International Journal of Recent Engineering Research and Development (IJRERD)
ISSN: 2455-8761
www.ijrerd.com || Volume 09 – Issue 03 || May - Jun 2024 || PP. 171-176

Neurophysiological Evaluation based Scheduling Time Synchronization using Page Rank Algorithm

Naveen R, Elangovan R
UG Scholar, Department of CSE, A.R.J College of Engineering and Technology, Mannargudi, Thiruvarur, Tamilnadu-614 001, India

Suruthi S,
Assistant Professor, Department of CSE, A.R.J College of Engineering and Technology, Mannargudi, Thiruvarur, Tamilnadu-614 001, India

Abstract: Integrating neurophysiological evaluation with the Page Rank algorithm for car driving is an intriguing idea that involves combining insights from neuroscience with a web page ranking algorithm and Neurophysiological techniques. Car driving expert login the web application and client login the web application and trainer login the web application. Expert accepts the communication into trainer and client, both are communicate to each other. During simulated driving scenarios, neurophysiological testing methods such as Electroencephalography and functional near infrared spectroscopy are utilized to assess the cognitive states of the driver, including stress levels and attention levels. Simultaneously, comprehensive driving behavior data is collected to capture the nuances of the client's performance. A graph based model is established, treating driving events as nodes and leveraging the Page Rank algorithm to assign importance scores based on the relationships between these events. Results demonstrate improved time synchronization accuracy, robustness, and adaptability to dynamic network conditions. Furthermore, the algorithm exhibits resilience to transient disturbances and varying workloads, making it suitable for applications in mission critical systems, and other distributed environments where precise time synchronization is imperative. To empower trainers to communicate efficiently with clients, providing personalized coaching based on individual neurophysiological responses. Ethical considerations are carefully addressed throughout the study, ensuring the responsible use of neurophysiological data. The research outcomes contribute to the development of advanced driver training methodologies, leveraging technology to bridge the communication gap between clients and trainers. This approach holds potential implications for the broader domain of human machine interaction in the context of driver education and road safety.

Keyword: Neurophysiological, Page Rank algorithm, EEG, infrared spectroscopy.

1. Introduction

Novel integration of neurophysiological evaluation with the Page Rank algorithm, aiming to facilitate effective communication and collaboration among these key stakeholders in the context of car driving. The field of driver training has witnessed significant advancements over the years, with a growing emphasis on leveraging technology to enhance the learning experience and improve road safety. As we delve into the intricacies of human cognition and vehicular interactions, there arises a need for innovative approaches that bridge the communication gap between driving experts, clients and trainers. The process of driver training traditionally relies on subjective evaluations and observable driving behaviors. While valuable, these assessments may not capture the complete spectrum of a drivers cognitive states and nuances.

Advances in neurophysiological monitoring technologies, such as Electroencephalography and functional near infrared spectroscopy, provide a window into the intricate workings of the drivers mind, revealing cognitive factors like attention levels, stress, and cognitive workload. Despite the wealth of data available, the challenge lies in translating neurophysiological findings and algorithmic outputs into actionable insights for driving experts, clients, and trainers. Effective communication is essential to bridge the gap between technical data and practical driving interventions. The study aims to address this challenge by creating a seamless communication loop facilitated by the Page Rank algorithm, allowing experts and trainers to convey relevant insights to clients in an accessible manner. The outcomes of this study hold significant implications for advancing driver training methodologies and promoting road safety.

2. Literature Survey

Boosarapu , et.al (2021), Deep Learning for Vision and Decision Making in Self Driving cars, In recent times self-driving vehicle is a revolutionary Idea. Self-Driving cars are the driver less cars where the car runs by itself called as Autonomous cars. There are lot of underlying Technologies like Machine Learning and Deep

Learning. This paper focuses on vision and decision making capabilities of self-driving cars using Deep Learning and also ethical challenges while making sudden decisions. Deep Learning is a sub part of Machine Learning which is inspired by the working process and functionality of biological neurons. Vision is the important and strong aspect of self-driving car that contribute a lot i.e., sensing the environment to identify obstacles, reading traffic signs, understanding traffic signal light status, traffic light count down time recognition and finally making appropriate decision on what it sees. Decision making is a complex task when it comes to real time scenarios, where the autonomous driving agent need to make decisions based on the data generated in real world. There is huge amount of data generated by various sensors, radars and LIDAR's. Every time it is like a new experience for the autonomous driving agent, it is difficult to make different policies for different driving scenarios because of existing rules and amount of previous data available. Decision making depends on different technologies like computer vision and deep learning.

