Bibliographic References Rubén Martínez González

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Título:

Autonomous Driving Architectures: Insights of Machine Learning and Deep Learning Algorithms [1]

Resumen en inglés:

Research in Autonomous Driving is taking momentum due to the inherent advantages of autonomous driving systems. The main advantage being the disassociation of the driver from the vehicle reducing the human intervention. However, the Autonomous Driving System involves many subsystems which need to be integrated as a whole system. Some of the tasks include Motion Planning, Vehicle Localization, Pedestrian Detection, Traffic Sign Detection, Road-marking Detection, Automated Parking, Vehicle Cybersecurity, and System Fault Diagnosis. This paper aims to the overview of various Machine Learning and Deep Learning Algorithms used in Autonomous Driving Architectures for different tasks like Motion Planning, Vehicle Localization, Pedestrian Detection, Traffic Sign Detection, Road-marking Detection, Automated Parking, Vehicle Cybersecurity and Fault Diagnosis. This paper surveys the technical aspects of Machine Learning and Deep Learning Algorithms used for Autonomous Driving Systems. Comparison of these algorithms is done based on the metrics like mean Intersect in over Union (mIoU), Average Precision (AP)missed detection rate, miss rate False Positives Per Image (FPPI), and average number for false frame detection. This study contributes to picture a review of the Machine Learning and Deep Learning Algorithms used for Autonomous Driving Systems and is organized based on the different tasks of the system.

Resumen en español:

El artículo se centra en la investigación en el campo de la conducción autónoma y destaca que esta área está ganando impulso debido a las ventajas inherentes de los sistemas de conducción autónoma. Las principales ideas y temas tratados en el artículo son:

- Ventajas de la conducción autónoma, como la reducción de la intervención humana y la disociación del conductor del vehículo.
- La complejidad de los sistemas de conducción autónoma, que involucra la integración de múltiples subsistemas.
- Diversas tareas en la conducción autónoma, incluyendo la planificación de movimiento, la localización del vehículo, la detección de peatones, la detección de señales de tráfico, la detección de marcas viales, el estacionamiento automatizado, la ciberseguridad del vehículo y el diagnóstico de fallas del sistema.
- Uso de algoritmos de Aprendizaje Automático y Aprendizaje Profundo en arquitecturas de conducción autónoma para realizar estas tareas.
- Evaluación y comparación de algoritmos basada en métricas como mIoU, AP, tasa de detección perdida , tasa de omisión, falsos positivos por imagen y promedio de detección de fotogramas falsos.

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