

An IoT-Based Intelligent System for Real-Time Parking Monitoring and Automatic Billing

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Abstract: This paper describes about an internet of things (IoT)-primarily based totally parking sensing gadget that deploys a strong outdoor automobile localization and reputation methodologies. Although, parking occupancy tracking structures have made a sizable progress, clever parking fee is not often studied in clever parking research. This paper proposes a brand new low-cost sensor gadget which the permitting real-time parking occupancy tracking at the side of parking fee without requiring any user/driver interaction. The proposed on-board automobile transceiver device (VTD) sensor, might be deployed while not having to put in new additives on every parking lot. It has blessings in phrases of detection and fee reliability, and decreased price by decreasing the gadget complexity, infrastructure investment, and battery alternative price. A strong automobile reputation and parking occupancy tracking is finished the use of two-fold sensing approach. It is a chain of movement detector and global navigation satellite tv for pc gadget (GNSS) sensing techniques. The sensor is induced while the automobile is inside a parking area way to a proposed radio frequency (RF) wake-up technique. As consequence, the strength intake is optimized and the VTD has a energy saving scheme with a energy intake as low as 20 μ W at three V supply. The VTD may be seamlessly included into the wise vehicular ad-hoc networks (inVANETs).

Keywords: Parking Sensor, Low-Power Sensor, Internet of Things (IoT), RF Wake-Up Sensor, Smart Parking, Smart Billing, inVANETs

REFERENCES

- [1]. Z. Zhang, X. Li, H. Yuan, and F. Yu, "A Street Parking System Using Wireless Sensor Networks," International Journal of Distributed Sensor Networks, 2013.
- [2]. SMART, "Vehicle parking," United States of America Patent 0142534A1, 2015.
- [3]. Economic and Social Council, United Nations. Smart cities and infrastructure: Report of the secretary general. Geneva: Commission on Science and Technology for or Development (2016).
- [4]. Transportation Cost and Benefit Analysis II: Parking Costs, VTP Inst., Victoria, BC, Canada, 2018.
- [5]. Z. Ji, I. Ganchev, M. O'Droma, L. Zhao, X. Zhang. Sensors 14:2272–22393 (2014).
- [6]. M. Sudak, E. Morris, "Monitoring car parking," UK Patent Application No. 2437197A, 2007.
- [7]. G. Alessandretti, A. Broggi, and P. Cerri, "Vehicle and guard rail detection using radar and vision data fusion," IEEE Transactions on Intelligent Transportation Systems, vol. 8, no. 1, pp. 95–105, 2007.
- [8]. P. N. Pathirana, A. E. K. Lim, A. V. Savkin, and P. D. Hodgson, "Robust video/ultrasonic fusion-based estimation for automotive applications," IEEE Transactions on Vehicular Technology, vol. 56, no. 4, pp. 1631–1639, 2007.