Ruixin Du et.al (2022), Media and Trust Influence Consumers Acceptance of Self-driving Car, This study explores the public perception and acceptance of self-driving cars and its influencing factors. The acceptance model of new ternary interaction theory included self-efficacy and the external environment was innovatively proposed by constructing two different mass media (social media and traditional media). In our approach, we applied structural equation model and distribute questionnaires through a combination of online and offline methods with 437 valid response. Modeling result shows that the media has a significant impact on perceived value. Further, perceived security risk and perceived privacy risk significantly affect initial trust, while perceived value, self-efficacy and initial trust had positive effects on acceptance. Based on this learning, we suggest marketers paying more attention to the information release by mass media, promoting positive reports and improving word of mouth about driverless cars (self-driving cars) to increase consumer acceptance of self-driving cars.

Mohamed Alsherif et.al (2022), Recently, the study of self-driving autonomous vehicles has gained great popularity. The development of automated driving will change humans' lives which can provide a fully safe transportation system for them. Such a system requires huge computing power with a high cost, So the simulator is a good choice to train and test self-driving cars as an initial step before implementing them in real. This paper provides a study on how a self-driving car is trained for steering angle prediction and following the road lane in the Udacity simulator via the input data from the car's front-center camera. It also explores the utilization of pre-trained Keras transfer learning models in self-driving cars. The methodology involves collecting the necessary driving data and preprocessing it. Then the transfer learning models are used as base models. The models are trained on a part of the lake track road of the Udacity simulator and tested on the rest part of the road. Also, the trained models have been evaluated by mean square error, the coefficient of determination R square.

3. Proposed System

The proposed system presents an innovative approach to automated lung cancer detection using deep learning techniques, specifically leveraging the Inceptionv3 architecture. The system's workflow begins with the collection of a diverse dataset comprising CT scan images, ensuring representation across various lung cancer stages and potential COVID-19-related abnormalities. These images undergo preprocessing to standardize their format and enhance consistency and quality, essential for subsequent analysis. Subsequently, relevant features are extracted from the preprocessed images to capture key characteristics indicative of lung cancer presence. Following feature extraction, the Inceptionv3 neural network is trained on the prepared dataset to differentiate between lung cancer and non-lung cancer cases, categorizing them into four distinct classes: COVID-19, normal lung scans, early-stage lung cancer, and intermediate-stage lung cancer. Through an iterative learning process, the model learns to discern subtle patterns and nuances within the images, enabling accurate classification. Once trained, the model becomes proficient in classifying new CT scan images, facilitating early detection and diagnosis of lung cancer at various stages, including potential complications associated with COVID-19. Before potential deployment in clinical settings, the system undergoes rigorous evaluation and validation, emphasizing criteria such as accuracy, precision, and safety to ensure its reliability and effectiveness in enhancing patient.

4. System Architecture

The "Neurophysiological Evaluation-Based Scheduling System Using Page Rank Algorithm" project aims to enhance scheduling efficiency and client-trainer matching in a healthcare or wellness setting. The system features robust functionalities including user login and registration for both clients and trainers. Clients can select trainers based on their profiles and specialties, facilitated by a dynamic scheduling module. Using the Page Rank algorithm adapted for this context, scheduling requests are prioritized considering historical data and neurophysiological metrics such as stress levels or cognitive load.

