Public transportation optimization

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Project name	Public transportation optimization
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INTRODUCTION:

In order to be environment-friendly, relieve traffic congestion, reduce pollution, and be green and sustainable, the optimization and development of public transportation, as the subject of people's long-term research, has always been shining. With the emergence of shared transportation, public transportation systems face more challenges. In order to better connect with bike-sharing, car-sharing, and other modes of transportation, public transportation will carry out important reforms, among which the optimization of line network is one of the most important tasks.

AI PUBLIC TRANSPORTATION OPTIMIZATION:

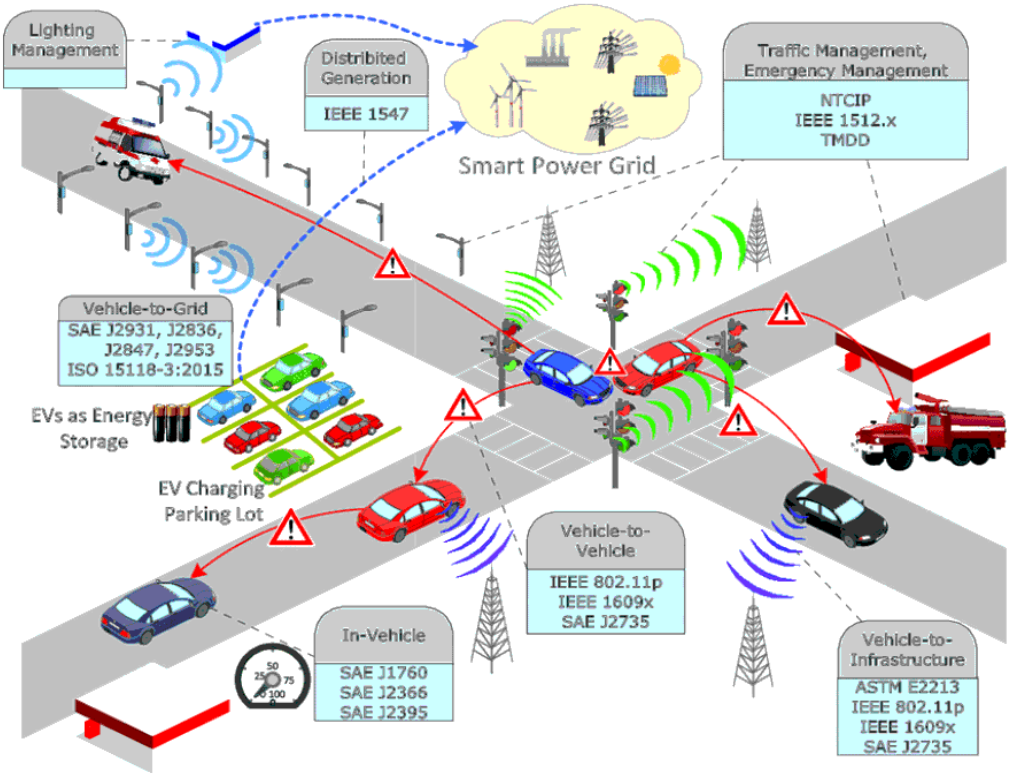
- Artificial intelligence (AI) is a broad area of computer science that makes machines function like a human brain.
- It is used to address issues that are difficult to clarify using traditional computational techniques. In many cases, it is hard to fully understand the relationships between the characteristics of the transportation system.
- Therefore, AI methods can be presented as a smart solution for such complex systems that can’t be managed using traditional methods.

- AI can play an important role to prevent urban road accidents and reduce the impacts of accidents.
- The reasons behind vehicle accidents varies in space and time. AI applications have demonstrated real value is in vehicle tracking on transport networks.

APPLICATION OF AI IN TRANSPORT OPTIMIZATION:

- Many researchers have demonstrated the advantages of AI in transport.
- An example of that includes transforming the traffic sensors on the road into a smart agent that detects accidents automatically and predicts future traffic conditions
- An Automatic Vehicle Location (AVL) system has been introduced to improve operational efficiency of public transport, manage operational control and enhance overall quality of public transport services.

