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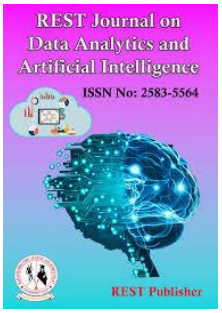

Future of Transporatation with AI

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Abstract: As a means of transportation of small loads, wheels were attached to carts and chariots. Around the same time constituting to transportation history, people developed simple logs and controllable riverboats to direct the vehicle. From here people went on to tame animals like horses, bullock carts .In 18th and 19th century there were significant development in transportation with invention of trains, cars, aeroplane and satellites .The vehicles were driven with man as a mode of driver. This led to easy and faster mode of movement of goods and people. The transportation industry has gone through several research, studies and refinements to reach where it is now. Thus signification transformation is seen in recent years. Thus the industry has reached an unprecedented level where vehicles don't even require human intervention to zoom around the road. The technological advancements have laid a hand in its remarkable journey of innovation and evolution. Today in this digital 21st Century there is invention of automation in field of transportation with driver less. AI technology brings manifold benefits to the transportation sector. It increases efficiency and reduces emissions while enhancing safety by reducing human error, that's leading cause of accidents. Personalized user experience, are becoming the norm due to AI. In the future ,AI-based solutions will add more value to cars, resulting in further advancement in the development of autonomous driving ,maximizing production capacity, increase in production and gathering data for improved road safety and passenger experience .We are not at the age where AI in transportation helps achieve major breakthrough ,but also catching the eyes of transportation bosses worldwide. The field of autonomous vehicles is undergoing a significant transition, largely due to the swift progress made in Artificial Intelligence .These advances go beyond self-driving cars to include drones, truck ,taxies and other type of transportation. The incorporation of artificial intelligence into driverless cars is paradigm change that might completely alter how we view and engage the transportation.

Key words: transportation, advancement, invention, personalised user experience, self- driving.

1. INTRODUCTION

Urban mobility has seen a significant adjustment recently. In addition to become more complicated, the usual home –work-travel pattern is no longer the norm. Nowadays, trips frequently connect several locations in an irregular fashion. The capacity to recognize typical travel pattern and design the transportation system appropriately has transformed the approaches to transportation planning and operation. The conventional method has been to forecast ,plan and deliver before carrying it out. But there are also significant changes taking place in the conventional transport section .The transportation industry ,is a multi-model people and goods moving with $10 trillion global system of networks, with multitude of external and self-internal challenges like subsidies, fragmented network ,rising congestion ,emissions ,safety and myriad of inefficiencies caused by outdate government policy .Traditional policy and technology approaches have shown incremental progress in specific areas but haven't achieved world-wide transformation. This is partly due to the inherent challenges of the transportation industry which relies heavily on public perception and behaviour change.

Transportation is one of the major industry's that is receiving a lot attention with artificial intelligence today. In particular ,the automobile industry has begun to apply artificial intelligence to automobile industry has begun to apply AI to complex tasks where reliability and safety are essential for utilising new technologies, such as traffic management and self driving cars.

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Artificial Intelligence (AI) seems to be popping up in every complex business these days. For example banks are utilizing AI to quickly analyse and scrutinize billions of credit card transaction and stop fraud based on its knowledge of where customers might logically shop and where they won't. Then why not in transportation sector .It is not too far behind in implementation .According to a recent survey conducted by YouGov a developer of location data and technology solutions ,of more than real world ,a continued focus on core system such as ERP software ,AI and related technologies continue to mature and be more successful .As a reason industry are pushing forward AI to realize the gains it promises, including greater accuracy ,improved customer and partner satisfaction .Probably these are the reasons for utilization is low in transportation due to high level of confusion in implementation. LG electronics is researching an artificial intelligence device that will gather sensor data, perform self-diagnosis on the damaged part and output a self-diagnosis on the damaged part and result as a visual warning and auditory warning.

Artificial Intelligence will take over all data collection, data analysis, scenario modelling and the calculations for making things more effective and efficient.AI will be very powerful. The community debate when the AI singularity will arrive is when the point at which AI is an intelligent as humans .Several estimate this will arrive within 40 years, some estimate sooner. However for the co-ordination of transport, full human like intelligence is not required.

2. LITERATURE REVIEW

The goal of incorporating AI into daily life planning is to be aware of community needs and to select the best course of action to ensure that there will be no negative effects on social, environmental and economic aspects of transportation. Being the backbone of urban infrastructure, the transportation sector cannot ignore data collection and consumption .Due to it's emphasis on people and substantial financial gain it plays a significant role in improvement. According to the forecast of Prince Water House Coopers,the accelerated development and penetration of artificial intelligence will ensure an increase in the world gross product by 2030 by no less than 14% .Global consultant McKinsey Institute expects about 70% of companies to be actively using at least one type of artificial intelligence technology by 2030.

