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FLEXIBLE CONTROL OF AUTOMATIC TRAFFIC VEHICULAR COLLISION AVOIDANCE BASED ON 5G WIRELESS MOBILE COMMUNICATION SYSTEM

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With the development of economic and industrialization, many countries entered the era of the automobile society. Anti-collision control system is very important to improve the safety of the automatic machine. The researching of anti – collision control system belongs to 5G wireless system has been paid much attention by different ISP, equipment provider and universities. There have many different collision avoidance control systems in automatic traffic machine science 1971, such as collision avoidance which controlled by ultrasonic, laser, infrared, microwave. However, there are many shortcomings to impede development of anti-collision control system. Automatic traffic machine collision avoidance is based on vehicular mobile network, integration of sensors, RFID (radio frequency identification), data mining, automatic control technologies. According to communication protocols and standards to achieve dynamic mobile communications is a typical application of Internet of things technology in transportation systems. Vehicles as mobile communication devices in the form of topology nodes to organize network. Due to the mobility of access increased frequency, increased node coverage, complex communication environment. 5G mobile communication network will integrate advanced technologies such as millimeter-wave communication technology, large-scale antenna array, ultra-dense networking and cognitive radio (CR) with developing which has low latency and high reliability applications will solve problems in current Automatic traffic machine collision avoidance. The base stations and infrastructures do not need to established in Vehicular mobile system bring a historic opportunity for the development. “Automatic traffic machine in millimeter wave anti-collision system” has become a hot topic in the international researching in recent years.

The terminals in 5G wireless mobile network communications will be established through self-controlled communication in future. Terminal equipment regularly broadcasts with identity information, other neighboring terminals according to the channel state information (CSI) in adaptively select the current optimal channel. Direct communication between 5G terminals and selecting appropriate relay forwarding messages enables 5G terminals to implement information exchange in an optimal way. On Board Unit (OBU) can access the Internet through multiple channels according to the diversified communication methods of 5G terminals. The OBU adaptively selects the channel quality to access the Internet through multiple channels such as nearby 5G base stations, 5G vehicle-unit OBUs, and 5G mobile terminals on the Figure 1.

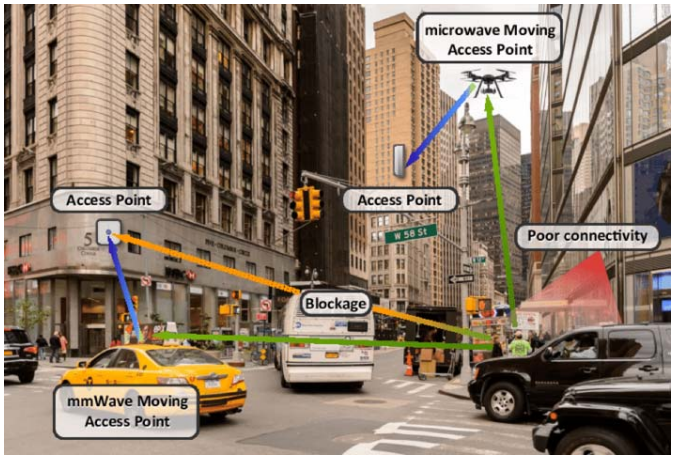

Figure 1 – The multi-channel in 5G wireless vehicle networking access internet architecture

5G wireless mobile communications fusion cognitive radio (CR), Millimeter wave, Massive MIMO antenna array, ultra-dense networking, full-duplex communication (FD), and wireless full-duplex to significantly improved system performance. The characteristics of 5G vehicle networking are mainly reflected in low delay and high reliability to compare IEEE 802.11p with spectrum utilization.

The efficient use of spectrum is an important feature of 5G user experience. The application of 5G communication technology will solve the problems of the current vehicle networking resources. The efficient use of spectrum in 5G vehicle networking mainly in the following aspects:

1）D2D wireless communication;

2）full-duplex communication mode;

3）cognitive Radio technology.

5G wireless communication networks are expected to have ultra-high capacity and provide gigabit-per-second data rates for users. A millimeter-wave communication system with a frequency band of 30-300 GHz is proposed to exchange information between 5G terminals or between the base station. The millimeter waves have a very large bandwidth to provide very high data transmission rates. The interference of the environment and the probability of interruption of the connection which between the different terminals will be reduced in millimeter technology. Table II is a comparison of key technical parameters of between 5G vehicle network and IEEE 802.11p vehicle network. The result shows that 5G vehicle network has better wireless link characteristics than IEEE 802.11p vehicle networking.

Short range radar in ultra wideband operation at 24 GHz and at 79 GHz from 2013 at the latest will be used first in premium and later on in upper class models. Main applications will be ACC support, pre-crash detection, parking assistance, and blind spot surveillance. Market introduction of 24 GHz SRR will start in 2005. SRR sensors won't have angular measurement capabilities in the first generation (except the valeo-raytheon sensor), but future generations will also be able to provide angular information.

Although these sensors will be more expensive, they will contribute to the minimization of the total number of sensors and therefore they will reduce overall system costs. 77 GHz ACC systems will be extended to be operational at low speeds including full stop capability. This will provide increased customer benefits and it will contribute significantly to the market success of ACC systems.

In the same manner the 77 GHz sensor will be used not only for comfortable driving (ACC stop & go) but also for predictive and active safety systems.

Active safety systems up to an automatic emergency braking in unavoidable crash situations will be the key for a considerable reduction of the total number of crashes and fatalities.

Planar antennas in combination with digital beam forming provide interesting front end concepts for 77 GHz radar. These techniques might become feasible for high volume production as far as costs of 77 GHz components and powerful digital signal processing units will further decrease.

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SEMI-DIRECT RGB-D SLAM ALGORITHM FOR MOBILE ROBOT IN DYNAMIC INDOOR ENVIRONMENTS

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Abstract. *In order to solve the problem of accurate navigation of mobile robots in dynamic indoor environment, a semi-direct RGB-D visual SLAM (Simultaneous Localization and Mapping) algorithm based on motion detection algorithm is proposed. The algorithm is mainly divided into three parts: motion detection, camera positioning and dense map construction based*