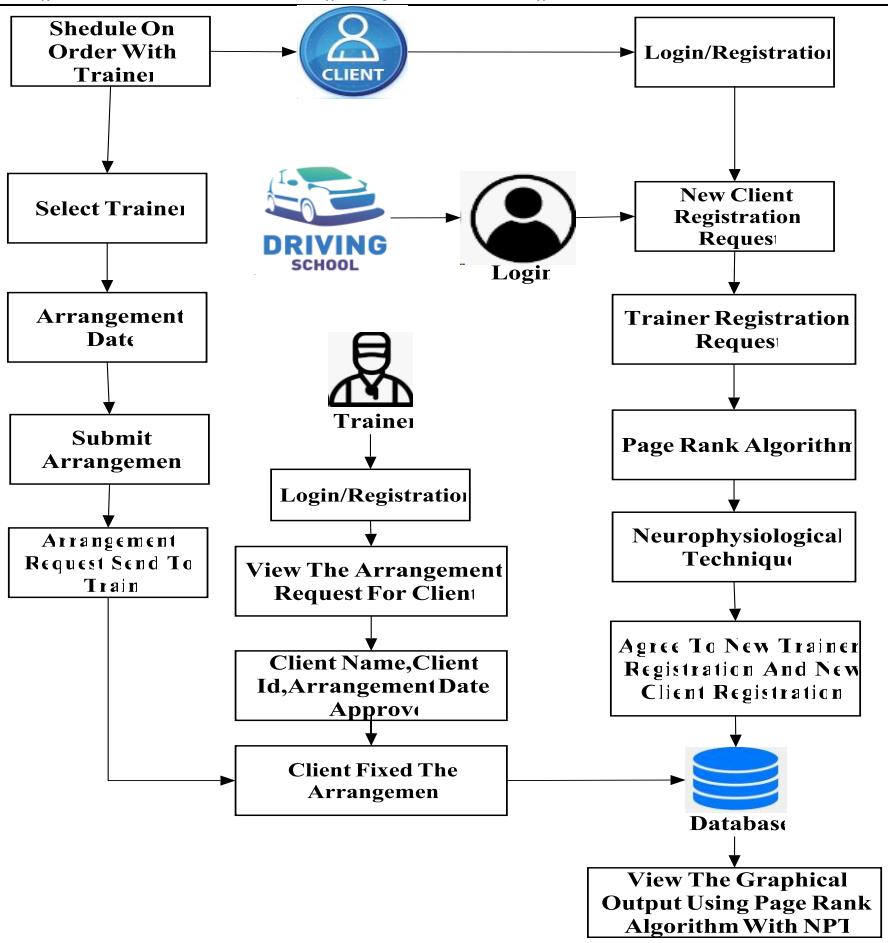

Figure 1: Block diagram of system architecture

Administrators manage new client and trainer registrations, ensuring alignment with system criteria for optimal service delivery. The system integrates a secure database to store client and trainer information, scheduling requests, and neurophysiological evaluation results. Graphical outputs utilizing the Page Rank algorithm with the Neurophysiological Technique (NPT) framework provide visual insights into scheduling optimizations and client-trainer matches, supporting informed decision-making.

5. Implementation

Car driving school login: If the student was new to the system, Initially the student enter into the system and enter their details like username and password the student will be registered into the system then the student will be login into the system again he/she will enter their details if it is valid it will direct them to next stage if it is not valid it will return again to the login stage.

Accept registration request using page rank algorithm: If the Approve registration was new to the system, Initially the Admin enter into the system and enter their details like username and password the Admin will be registered into the system then the admin will be login into the system again he/she will enter their details if it is valid it will direct them to next stage if it is valid it will Page rank algorithm. Implementing the Page Rank algorithm can optimize the driving education curriculum by prioritizing essential topics based on their importance and relevance. By monitoring physiological responses and brain activity during driving simulations or real-world practice, instructors can better understand individual learning patterns and cognitive processes. Automating tasks such as background checks, scheduling, and matching clients with compatible trainers, these systems can improve efficiency and reduce administrative burdens.

New client registration request: After entering into the system the client login will enter the details like Name, Age, Vehicle, and Phone number. Once the student entered all details the system will get the details for fixing the order request. Implementing a dynamic scheduling system allows learners to efficiently book sessions with available trainers based on their preferences and availability. Introducing a centralized platform for arranging

driving dates streamlines communication between learners and trainers.This approach minimizes scheduling conflicts and eliminates the need for back-and-forth communication, enhancing efficiency and reducing frustration for all parties involved. Learners can easily indicate their availability and driving preferences, while trainers can access this information to plan their schedules accordingly.

Trainer registration request: Admin enter into the system after giving the login details into the system the admin will view the student details. The admin will allocate the class slot for each student and the slot details are stored into the database.

Stored in database: In this module storing data in databases has become indispensable for businesses and organizations across various industries.

6. Activity Diagram

Activity diagram is another important diagram in UML to describe dynamic aspects of the system. Activity diagram is basically a flow chart to represent the flow form one activity to another activity.

