithms analyze the data to evaluate driver behavior and identify risky driving patterns.

- Personalized feedback and recommendations are provided to drivers for improvement.

- The system benefits individual drivers, fleet managers, transportation companies, and road safety authorities.

- Advantages include enhanced road safety, improved driver performance, cost reduction, and positive social impact.

- The system is customizable and adaptable to different industries and driving contexts.

- The project aims to promote responsible driving, reduce accidents, and create a safer road environment.