DIAGRAM:



ADS PUBLIC TRANSPORTATION OPTIMIZATION:

- As the population residing in cities and the gross domestic product increase the overall welfare of people also increases, correlating with the increased use of individually owned vehicles instead of public transportation.
- At regions that are picked to be transformation foci, public transportation projects that are integrated to the nearest main system should be prepared ahead of time.
- In such projects decision-makers can be from different local administrations resulting in conflicting situations.
- In the application phase all the decision-makers should be aware of all system inputs, constituents and outputs so that public can be informed thoroughly.
- Also academia should participate in the informing process via conducting studies and publishing on urban transportation systems.
- The process of public participation in transportation should be evaluated as a whole considering public awareness, disabled citizens, urban transformation projects, along with monetary terms, comfort, speed, etc.,..

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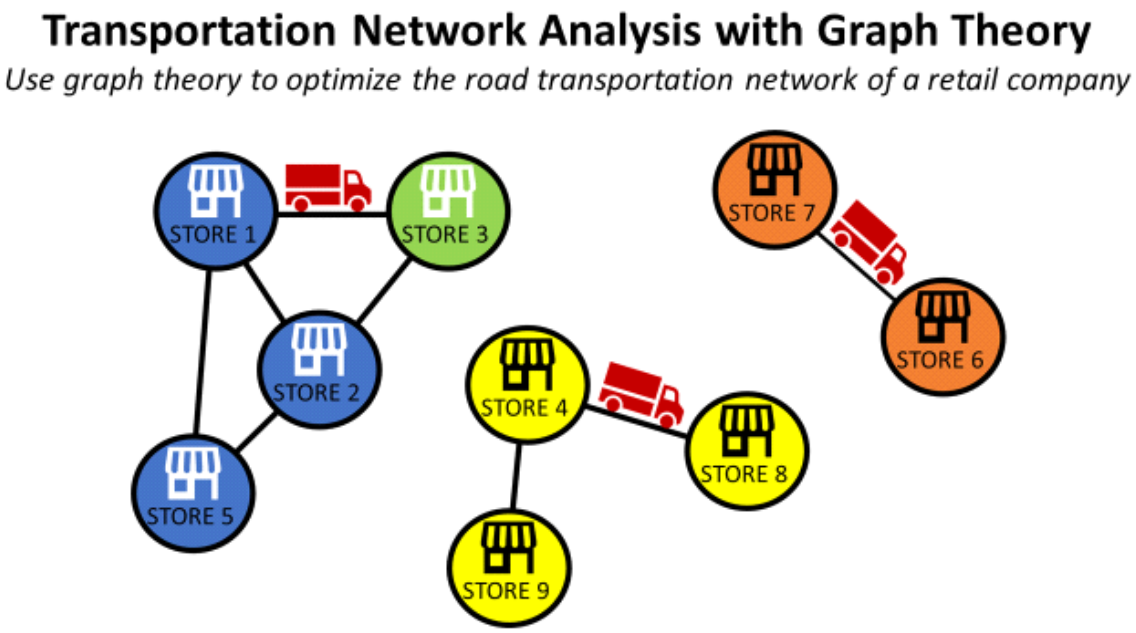

DAC PUBLIC TRANSPORTATION OPTIMIZATION:

- The present research advocates a new paradigm of the Intelligent Transportation System (ITS) in the near future, to rescue fossil fuel and to maintain a healthy environment for the current generation.
- To provide this facility, Long Short Term Memory (LSTM) based intelligent learner has been proposed.
- This intelligent learner is mainly used to predict high vehicle demand requests in order to utilize a public transport system effectively.
- A new enhanced approach has also been designed to establish communication between the onboard vehicles and the passengers for instant reservation of their seats based on real-time sensors.
- . To achieve the effective usage of the public transportation system, an effective dynamic scheduling algorithm that dedicates more convenient travel in the complex transportation system, has been proposed.
- The proposed system results are evaluated using real-time transport data, which are collected from major cities and they are implemented to predict the exact vehicles demand.
- The performance results are compared with various existing methods and the proposed system has proved its efficiency than the existing methods.