The Evolution of AI in Transportation sector

The foundation of Artificial Vehicle (AV) has been due to artificial intelligence, which has made previously unachievable levels of precision, flexibility and intelligence possible. Important application of AI in AV s include are:

Machine Learning and Data Process: The AV's receive data from sensors, cameras and GPS system which is interpreted by machine learning algorithms which help the vehicle to navigate, avoid obstacles and make judgments in real time with the use of this data.

Predicative Analytics: AI makes it possible for AV's to foresee possible threats and modify their course of driving technique accordingly .Its ability to forecast the future is essential to maintain the efficiency and safety.
Human Machine Interaction: AI facilitates communication between human passengers and vehicle, allowing human input to be seamlessly integrated with autonomous system.

Today, with faster than ever response time benefitting drivers, passengers and pedestrians altogether, AL and ML are changing transportation and moving towards the future at lightning speed. The idea is not limited to labs anymore but is now being seen on roads .In fact people on the streets of Guangzhou are trying to test these vehicles by aggressively cutting in front of them. Not just in China, autonomous vehicles have even already made their way into cities across America where Google has tested it fleet of self-driving cars for over six years now with zero crashes.

Artificial Intelligence in transportation

Transportation with the help of AI brings lot of advantages, revolutionizing the industry and enhancing various aspects of transportation ecosystem. AI, in tandem with other emerging technologies like Internet on things(IoT),Machine learning, cloud computing ,big data analytics and 5G opens up a world of opportunities and new horizon of interconnectivity between vehicles, paving the way for more efficient ,advanced and safer transportation system. With AI the vision of self-driving cars becomes a reality, promising a revolution.

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1. Traffic flow analysis

As the number of vehicle sum on the road increased, traffic congestion also increased significantly. Congestion wastes time and money ,it puts lot of stress on drivers and contributes to global warming ,thus improving traffic management will led huge improvement to road safety.AI is paving the way for smooth transportation with the help of computer vision and machine learning algorithms .These traffic are monitored by camera and data are fed into computer for analysis. The AI enabled smart system can easily calculate and track traffic density and highways with precision .It helps local government monitor traffic flow conditions in their cities to design more efficient traffic management system with better road safety.AI has the potential to remove unwanted traffic from roads and improve safety.

2. Parking and traffic enforcement

It has become easier to control traffic thanks to AI. Cameras and various IoT sensors are used for data collection. For example, sensors can detect the occupancy of parking space; help drivers instantly find a parking space in crowded cities. Camera-based AI system can help patrol officers spot vehicles violating traffic law .This helps authorities identify vehicles by licence plate, car model type and colour along with any traffic violations. Although many countries have implemented these systems, full adoption of AI –based traffic monitoring system is still in work in progress .Ultimately, the future of transportation using AI will be easy.

3. Automatic licence plate recognition

Automatic License Plate Recognition (ALPR) involves computer vision –based camera system attached to streetlights, overpass and highway to capture vehicle's licence plate, time, date and location. This advanced system with AI capabilities will be invaluable to police in detecting and preventing crime .For example, police can identify the presence of a specific vehicle at a crime scene. In future, this same technology will identify travel pattern, help manage tolls and parking and help auto dealership companies track their assets.

4. Self- driving cars

With the advent of self-driving cars the application of artificial intelligence in transportation has become more popular. Self-driving cars are simply self –driving cars that are equipped with various sensors such as LiDAR, RADAR and cameras to understand the surrounding situation and plan a route accordingly. IoT-based sensors generate huge amount of data that can be converted into useful insights with the help of AI algorithms, object character recognition, machine learning and computer vision technologies. The concept of self-driving cars is slowly and steadily moving from sci-fi future to real reality. Along with self-driving trucks and taxis have also entered the transportation industry. For example Tokyo, a tech savvy nation, has already using self –driving taxis for public transportation. However, in the United States, there are many benefits.to using self-driving trucks to transport goods. According a report published by McKinsey, self –driving trucks can reduce management and maintenance costs by 45%.The use of AI based self-driving cars is not yet standard.

5. Delay estimation

The future of AI is not limited to vehicles or traffic management, because AI is also revolution the aviation sector and solving traditional problems through innovation in this field. The most important problem in air transport is related to flight delay. Not only does this lead to financial losses, but it also negatively impact the customer's flying experience. In the future,AI will come to rescue the problem. The airline industry is using computer vision and data lake technologies to improve customer's travel experiences by reducing waiting times and delivering exceptional service. Everything from technical glitches to bad weather can affect flight times, but with the help of AI, airlines can track delay in real time and notify passengers in advance. Machine learning and Artificial intelligence also crunch real-time weather information, historical records and flight data to track hidden patterns that cause flight cancellations and delays.

