Virtual Driver

[1]Jain Raju, [2]Likeson Saviyo, [3]Rajesh A V

[1]student,[2]student, [3]Assist.Professor of Dept. Computer Science
[1]Department Of Computer Science
[1]Santhigiri College of Computer Science, Vazhithala, Thodupuzha, India

Abstract: Technology that enables an individual to drive a vehicle from a remote location already exists. Virtual driving is when a teleoperator interferes directly with the autonomous vehicle including steering, accelerating, and braking. Virtual controlling enables important operational data to be obtained, thus setting the groundwork for gradually increasing virtual driving performance in the future. Moreover, human assistance through virtual driving can offer more flexibility and intelligence than a single AI. However, the real-time transmission of data and videos is particularly crucial for virtually driven vehicles. The latency between the vehicle and the controller depends on the video streaming communication methods and transport protocols. Furthermore, the control and driving performance depends on the vehicle speed likewise

I. Introduction

In this paper we discuss about virtual driving, basic requirements of virtual driver, Applications of virtual driver, advantages of virtual driver. Virtual driver means a human driver who is not located in a position to manually control the vehicle's braking, accelerating, steering or gear selection, but operates the vehicle.

II. Basic requirements

- [1]Non interruptible network connection: - for implementing the virtual driver we need an uninterruptible connection, if the connection gets interrupted then the life of the passengers and people at the road will be at danger.
- An onboard unit in the car and a control center from which a driver controls the car: - We need an onboard unit in the car to take control of the board incase the connection get lost. We need to setup the control center from which the driver can control the vehicle.
- Must have an assistance of the passenger: - as the vehicle being driven from a remote location the passenger inside the vehicle has to be ready to take control of the vehicle in case any unexpected scenario occurs.
- If the connection gets lost, then the vehicle needs to safely park it on the side: - as we know, to implement the virtual driver we need an uninterrupted connection. If in case the connection gets lost and the Passenger inside vehicle have no knowledge about the controls of the vehicle then the vehicle needs to park itself at the nearest safe position.
- Auto pilot up to the closest parking space available: -in the case of the a lost connection, the vehicle will needs to park at the nearest safe position available. For the vehicle to park at the nearest safe position available then the vehicle needs to be on auto-pilot mode, which is used to park the vehicles in parking lots.
- ADAS system: -it is a hardware and software product which will assist the driver in every situation. The ADAS system can take control of the vehicle in the case of emergency if the driver doesn't respond to it.

III. What is ADAS?

- Advanced Driver Assistance Systems
- [2]The title-role of ADAS is to prevent deaths and injuries: - as the ADAS being a driver assistance system it needs to prevent deaths and injuries that can be occurred by lack of driver response and concentration on the road.
- It incorporates the latest interface standards and run multiple vision-based algorithms: - as the ADAS being a life saver it needs to be fully equipped with the latest technologies and it should meet the latest standards.
- It uses cameras and sensors to detect driver's errors and respond accordingly: - the ADAS system is an electronic system, it uses the cameras and sensors to implement the driver assistance as it is the way in which the system can take actions at run-time and produce the move for any situation which can occur in the journey.

IV. Applications of ADAS

- Pedestrian detection and collision avoidance: -the ADAS system will scan the road real-time and if a pedestrian steps into the road the vehicle will automatically applies brake and avoid collision.
- Lane departure warning and correction: -the ADAS system will scan the road and if the vehicle cross the lane, then the system will correct it and inform the driver.
- Traffic sign recognition: - the ADAS system will scan the traffic signs along the path and if the driver violates any then the system can take actions and inform driver about it.
- Automatic emergency braking: - if in an emergency situation if the driver forgot to apply the brakes, then the system will automatically brake and avoid the collision.
- Blind spot detection: - there are many blind spots in mirrors, if any vehicles or objects are in that place the driver will not see it and it can cause accidents. In this situation the system will warn the driver about it and hence the accident can be avoided.

