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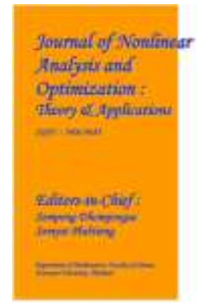

Real-Time Intersection-Based Segment Aware Routing for Urban VehicularNetworks

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ABSTRACT
In the realm of autonomous vehicle navigation, the burgeoning challenges of dynamic traffic environments necessitate intelligent and responsive systems. This paper introduces STARVAN (Smart Traffic-Aware Responsive Vehicle Autonomous Navigation), a comprehensive navigation framework tailored to address the intricate demands of modern traffic scenarios. STARVAN transcends conventional route planning and obstacle avoidance by integrating real-time traffic awareness and adaptive decision-making. Drawing inspiration from the shortcomings of existing systems, STARVAN emphasizes proactive responsiveness to traffic conditions, offering a paradigmshift towards enhanced autonomy and reliability in autonomous vehicle navigation. Through rigorous simulations and comparative analyses, this paper demonstrates STARVAN's superiority interms of adaptability, efficiency, and safety, marking a significant advancement in autonomous vehicle navigation technology.
Keywords: navigation, traffic awareness, adaptive decision-making, route planning, obstacle avoidance, responsive systems, traffic conditions, safety, efficiency, simulation.

INTRODUCTION
The rapid advancement of autonomous vehicle technology heralds a future where vehicles navigatebustling city streets, winding highways, and suburban lanes with precision and autonomy. Yet, amidst this promise lies the intricate challenge of navigating through dynamic and often unpredictable traffic environments. Traditional navigation systems, while proficient in route planning and obstacle avoidance, often falter in their adaptability to real-time traffic conditions, leading to inefficiencies and safety concerns. In response to this pressing need, we introduce STARVAN (Smart Traffic-Aware Responsive Vehicle Autonomous Navigation), a pioneering navigation framework designed to imbue autonomous vehicles with unparalleled adaptability and responsiveness to the ever-changing landscape of modern traffic scenarios. By seamlessly integrating advanced algorithms and real-time traffic awareness, STARVAN represents a paradigm shift towards safer, more efficient, and ultimately, more intelligent autonomous vehicle navigation. In this paper, we delve into the design, implementation, and evaluation of STARVAN, highlightingits transformative potential in shaping the future of autonomous mobility.

LITERATURE SURVEY
[1] Yusor Rafid Bahar Al-Mayouf, Nor Fadzilah Abdullah, Omar Adil Mahdi, Suleman Khan, Mohsen Guizani, Mahamod Ismail, Syed Hassan Ahmed. IEEE Real-Time Intersection-Based Segment Aware Routing algorithm for urban vehicular network was proposed in 2018. Real-time intersection-based segment aware routing uses traffic and road segment status for the selection of

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intersection. Proposed an efficient routing protocol to overcome the transmission delay, packet loss, along with enhancing the efficiency of the VANET. Summary: From this article, I have considered the concept ofthe current conditions of urban scenarios.

[2] Al-Rabayah M and Malaney R. ACO–IBR: a modified intersection-based routing approach for the VANET. IET J. Solid-state Circuits 2020. Position-oriented routing protocols use vehicle positions to determine routes, leveraging beacon messages for neighbor position awareness, ensuring scalability and high delivery ratio in VANETs. ACO–IBR enhances routing stability and throughput in urban environments through dedicated short-range communication, addressing intermittent connectivity and minimizing network costs. The new models gave the better accuracy compared in this work, while the time delay, packet loss decreased moderately compared to that ofthe other proposed models.

EXISTING METHOD

RTISAR aims to address the challenges posed by high vehicular mobility, which result in frequent changes in traffic density and discontinuity in inter-vehicle communication. The algorithm considersboth traffic and segment status to provide an optimal route for forwarding data packets towards their destination. It introduces a new formula for assessing segment status based on connectivity, density,load segment, and cumulative distance towards the destination. Additionally, RTISAR proposes a verity period mechanism to minimize communication overhead during segment status

Disadvantages

This limitation highlights the need for a more holistic and adaptive approach, such as the proposed STARVAN system, which prioritizes real-time traffic awareness and adaptive decision-making to navigate complex traffic environments effectively.

