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A survey paper on- artificial intelligence for vehicle to everything

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Abstract

Now a day, an improvement in transmission system, Intelligent transportation system has started many latest chances for intelligent traffic safety, Useful and meaningful solutions. Artificial intelligence is widely used in different fields of scientific research. AI is used to building smart and technical machines capable for performing tasks that required for human intelligence, also it provides the information and instructions to drivers so they can avoid damages or accidents so we can say it provides safety and comport driving. This article shows a survey of research work in AI traffic system and challenges in vehicle-to-everything system. We are going to presents many open problems and challenges researcher fields that subscribe the future of AI to the vehicle-to-everything system.

Keywords - Machine learning, Artificial intelligence vehicle-to-everything prognosticate

Introduction

Today, AI techniques have opened many application areas in traffic systems. The vehicles systems like sensors are also becoming with new latest smart features, resulting the vehicles to better advantages in environment. A plenty applications are develop starting from safety to the advance traffics, ranging from self-determining to the internet of vehicles. Vehicular applications are widely used to execute task like as traffics congestion better enhancement of electric plug, for charging minimizing fuel improved the GPS system. Due to very few traffics data its experimental are limited to those data sets.

AI has largely applied for the many different-different algorithms such as computer vision, data science, medical, industrial etc.AI together with the vehicle-to-everything can enable to unconventional applications areas, location-based areas, data storage and vehicles. AI tools challenges pertaining of the vehicular network in research areas.

1. Vehicle-to-everything communication technologies –

According to this survey two types of communications technologies first, dedicated short range communication (DSRC, and second is, long term evolution (LTE) cellular communication(C-V2X). Both technologies DSRC and C-V2X are support the V2V (vehicle-to-vehicle) and V2I (vehicle-to-infrastructure) for vehicle to communicate.

LTE is highly reliable, with high bandwidth and requires the improvement before used in the V2X systems.

2. Artificial intelligence and v2x(vehicle-to-everything) system-

V2X is an addition of vehicular network system. It is used to provide safety and efficiency of transportation system. The AI research was started from 1956 at Darmouth College in Hanover. It has been widely applied by modern machines

many applications competing at highest level in many technical games. Some research areas used many AI techniques: Heuristic techniques, robotics, expert systems, planning schedule, logical AI, machine learning, funny logics etc.

a. Machine learning:- Machine learning can be describe into mainly three types: supervised learning, unsupervised learning, and reinforcement learning. Training and testing are two stages those we can understand ML easily where, training based on realistic data and testing based on trained models.

i. **Unsupervised machine learning**: It is totally depends on unlabeled data. Clustering is type of unsupervised machine learning that is similar type of data in group. In clustering many algorithms are used to solve the problems k-mean and hierarchical clustering algorithms.

ii. **Supervised machine learning:** supervised machine learning is depends on labeled data, it is categorized into two form first, classification and second, regression. Classification is a problem of predicting a discrete class label output where, regression is a problem of predicting a continuous quantity output, regression algorithm output are describe the prediction of stock details in banking for customer transaction, vehicles battery , and various technologies in traffics etc.

iii. **Reinforcement learning:** Reinforcement learning tells how the intelligent agents takes the actions corresponding the rewards, action and their reward generate the ides of choice with proper actions.

b. Deep learning: Deep learning is specially used to copy the human brain like as working ability, many activities, translating languages, detecting objects and making decisions. Deep learning work-out enormous quantity of unstructured data that normally takes human decade to understand and process. Deep learning is the subset of Machine Learning which employs hierarchical levels of artificial neural networks to carry out the process of machine learning.

c. Expert system: Expert system is mainly describing the capability to make decisions. Expert system solved the many complex problems that generated by human hand. It can be categorized into two parts first, knowledge base and second, inference engine.