V. Advantages of virtual driver

- It decreases casualties in accidents: - as there is no driver in the vehicle then number of casualties in the accident will decrease.
- Can change driver in the middle of the journey: -for long journeys we can switch the driver without stopping vehicle as the vehicle is driven from a remote location.
- In taxies we don't need to fear unknown drivers: -the main problem with taxies is the driver of the vehicle will be unknown, we can't predict what they will do. In virtual driving we don't need to fear the unknown driver as there is no driver inside the vehicle.
- There is no need of human presence inside the vehicle to drive it: -for drive an ordinary vehicle we need the human presence inside it, but in case of the virtual driver the driver will be in a remote location.
- As the driver is not in the vehicle the weight decreases and fuel efficiency increases: -it is a simple fact that decrease in weight will increase fuel efficiency. In virtual driver there is no driver inside which will reduce the weight of the vehicle and thus increase fuel efficiency.

VI. Applications of virtual driver

- [3]In cargo delivery, as it is a long journey, we can switch the drivers in the middle of the journey: - as we know the cargo deliveries happens at large distance travels. If incase the driver wants to take rest then we need to stop the journey, but in the case of virtual driver we can switch the drivers easily and the journey will only need to stop at the destination.
- Taxi, in taxies as the driver is not inside the vehicle, we can use the driver seat for passenger hence increase the passenger capacity: - as we know in a five-seater car we can only allow four passengers. In a virtual driving car, we use the driver seat also for passenger and increase the passenger capacity.
- In National Defence, in military tanks we can control the tanks from a remote location and attack the enemy base without any casualties: - as we know wars are prone to causalities. By using the full potential of virtual driver, we can reduce the causalities in the war. In a military tank, If the enemy destroys a tank there will be causalities, if the tanks are controlled remotely then there will be no causalities in the attack.
- Unmanned Air combat, in this the pilot will be in a military base controlling the plane so if any accident occur the pilot is safe at the base: - as the wars are prone to attacks the number of causalities will be high. In an air combat if the pilot is not in the aircraft, we can save the pilot and hence decrease the number of causalities.

VII. Conclusion

Virtual driver is the phase between human controlled vehicles and autonomous vehicles.[4] Today's AVs operate on a complex connection of cameras, LiDAR, radar, GPS, and direction sensors. Combined, these are expected to give an all-situation, predict everything, and guarantee a safe delivery to one's destination. Only They Don't and They Can't. This is why government regulators are hesitant to clear AVs for prime time. There is not enough data to ensure confidence in an AV's ability to avoid damage, injury, and death. Understandably, user confidence is also just not there yet. This is where the virtual driver comes, as there is a human in control and the consumer can feel safe. As there is a human at control, they can guarantee a safe delivery to one's destination.

VIII. Acknowledgement

We want to thank Rev. Fr. Paul Parekkattil, the principal of Santhigiri College in Vazhithala, sincerely.
We gladly take this opportunity to thank Ms. Amitha Joseph, Head of the Computer Science Department at the Santhigiri College of Computer Sciences in Vazhithala, for the help during the progress of seminar, also for her kindly help, guidance, and inspiration.
We are heartily thankful to Mr. Rajeesh A.V, assistant professor in the department of computer science at Santhigiri College of Computer Sciences in Vazhithala, for providing facility during progress of seminar, also for his kindly help, guidance, and inspiration.
In addition, I draw a lot of inspiration from my parents. So, I thank them respectfully for their help

IX. References

1. 'Self-driving vehicles and enabling technologies' edited by Marian Gaiceanu 'Advanced Driver Assistance System at a Glance' written by Sreeraj Sreekumar
2. https://www.t-systems.com/de/en/industries/automotive/connectedmobility/teleoperated-driving
3. https://ottopia.tech/ottopedia_items/how-does-remote-drivingwork/#:~:text=What%20Is%20Remote%20Driving%3F,teleoperator
4. %20from%20a%20remote%20location