PROPOSED METHOD

STARVAN operates at a superior level compared to conventional navigation systems, prioritizing overall navigation strategies, traffic conditions, and adaptive responses. It comprises three fundamental components: route planning, obstacle avoidance, and real-time decision-making. In route planning, STARVAN employs advanced algorithms to generate optimal paths considering factors like traffic congestion, road conditions, and vehicle dynamics. By analyzing real-time and historical traffic data, STARVAN anticipates bottlenecks and selects routes to minimize travel timeand enhance efficiency.

For obstacle avoidance, STARVAN utilizes sensor data to detect and navigate around obstacles in real-time. Employing sensor fusion techniques such as LiDAR, radar, and cameras, STARVAN accurately perceives the vehicle's environment, making informed decisions to avoid collisions. In real-time decision-making, STARVAN continuously monitors traffic conditions and dynamically adjusts its navigation strategy for optimal performance. Integrating machine learning, STARVAN learns from past experiences, adapting to evolving traffic scenarios to ensure safe and efficient travelin dynamic environments.

Advantages: STARVAN lies in its ability to adapt and optimize navigation strategies based on real-time traffic conditions, thereby enhancing overall travel efficiency and safety.

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Schematic diagram for proposed model

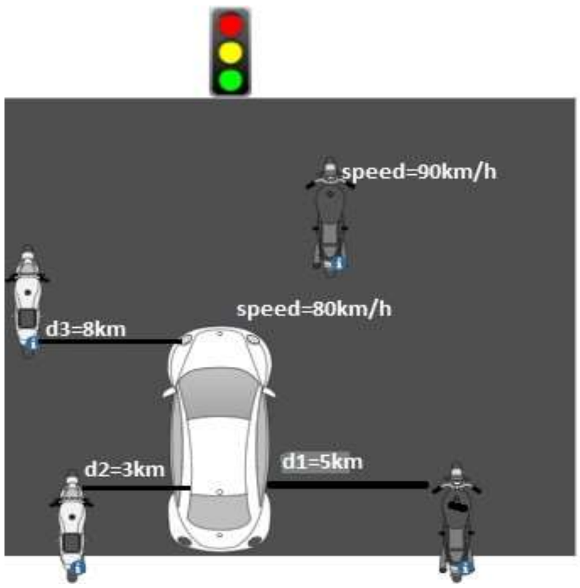

Fig.1. Model Architecture

OUTPUT SCREENS

Fig.2. vehicle movement

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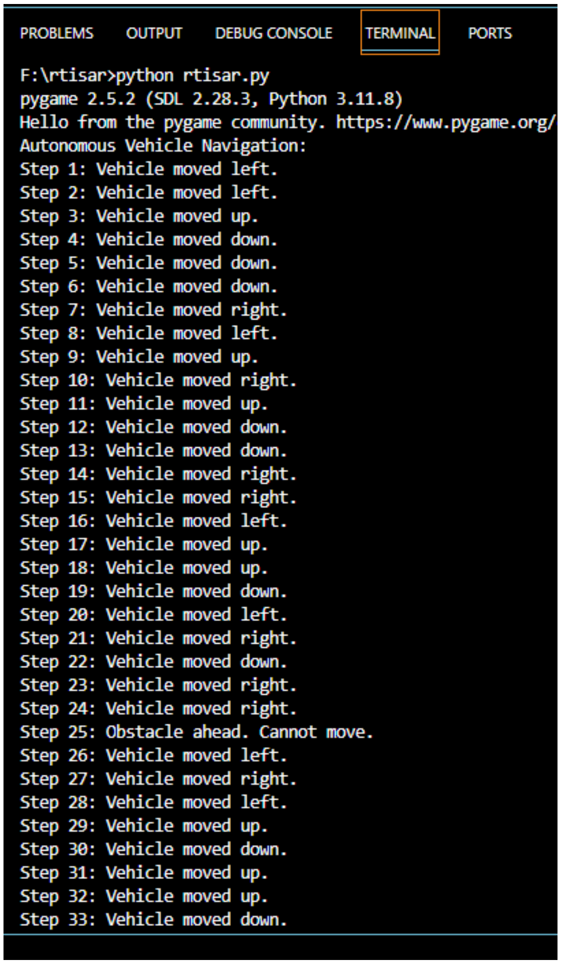

