

ASTRI promotes the development of connected vehicles and connected autonomous vehicles technologies

應科院推動車聯網與聯網自動駕駛技術發展

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Smart Mobility (Transportation) Improves Road Safety and Efficiency

Smart Mobility addresses today's traffic problems with a digitally connected approach. It is a sustainable concept for urban mobility that uses technology to provide a convenient and integrated transportation system to address various problems arising from transportation needs. The modern society has been evolving in a faster speed, citizens face many traffic problems in their lives, such as waiting in line, traffic congestion, difficulty in parking, long time to find a parking space and safety threats caused by traffic accidents, etc.

The Cellular-Vehicle-to-Everything (C-V2X) is a key technology for smart travel. Vehicle networking technology refers to low-latency communication systems between vehicles and vehicles, vehicles and pedestrians, vehicles and road infrastructure, and vehicles and networks. Through real-time information exchanges, the interconnection and coordination of people, vehicles, and road infrastructure are realised, and road users can receive reports and early warnings in real time to enhance road safety and assist driving. At the same time, C-V2X technology can be applied to real-time traffic monitoring, event management, route planning, etc. to improve traffic efficiency. In the long run, C-V2X technology can better cooperate with the development of autonomous driving technology, assist autonomous driving to detect hidden dangers, and improve road safety.

智慧出行 (交通) 提高道路安全和效率

智慧出行包含以數碼連接方法應對當今的交通問題。這是一個可持續的城市出行概念，運用科技提供方便和整合的交通運輸系統，以解決交通運輸需求所引致的各類問題。現代社會發展迅速，市民在生活中面對諸多交通問題，如排隊等待、交通擠塞、停車困難、尋找車位需時、以及交通事故威脅人身安全等。

車聯網 (C-V2X) 是智慧出行的關鍵技術。車聯網技術指車輛與車輛、車輛與行人、車輛與道路基礎設施、車輛與網絡之間的低延遲通訊系統。通過實時資訊傳輸，實現人、車、道路基礎設施的互聯和協同，道路使用者實時接收報告和預警，增強道路安全及輔助駕駛。同時，C-V2X 技術可應用於實時交通監控、事件管理、路線規劃等，提高交通效率。長遠而言，C-V2X 能夠更好地配合自動駕駛技術的發展，輔助自動駕駛檢測隱患，提昇道路安全。



ASTRI's leading smart mobility solution platform launched in Hong Kong

With its leading technologies in 5G communication and C-V2X, ASTRI has been working with partners in various fields of smart transportation since 2016, such as in-vehicle intelligent safety systems, roadside fusion perception platforms, traffic planning and simulation platform and V2X edge management platform, etc. to promote the overall breakthrough of smart mobility and system verification for commercialisation. In 2021, a smart transportation system combining 5G and C-V2X has been deployed in Hong Kong - a 14-kilometer public road test between Shatin and Science Park. Leveraging on low-latency and highly reliable communication technology, multiple technologies such as in-vehicle technology, smart transportation infrastructure, fusion perception, AI, edge and cloud computing have been successfully integrated, verifying a new smart mobility model.

ASTRI is actively researching and developing technologies for smart mobility that meet citizens' living habits, comply with traffic rules and protect the environment, with a view to enhancing Hong Kong's road safety and traffic efficiency. The related technologies can also be applied to various smart city scenarios such as smart factories, smart terminals, smart parks and smart highways.

應科院領導智慧交通平台落地香港


憑藉在 5G 通訊及車聯網 (C-V2X) 的領先技術，應科院自 2016 年起與合作夥伴共同研發智慧交通的多個領域，如車載安全智慧系統，路旁融合感知平台，交通規劃與模擬平台，V2X 邊緣管理平臺等，推進智慧交通領域的整體突破和驗證落地。2021 年，結合 5G 與 C-V2X 的智慧交通系統落地香港，並在沙田及科學園展開了 14 公里的公開道路測試，通過低時延、高度可靠的通訊技術，成功將車載技術、智慧交通基礎設施、融合感知、AI、邊緣及雲計算等領域融為一體，驗證了嶄新的智慧交通模式。

應科院積極研發配合市民生活習慣、符合交通規則與注重環境的智慧交通技術，務求提升香港道路安全及交通效率。而相關技術更可應用於智慧工廠、智慧碼頭、智慧園區、智慧高速等各類智慧城市場景。



ASTRI promotes connected autonomous vehicles technology

The autonomous vehicles technology may impose certain risks and challenges. On one hand, the vision of the vehicle perception is limited, as the high cost of vehicle perception equipment has restricted its capability and computing power. On the other hand, the over-reliance on AI leads to the black box effect, resulting in questioning of credibility of its security. In the future, smart city will be integrated by communication infrastructures as the bridge, which are inter-connected to build the core of smart city, i.e., the city brain. The ICT smart city infrastructure platform built by ASTRI is based on its leading communication technology capabilities, which is supposed to serve as the city brain and promote the research and development of Connected Autonomous Vehicles (CAV): In ASTRI's end-to-end V2X solution architecture, vehicles will be acted as independent individuals by applying autonomous driving function (i.e. the CAV technology) with the support of the city brain.

CAV technology can further improve the performance and safety of autonomous vehicles through network and cloud computing. Through 5G+V2X technology, the roadside infrastructure, vehicles, pedestrians and other traffic participants in the city are connected. With the technologies of roadside perception, detection and geolocation, we are able to capture potential road hazards and send early warning, expand the range of perception of autonomous vehicles to the environment, so as to minimise the potential safety hazards caused by limited perception ability of autonomous car. At the same time, the roadside perception and computing capabilities are used to reduce the demand of individual vehicle for computing and energy consumption. The C-V2X also can provide fully-covered-area traffic management capabilities, further improving traffic safety and efficiency. 

應科院推動聯網自動駕駛技術

自動駕駛技術，存在一定的風險及挑戰。一方面車載感知的視野局限，成本高而導致車載感知設備及計算能力受限制。另一方面對 AI 的過度依賴，而引致的黑箱效應令安全性受質疑等等。未來的智慧城市將是一個整體，以通訊基礎設施為橋樑，構建智慧城市的核心——城市大腦。應科院以領先的通訊技術打造的 ICT 智慧城市基礎設施平台，作為城市的大腦，推動聯網自動駕駛 (CAV) 的研發：在應科院的車聯網架構中，車輛將作為獨立個體在城市大腦的支援下，實現自動駕駛功能（即聯網自動駕駛技術）。

聯網自動駕駛技術通過網絡與雲計算，進一步提高自動駕駛車輛的能力與安全。通過 5G+V2X 技術，將智慧城市的路旁基礎設施、車輛、行人等交通參與者聯繫起來。通過路旁感知、識別、定位技術，對道路可能出現的危險情況進行捕捉及預警，增強自動駕駛車輛對環境的感知範圍，解決自動駕駛車輛局限於自身感知能力而造成的安全隱患。同時，利用路旁感知與運算能力，減輕單車運算及能源消耗。車聯網更可以提供全域交通管理的能力，進一步提升交通安全與效率。 