

Research on some traffic load balancing algorithms for smart parking based on Internet of Things technology

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Abstract: This study investigates load-balancing algorithms for smart parking systems within the Internet of Things (IoT) framework. As urban vehicle density increases, efficient parking space utilization becomes critical. The research addresses the challenge of uneven traffic distribution across parking facilities, which leads to congestion and wasted resources. We propose and evaluate several algorithms designed to dynamically allocate incoming vehicles to available spaces based on real-time IoT sensor data. The algorithms consider factors such as proximity, parking cost, and current occupancy rates to optimize overall system throughput. Through simulation and comparative analysis, we assess performance metrics including average waiting time, space utilization rate, and system response time. The results demonstrate that the proposed load-balancing approach significantly reduces congestion and improves user satisfaction compared to traditional first-come-first-served methods. This work contributes to the development of more efficient and scalable smart city infrastructure, offering practical solutions for urban traffic management.

Keywords: IoT, load balancing, smart parking, traffic allocation