Fig.3. Autonomous Navigation

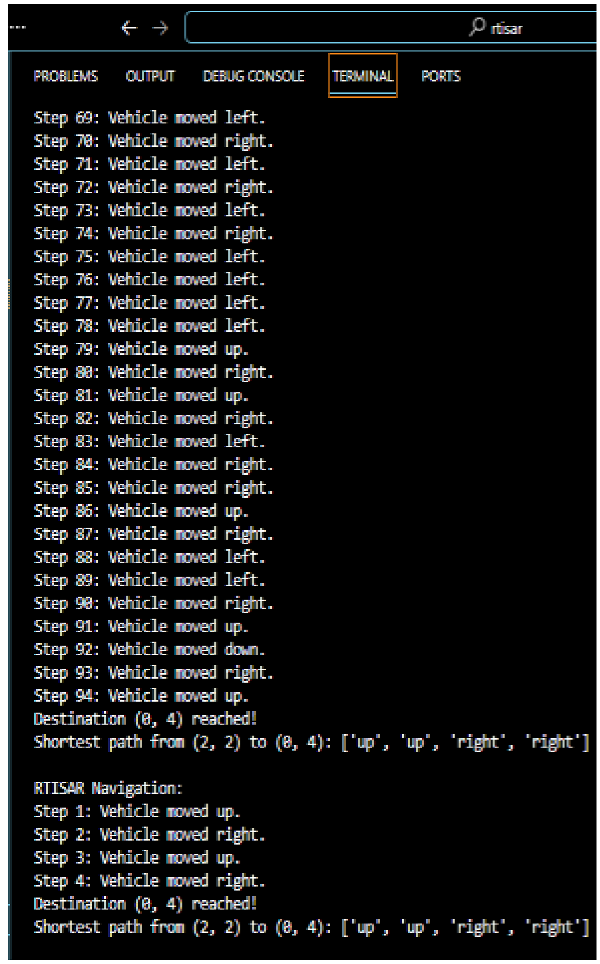

Fig.4.RTISAR Navigation

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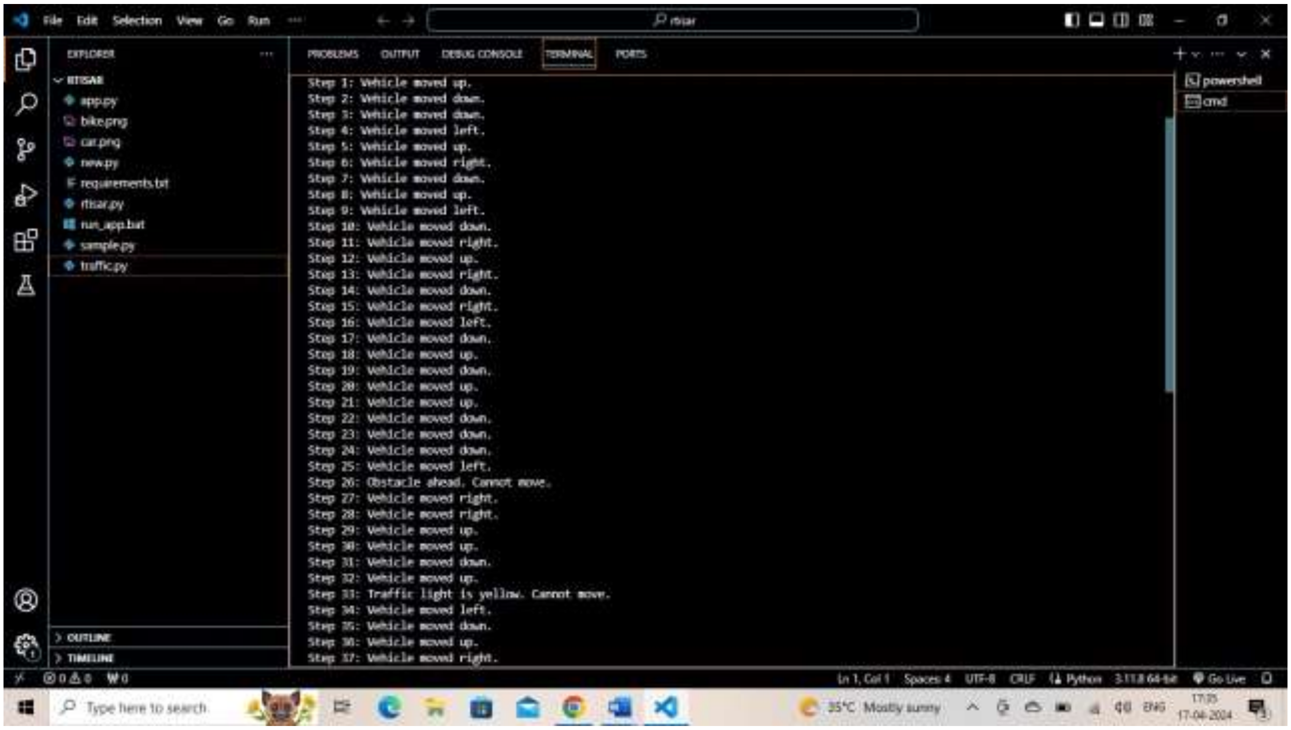