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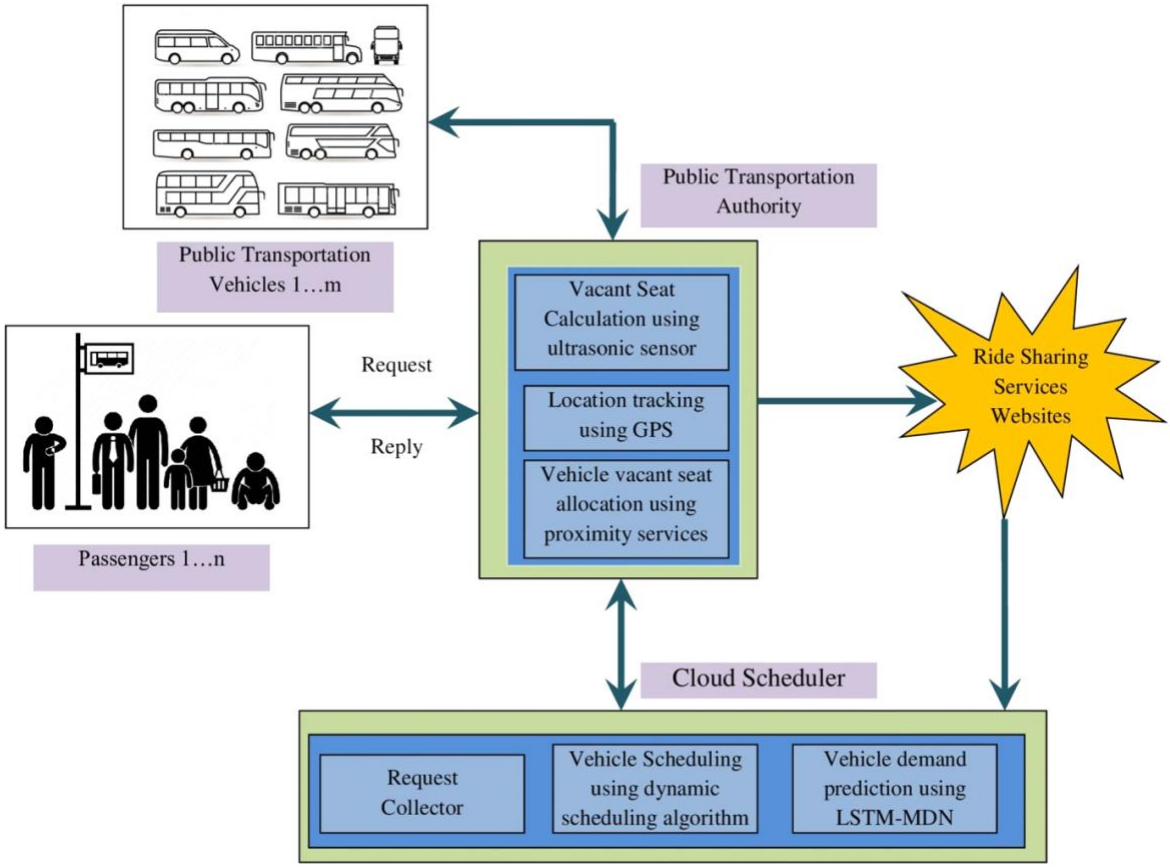

IOT PUBLIC TRANSPORTATION OPTIMIZATION:

- The internet of things (IoT) provides windows of opportunity for public transportation system.
- IoT plays an important role in many industrial fields such as manufacturing, logistics, transportation, health care, and will bring a revolutionary change to our daily life.
- Another benefit brought by IoT is that, some sub-system of transportation based on IoT has the ability of self-coordination and self-autonomy, which can reduce the quantity of data transmission and alleviate the computational burden of the transit control center.