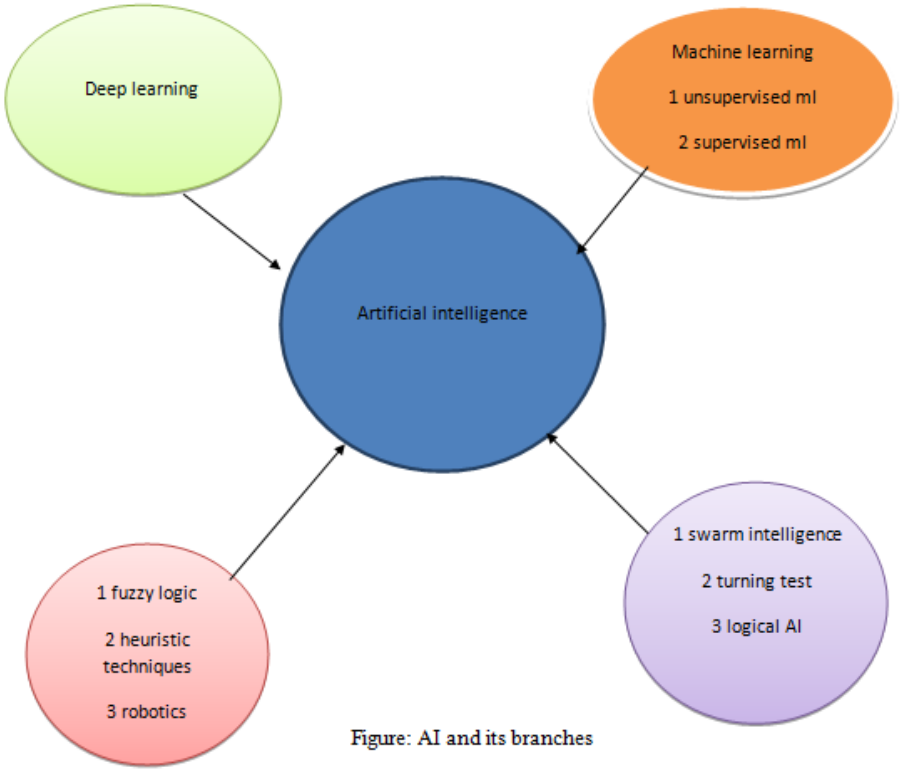

Figure: AI and its branches

Software tools for AI

a. **Open source tool for AI:** There are some of tools that can be used for AI based v2x applications. The first is Tensor-Flow developed by the Google. It can be widely used in deep learning network in autonomous vehicular system. Tensor-Flow can be run many CPU'S and graphical processing unit(GPU). It provides an interface for programming the whole clustering.

SCIKIT-learn is ML based library available for python, it can be used many algorithms support vector machine, random forest and k-mean algorithms.

PYTORCH is another tools in python used in natural language processing, It was developed by Facebook. It is a powerful library for cyber social computing.

b. **Proprietary software tools for AI: One** of the most popular software tools in this kind is known as amazon web services. It is a supplementary of Amazon.com that give on demand for AI research community. It helps to give permission AWS subscriber to connect its AWS system using modern browser. Google indicator is a set of application programming interfaces (API) that help to communicate with Google services and their combination to other vehicular services. API used in many languages like .net, php, java and python.

The another cloud computing web services for AI is Microsoft azure created by Microsoft, that can be used for training, testing, building and deployment of v2x AI application. It also provides software-as-a-service (SAAS), platform-as-a-service (PAAS), and infrastructure-as-a-service (IAAS). It supported multiple programming languages.

AI In V2x Application

A. **Safety and comfort:** In this field many applications are come-

i. Safety and comfort: It provides the safety in driving, road safety index, passenger safety and planning of routes. Some predictions are used to data received from vehicles, GPS trajectories and mobile sensing data received by VANET. In deep learning used to improve the vehicle safety, providing the information of accident to drivers. Another it tested in deep learning to meliorate vehicle safety by performing human factors. Safety task is overtaking that requires better driving skills, when multiple participants involved the overtaking process. It is very important to discern coordinate and safe the future actions of other vehicles.

ii. Parking: Due to more traffic in same location on same time car parking problems are occur, so this approach searches distance and search parking in v2v systems.

iii. Traffics light control in vehicular system: It was used in deep RL system that can be used to read the real-time GPS data and learns how we can control the traffics light in traffics

iv. Prediction of road traffics flow: These AI application expertly used this information for the tasks like as traffics congestions better employment of DEV charge, minimizing fuel consumption and give better location based services. This method are divided into two parts one is "**parametric method"** are known as Auto Regressive Integrated Moving Average(ARIMA) another is **"Non- parametric method"** assume traffics prediction in stationary process.

v. Speed advisory: The green light optimal speed (GLOSA) is system which admit vehicle to convey with traffics lights. This will improve the air quality. It introduced the air consumption and average stop time behind the traffics light.

B. Network congestion control: The traffics and network congestion is commonly used in urban environment. Unsupervised machine learning is based on the k- mean clustering, uses central controlled approaches to manage congestion.

The term vehicle-to-grid (V2G) is energy flow between electric vehicle and power grid that enable bidirectional communication. V2g network give the smart energy sharing among EV engine.

C. Navigation of autonomous vehicles: vehicle-to-vehicle in autonomous vehicle can be features as a machine to machine pattern. In this pattern the QOS aware architectures are of great importance. If the number of encompassing vehicles is greater than collision point calculation became much more arrange. Autonomous intersection management (AIM) is another aspect of its .AIM is going through revolutionary changes which are brought by v2x pattern to the automated vehicles.

D. Demand and supply oriented application: V2x model is gave the benefits passengers and drivers, vehicle-to-grid (v2g) able to communicate bidirectional and flow of energy electrical vehicle and power grid.

E. Safety in VANET: It is mostly used to give protection against potential threats like as jamming attacks. Jammers calculate the vehicles on board unit and unnamed area of vehicles line status. Black whole and wormhole are used to detect routings attacks.

Conclusion

In this article we represent the common survey of AI based technique vehicle-to-everything (V2x) models. We have represents many AI-Driven algorithms for v2x applications that improve the performance many branches of AI can help each other to bring out particular correct solutions that not caused any problems in domains. AI algorithms are requires higher computational sources in future v2x applications. These techniques are very helpful for vehicles systems and machinery fields and they will give large benefits from computing fields.

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