Fig.5. console step by step process

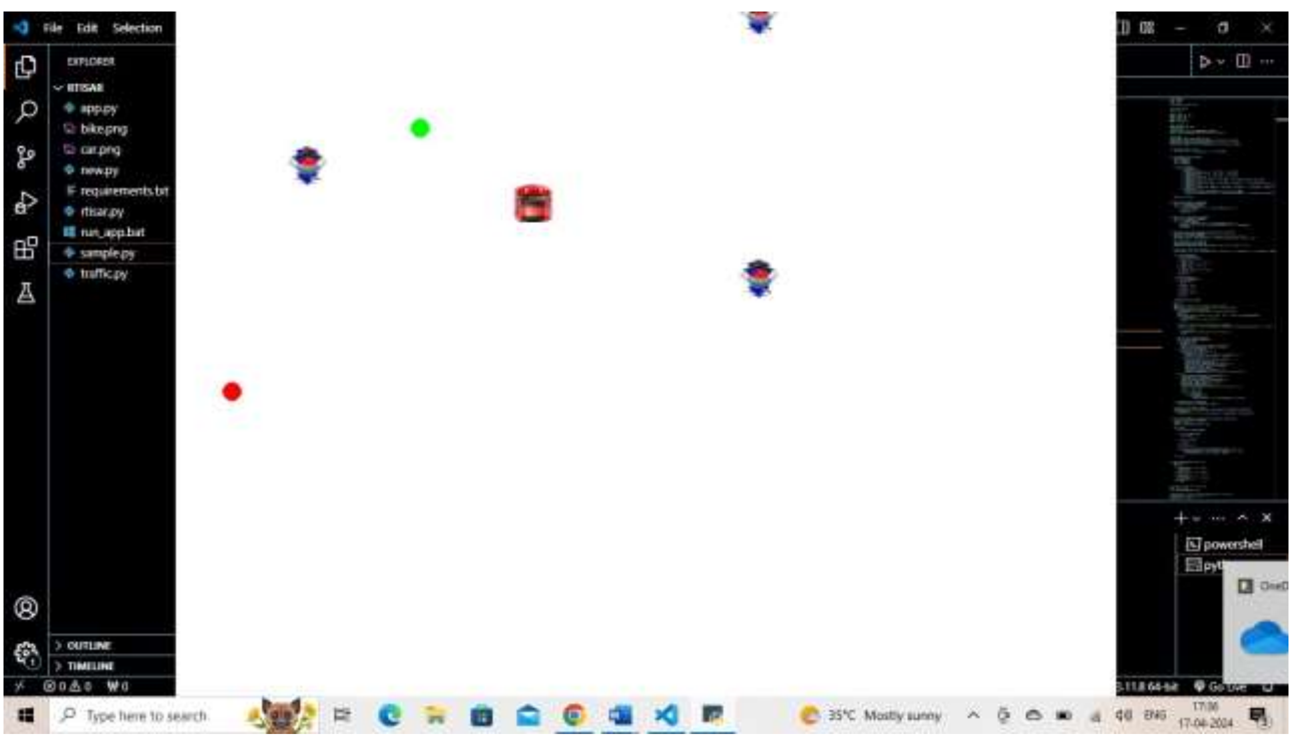

Fig.6. vehicle moving at traffic signals

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CONCLUSION

In this paper, the design and analysis results of the STARVAN, a cutting-edge autonomous vehicle navigation system designed to meet the evolving demands of modern traffic environments. By emphasizing holistic navigation strategies, traffic adaptability, and real-time responsiveness, STARVAN represents a significant advancement over traditional navigation systems. Through its integrated modules for route planning, obstacle avoidance, and dynamic decision-making, STARVAN offers a comprehensive solution for safe and efficient autonomous vehicle travel. The system's ability to analyze real-time traffic data, anticipate obstacles, and dynamically adjust navigation strategies ensures optimal performance even in the most challenging scenarios. With thecontinuous advancement of technology and the integration of machine learning algorithms, STARVAN holds promise for revolutionizing the future of autonomous vehicle navigation, pavingthe way for safer, more efficient, and more reliable transportation systems..

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