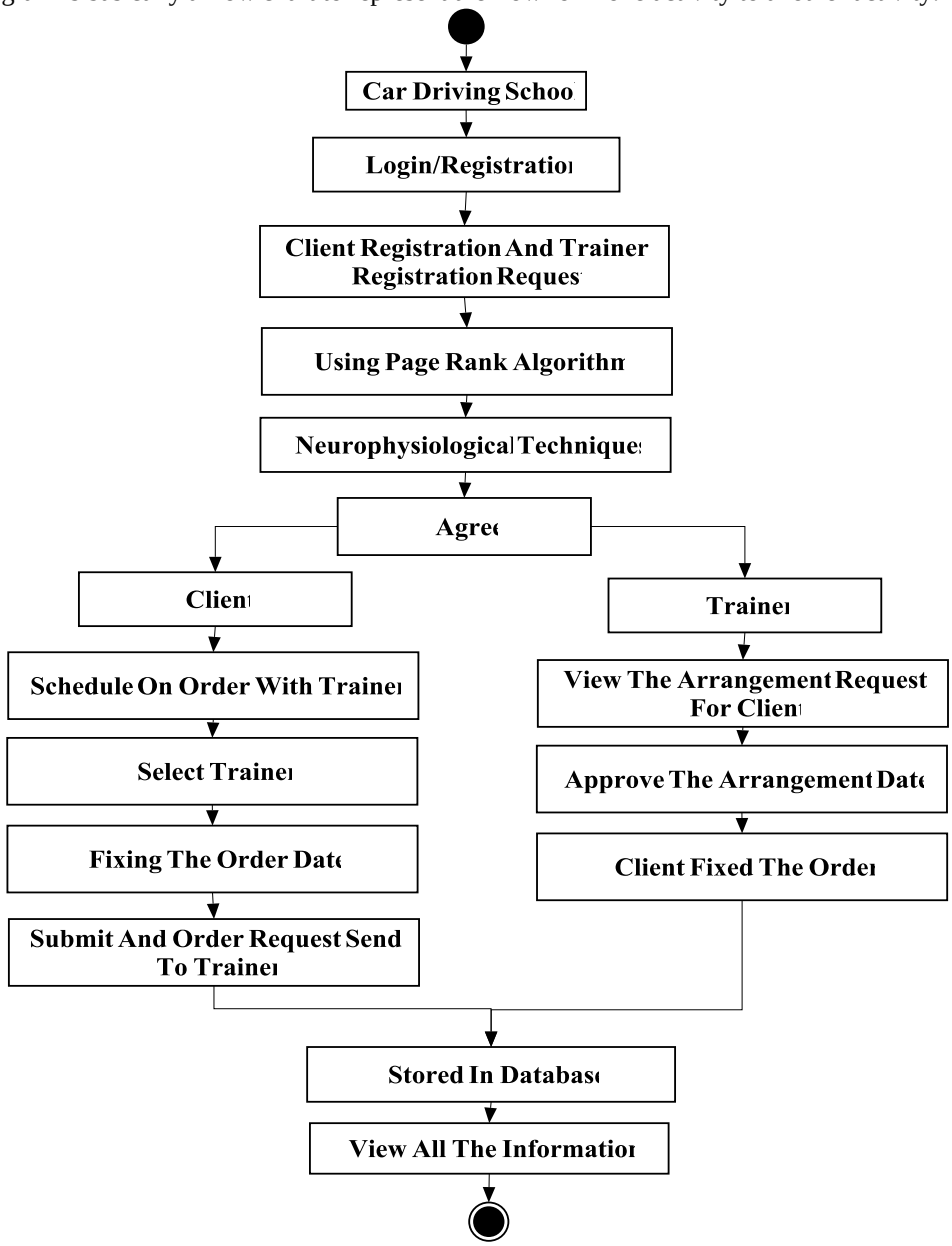

Figure 2: Activity Diagram

The basic purposes of activity diagrams are similar to other four diagrams. It captures the dynamic behavior of the system. Other four diagrams are used to show the message flow from one object to another but activity diagram is used to show message flow from one activity to another. Activity is a particular operation of the system. Activity diagrams are not only used for visualizing dynamic nature of a system but they are also used to construct the executable system by using forward and reverse engineering techniques. The only missing thing in activity diagram is the message part.

It does not show any message flow from one activity to another. Activity diagram is some time considered as the flow chart. Although the diagrams looks like a flow chart but it is not. It shows different flow like parallel, branched, concurrent and single. The activity also described as an operation of the system. So the control flow is drawn from one operation to another. This flow may be sequential, branched or concurrent. Activity diagrams deals with all type of flow control by using different elements like fork, join etc.

So the purposes can be described as:

- Draw the activity flow of a system.
- Describe the sequence from one activity to another.
- Describe the parallel, branched and concurrent flow of the system.

7. Result

The Neurophysiological Evaluation-Based Scheduling System utilizing the Page Rank Algorithm aims to revolutionize scheduling efficiency and client-trainer matching within healthcare and wellness contexts. By integrating neurophysiological evaluations into the scheduling process, the system seeks to optimize appointment times based on client-specific metrics like stress levels and cognitive load. This approach not only enhances the overall quality of care by ensuring appointments are scheduled at optimal times for each individual but also improves client satisfaction and adherence to treatment plans.