- For example, a smart traffic light controller perceives the approaches of buses at a cross-road, and adjusts the times of traffic signal phases.
- An automatic passenger counter on a bus perceives the existence of passengers, computes the number of passengers by using its embedded identification algorithm.
- Although IoT is a relatively new concept, many scholars have tried to integrate IoT elements into public transport system.
- Public transportation involves aviation, rail, road and water transport from the broad sense.
- In this paper, bus, subway (or light rail) and shared taxi, which are the three most commonly used trip choices for citizens in a modern city, are considered in design of the road public transportation system.
- Transport flow analysis: the data from IoT has the characteristics of mass volume from multiple sources, various forms including video and real time with variation. Transport flow includes road network flow and passenger flow. There are three steps for data analysis:

a) data preprocessing, which eliminates the noises of IoT sensor by filtering algorithms and normalizes the data.

b) pattern mining, which explores the useful patterns from historical transportation flow data and finds meaningful rules.

c) flow prediction.

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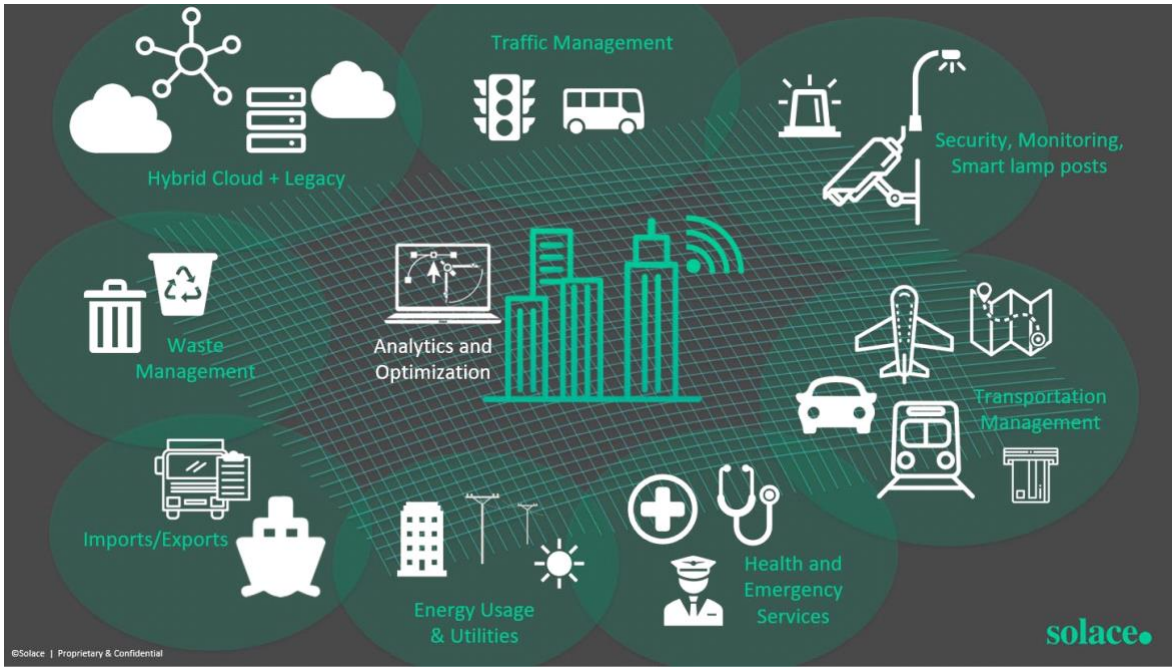
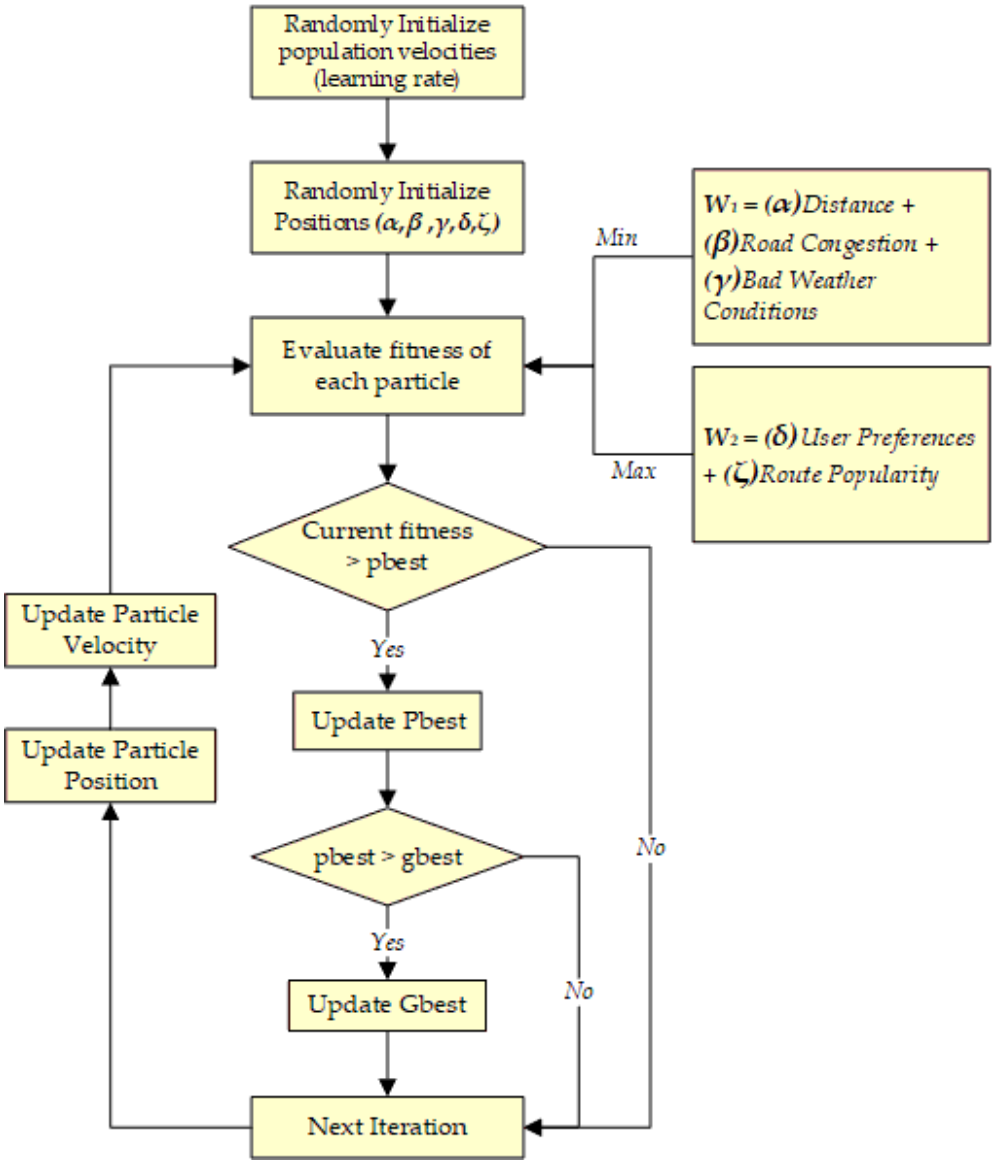