6.Drone taxi

These are the one of most cutting edge and fascinating application of AI transportation that we will see in the future. The passengers can reach their destination as quickly and viable solution. Additionally, with the help of drone taxis passengers can reach their destination as quickly as possible. Moreover, population growth is putting pressure on local governments to ensure smart urban planning without compromising on resource depletion .In this respect, AI –based drone taxis are a practical solution to all problems faced by urban planners. Recently about

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17 passengers in China experienced smart air mobility with the help of autonomous aircraft. This indicates that similar AI applications will be positively adopted to facilitate mobility in the future.AI helps drone delivers with GPS navigation, obstacle detection and avoidance, delivery disruption and emergency management capabilities.

Understanding the advantage of Artificial Intelligence in transportation system

1. Fully autonomous Vehicles

The development of fully autonomous vehicle is a significant focus for the future.AL algorithms combined with advance sensor technologies and deep learning techniques, will enable vehicles to navigate complex traffic scenarios and handle all driving tasks without human intervention. Thus improving road safety, reducing traffic congestion and increasing overall efficiency.

2 .Enhanced Traffic prediction and management

AI will continue in advance predicating and managing traffic patterns by analysing vast amount of real time data from various sources like sensors, GPS system .AI algorithms will provide accurate and up-to –date traffic predictions .This will enable better traffic management like congestion prevention, traffic signal control and resulting in smoother and more efficient transportation system.

3. Intelligent infrastructure and connectivity

Artificial Intelligence enables intelligent infrastructure system that communicates with vehicles and provides real time information. Thus AI powered vehicle to infrastructure and vehicle –to-vehicle communication system will enhance safety, co-ordination and efficiency on the roads.

3. Personalized Mobility Service

AI will play a important role in providing personalized mobility services to users .By analysing individual preference, travel patterns and real time data.AI algorithms will offer customized transportation solution .This will enhance the overall travel experience, improve accessibility and reduce the reliance on private vehicles. Transportation solutions, such as on-demand ride-sharing and multimodal journey planning. This will enhance the overall travel experience, improve accessibility, and reduce the reliance on private vehicles.

4. Sustainable Transportation Solutions

AI will contribute to the development of sustainable transportation systems .Machine learning algorithms can optimize energy consumption, promote eco-friendly driving behaviours.AI powered logistics and routing system will also prioritize environmentally friendly options thus promoting sustainable mobility.

5. Advanced Safety system

AI will continue to advance safety systems in transportation. Enhanced object detection and recognition algorithms, combined with AI-powered collision avoidance systems, will improve vehicle and pedestrian safety. Additionally, AI will assist in identifying potential maintenance .The flexibility of AI in the transportation sector means that there are countless other areas which could be affected going toward. Dubai has been experimenting with smart vehicle number plates with access to tools that can inform emergency series about the details of a crash or incident. These plates can even connect to your bank account to pay parking fines.AI solutions can be at the forefront of crewless require months or years away from home. Some professionals could even use AI or IoT connections to control vehicle from a distance. The future of AI transport could also include space light and transportation to other planets. Companies like Tesla have been investing more heavily in ideas that bring AI into the space environment .The future of space travel could be in the hands of AI-based tools.

Future Transportation in 2030's and later

The global AI market for transportation is projected to exceed $10 billion by 2030.This staggering figure underscores the significant financial impact of AI, demonstrating how it is revolutionizing the transportation of goods and people, making them more intelligent ,safe and efficient. There will be dramatically change between now and 2030.E-halling rides, car sharing schemes, electric vehicles, electric scooters, drones and even autonomous buses, taxis, lorries, engines are already here. Delivery by drone is one of immediate step and

advance. The transition of EVs is also accelerating rapidly, with electric vehicles set to be the cars of our now and immediate future. Sale of new petrol and diesel cars will be banned by 2030 in the UK, with $1.5bn government funding to support smart charging infrastructure for electric vehicles .New York has also announced that it will be spending about $1.6n across all types of zero emissions vehicles over the next five years. National Grid has an import role in enabling the rollout of future clean transport, by ensuring clean power can be efficiently moved from where it's generated to where it's needed by the transport sector .For example EV charging infrastructure along the strategic road network.

Fuels for the future

Petroleum was first discovered in 1859,but our reliance on this fossil fuel must end to effectively tackle climate change .So alternative renewable energy sources like biogas will be alternative and revolutionary possibilities for the future. In the future, it's possible we will see the large scale charging hubs for HGVs, buses and public fleet such as council and blue light vehicles, all in one location to minimise disruption.

