OUTDOOR PARKING MANAGEMENT SYSTEM

Under the Ground Type Sensor

On the Ground Type Sensor
Outdoor Parking Management System

Effective Parking Space Management

Effective parking space management empowers drivers reducing the hassles and find free parking space quickly. In addition, it helps to reduce fuel consumptions and feel relaxed from place to place.

NB-IoT / LoRa Dual-detection parking occupancy sensing system can accurately sense the occupancy status of parking space(s) by fully integrated dual-detection from Micro-radar and Earth Magnet sensing. As soon as a vehicle pulls in to or out through the sensor mounted on/under the surface of outdoor parking space. Parking space information is reported to the management platform through the NB-IoT or LoRa WAN/LAN network to fulfil smart parking management.

With leading technologies of NB-IoT and LoRa WAN/LAN, the system is easy to use and can be rapidly deployed. The system also provides cross-system integration for various payment methods including self-help automatic payment, membership payment.

Dual Detection
- Earth Magnet
- Micro Radar

Dual Wireless
- NB-IoT
- LoRa Wan
- LoRa

Durability Test
- Water Immersion
  - IP68 Degree
- Pressure
  - 50000kg sustainability
- Pressure under water
  - Real World Simulation

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100% Accuracy tested by SGS Lab
- Geo-magnet+Radar Detection

5 seconds identifying Tailing-parking to Self-ticketing automation

SGS tested IP68 grade
- Water-proof rolled over under water by vehicle

38AH ultra large battery capacity
- 3 years battery life

No calibration required
- 5 minutes installing one sensor

Patent designed for 4G LTE
- 88% antenna performance max

NB-IoT/CAT-M1/LoRa WAN protocol
- Supports 700/900/1800MHz wide bands

Remotely Upgrade(FOTA/COTA)
- Supports Firmware and Configuration

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Outdoor Parking Management System

Parking data
- **Occupancy status**: Data about occupancy of vehicle(s)
- **Battery status**: Battery voltage level of individual sensor
- **Time in/out/staying time**: Time stamp about occupancy of individual vehicle
- **Turn over by week**: Accumulative number of occupancy of entire parking space(s)
- **Parking space category**: Type(s) of parking space
- **Available space presentation**: Available parking space(s) from entire parking space
- **Environment data such as location, time and weather**: Connecting weather data from third party

OTA configuration
- **OTA magnetometer calibration**: Sensor Calibration by site supervisor via smart device(s)
- **Profile**: OTA sensitivity adjustment via platform
- **Check Alive**: OTA check-alive

**NB-IoT**
- RSRP log, SINR log, CSQ log, Tx power log, History log, Retry count log, Retry time log.

Security key generation and hack-protection
- Generation of security key and attacker IP filtering.

Sensing algorithm: x and y records
- Management of sensor data and profile

Alarm Management
- Receive alarm signal and report to supervisor

Talk with third party SaaS/PaaS
- Middleware for connecting to 3rd fog or cloud platform

Echo Management with UE
- Zero-data-loss signal feedback

Talk with Changeable Message Sign (CMS)
- Downlink message to CMS system
Outdoor Parking Management System

WoMtechnology, provides a complete range of hardware and software for Parking Management System based on Industrial IoT. The products range can fulfill all the requirements in below sectors:

- Parking Sensors with LoRa Module
- Parking Sensors with NB-IoT Module
- Private Cloud Platform

Parking Management System can be implemented in several industries and applications such as:

- **Public Parking on Streets**: to monitor the occupied and empty parking and guide the vehicle drivers to find the nearest empty parking by using a Mobile App or Outdoor LED Sign boards.
- **Shopping Malls**: to monitor the Occupied and Empty Parking and guide the vehicle driver to find Empty parking and Increase presence of shopping.
- **Airports and Train Stations**: To to monitor the Occupied and Empty Parking and guide the vehicle driver to find empty parking and reduce the traffic and air pollution.
- **Property Owners**: To manage the tenant parking and avoid violation on parking spots.

**BENEFITS**

- Saving Time
- Increase Traffic Analytics
- Reduce Fuel Consumption
- Reduce Traffic Jam
- Reduce Air Pollution
- Reduce CO2 Emission

**Challenges:**

- Different locations (Around the City)
- High Temperature Environment
- Central Monitoring and Management System
- Cost of Operation
- Reliable Real Time System
- Expandable Solution
- Easy to Installation and maintenance

**System Features:**

- Lot Planning
- Geo-fence Tracking
- Battery Maintenance
- Billing API
- Navigation API
- Authorization
- Big Data
- History Review

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