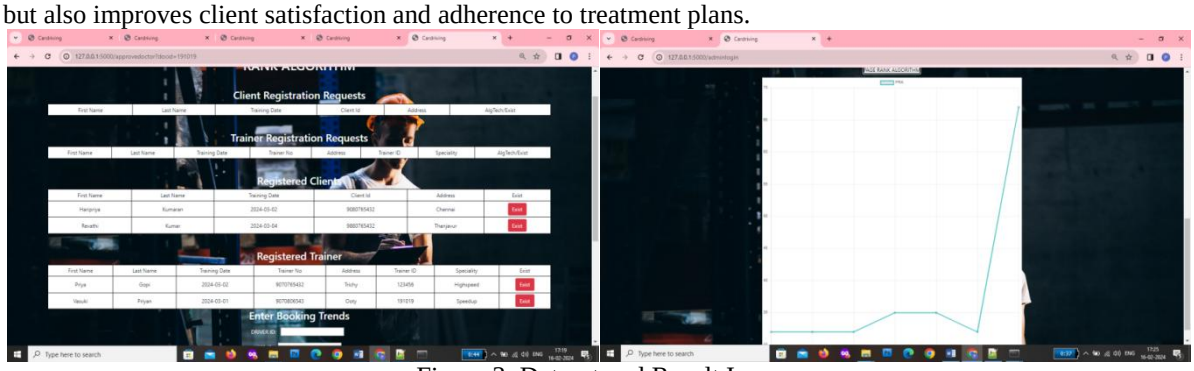

Figure 3: Dataset and Result Image

The Page Rank Algorithm further refines this process by prioritizing scheduling requests based on historical data and neurophysiological insights, facilitating better matches between clients and trainers. Administrators benefit from enhanced operational efficiency through automated scheduling workflows and data-driven decision-making supported by graphical outputs that visualize scheduling patterns and neurophysiological trends. Ultimately, the system aims to streamline healthcare service delivery, improve patient outcomes, and advance the field through innovative use of technology and data analytics.

8. Conclusion

Datasets are well integrated, resulting in a single representation that captures driving-related measures as well as neurophysiological characteristics. Using the Page Rank algorithm, a graph-based model is created, representing driving events as nodes and allocating relevance ratings according to the connections between these events. Customised interventions and feedback are made possible by this feedback loop, which promotes a collaborative learning environment. giving trainers the tools they need to interact with clients effectively and offer individualised coaching based on each person's unique neurophysiological reaction. Safety and skill development are increased when cognitive insights are combined with performance indicators to drive training. By utilising technology to close the communication gap between customers and trainers, the research findings aid in the creation of sophisticated driver training approaches. This strategy may have effects on the larger field of human-machine interaction when it comes to road safety and driver education.

9. References

[1]. Classification of Potholes and Plain Roads For Self-Driving Cars Bagam Laxmaiah_2023
[2]. Image processing algorithms for self-driving cars navigation Vitaliy Dementiev_2022
[3]. Facilitating the Development of Self-Driving cars with Open-source Projects Hongki Cha_2021
[4]. Survey of the Image Recognition Based on Deep Learning Network for Autonomous driving car Jinqiao Liu_2020
[5]. As Fault: Testing Self-Driving cars Software Using Search-Based Procedural Content Generation *Alessio Gambi_2019.*
[6]. A Novel Method of Developing Driving Cycle for Electric Vehicles to Evaluate the Private Driving Habits Fei Chen; Sida Zhou; Yang Hua; Xinan Zhou; Xinhua Liu; Ningning Wu; Jiapeng Xiu; Shichun Yang_2021.
[7]. Data-Driven Distributionally Robust Hierarchical Coordination for Home Energy Management Hossein Saberi; Cuo Zhang; Zhao Yang Dong IEEE Transactions on Smart Grid_2021.
[8]. Technology-Needs Assessment Data Analysis using PCA for the Design of a WLAN-based Hybrid Classroom Response and Learning Management System Android Application Joseph Bryan Ibarra; Meo Vincent Caya; Arnold Paglinawan; Jerry Turingan; Sarah Alma Bentir; Jim Joseph_2019.
[9]. The Reliability Optimization Allocation Method of Control Rod Drive Mechanism Based on GO Method Huina Mu; Hongmei Yan; Xiaojian Yi; Yuanyuan Yang; Guangliang Chen; Xue Dong_2019.
[10]. Exploring the Effects of Data-Driven Hospital Operations on Operational Performance From the Resource Orchestration Theory Perspective Wantao Yu; Qi Liu ;Gen Zhao; Yongtao Song_2021.