CAD PUBLIC TRANSPORTATION OPTIMIZATION:

- Public transit is an area that is generally well suited to the application of mathematical optimization methods.
- Planning problems in public transit can be seen as network optimization problems that can be addressed with mathematical methods.
- the progress and success in mathematical vehicle and duty scheduling, it is a natural idea to try to
- extend these methods and apply them to the construction of a public transportation network itself. One
- possible problem is line planning, i.e., the construction of a set of lines, and corresponding frequencies, to be able to service some demand in a given time period. The construction of a line in an infrastructure network.
- This is an example of an optimization problem that explicitly addresses forecasts on the behavior of users as an integral part of an optimization model.
- The discussion of the previous section has already indicated that model integration is one of the major

- challenges of public transport optimization. Starting with purely combinatorial models, e.g., in vehicle and duty scheduling, there is a need to integrate stochastic and combinatorial models to combine network design.
- Demand forecast, and nonlinear model components to deal with inherently nonlinear quantities such as the revenue (revenue is price times demand).



Conclusion:

Thus, it can be seen that, without considering other influencing factors, the design of bus corridor basic units with at least five alternative routes is the most reliable.

In practice, the route setting and station planning between stations will be determined according to the combination form of the route and station. If it is through each station, then use the serial-parallel system form, and each basic unit 6 stations is appropriate. If the large fast passenger flow channel is used, the use of parallel-series system form can set up three stations in the middle of the line.