Autonomous Vehicles and AI

AV's combined with artificial intelligence will provide a future of convenience and comfort when it comes to future transport .Banished to yesteryears will be bus timetable s and shelter and nose-to-bumper stress driving. Self –driving public vehicles running on advanced algorithms will pick up people who are going in the same direction. In future, robot vehicles may look entirely different from the hands –free/big screen version we expect. Envision a transport.

Super –sonic speeds

Elon Musk called his open sourced idea for a hyper loop train system, a cross between a Concorde, rail gun and an air hockey table. By 2030 ,Virgin Hyper loop could be whisking people and freight from London to Edinburgh in Hyper loop could be whisking people and freight from London to Ediburgh in 45 minutes ,or between New york and Washington DC in just minutes reaching speeds of up to 670 miles per hour, Hyper loop are powered by electromagnets and eliminates the air resistance experience by other mode of transport.

Hard hit by coronavirus pandemic, the global aviation industry is nevertheless continuing to pursue ways to reduce planes carbon impact by replacing traditional fuels with synthetic jet fuels and hydrogen alongside radical new futuristic engine and aircraft design. The UK government's Future Flight Challenge is investing $125 million to develop greener ways to fly, including all electric short haul aircraft, drone deliveries and autonomous flight technologies.

In US,Ford ,Argo AI and Walmart are collaborating on a delivery service located in Austin, Miami and Washington. The service will use Ford's self-driving vehicles paired with Argo AI's self driving system technology .According to executives, delivery capacity is projected to expand over time. Autonomous ships are expected to be crossing seas in the near future Advanced AI can calculate optimised routes and maximise speed by using weather and sea current data. Using maritime data already produced through ships smart systems could be the biggest wave forward in commercial shipping since the introduction of containers.

AI capabilities by 2050 might be more than enough based on Ray Kurzweil's predictions.

- Personal computers are thousands of times more powerful than a human brain
- Manufacturing and transport almost entirely automated
- Computers capable of autonomously learning and creating new knowledge to transport.
- 2045 Singularity-AI passes humans as being the smartest and most capable.
- People will spend most of their time in virtual reality.

Sensors in the transport infrastructure, system and vehicles can monitor traffic flows, travel times, weather and whole lot of other data too. The AI can use this data to predict various things including but not limited to Future Demand for travel and Future network performance

3. CONCLUSION

Artificial intelligence driven vehicles in transportation are driverless technology in future is completely poised to transform the transportation landscape. In spite of its potential benefits ,there are considerable legislative,

technological and sociological obstacles that must be overcome .Stakeholder collaboration is very important for this huge shift ,guaranteeing a day when autonomous vehicles will enhance transportation network by making them safer ,cleaner and more effective. With AI at the forefront ,the vision of self -driving cars becomes a reality, promising a revolutionary shift in the way we perceive and experience transportation .It will mark a significant stride towards the future where mobility is not just a source of reaching a destination but an intelligent ecosystem that prioritizes safety ,conveniences and sustainability .As AI in the transportation industry continues to evolve and make a mark on this sector ,we can expect to see more application of AI in automotive industry. This is just the start of it. Many manufacturers are collaborating with autonomous vehicle start-ups to implement such advanced AI assistance in their vehicles.AL and ML are bringing a revolution in the transportation industry .It'll be fascinating to see how the industry unlocks the full potential technologies and fast forward into the future of automobiles .Thus integration of Artificial intelligence in electric vehicles (EVs) is set to transform the automotive industry by 2025.This revolution brings about safer ,more efficient and environmental friendly transportation system, revolutionizing our road experiences.

REFERENCES

[1]. https://appinventiv.com/blog/ai-in-transportation/
[2]. https://cionews.co.in/autonomous-vehicles-and-ai-navigating-the-future-of-transportation/
[3]. https://www.forbes.com/sites/timothypapandreou/2024/03/04/generative-ai-is-coming-to-the-transportation-industry-is-it-ready/
[4]. https://www.sdcexec.com/transportation/automation/article/22894096/rippey-ai-the-past-present-and-future-of-ai-in-transportation-and-logistics
[5]. https://www.researchgate.net/publication/371282928_Artificial_Intelligence_in_Transportation_Systems_A_Critical_Review
[6]. https://medium.com/@rrathnakar707/what-is-the-future-of-artificial-intelligence-ai-in-transportation-028752014d59
[7]. https://www.nationalgrid.com/stories/journey-to-net-zero-stories/future-transport-driving-change-next-10-years
[8]. https://ijsrset.com/index.php/home/article/view/IJSRSET2411212/IJSRSET2411212