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Automated Vehicle Traffic Control Tower: A Solution to Support the Next Level Automation

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Abstract : Automated vehicles (AVs) have the potential to enhance road capacity, improving road safety and traffic efficiency. Research and development on AVs have been going on for many years. However, when the complicated traffic rules and real situations interacted, AVs fail to make decisions on contradicting situations, and are not able to have control in all conditions due to highly dynamic driving scenarios. This limits AVs’ usage and restricts the full potential benefits that they can bring. Furthermore, regulations, infrastructure development, and public acceptance cannot keep up at the same pace as technology breakthroughs. Facing these challenges, this paper proposes automated vehicle traffic control tower (AVTCT) acting as a safe, efficient and integrated solution for AV control. It introduces a concept of AVTCT for control, management, decision-making, communication and interaction with various aspects in transportation. With the prototype demonstrations and simulations, AVTCT has the potential to overcome the control challenges with AVs and can facilitate AV reaching their full potential. Possible functionalities, benefits as well as challenges of AVTCT are discussed, which set the foundation for the conceptual model, simulation and real application of AVTCT.

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