SIEMENS

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No more searching for parking spaces

It is something we are all familiar with: you pop into town with the car to do a little shopping or meet some friends. But the short trip often turns into a nerve-wracking ordeal that sees you circling around time and again on the lookout for a parking space. On average, German motorists cover 4.5 kilometers until they finally find a slot. That costs time, gas and nerves.

Siemens' new sensor-controlled parking management system can help to optimize usage of urban parking spaces and radically reduce traffic in towns and cities caused by drivers searching for a place to park. Sensor networks gather information on the parking situation in the town and this is then forwarded to motorists to help them find a vacant parking spot. The data also flows into a town's parking management control center where it is processed by an intelligent parking space management system with the aim of achieving a long-term improvement in the parking situation.

Facts on traffic caused by drivers seeking parking spaces

- The search for parking spaces causes **one third** of traffic in European city centers.
- On average, vehicles are parked for **23 hours** a day.
- **14 times around the world:** Around 30 percent of drivers are searching for a parking space in Germany's overcrowded city centers. Every year, the distance covered in each district of a city is equivalent to 14 trips around the world.
- On average, car drivers need **ten minutes** to find a parking space.
- In so doing, they drive an average of **4.5 kilometers**.
- **1.3 kilograms of carbon dioxide** is blown into the air during the average search.

The sensor-controlled parking management system – parking space without searching

- A sensor network – based on a newly developed overhead radar sensor – constantly monitors parking space and reports the occupancy status of parking slots to a parking control center.
- What is so special about this innovation is that the software works with adaptive systems. It recognizes recurring cycles in the parking space situation - for example at certain times of day or on certain days of the week. It then works out forecasts for road users, for example concerning the expected parking space situation at their destination or alternative routes through areas with lower volumes of traffic.
- An RFID solution can also be added to the sensor system. Here, user-related authorizations, such as parking permits for residents or the disabled, can be automatically recognized in vehicles fitted with RFID tags.
- The driver can enter his destination via a smartphone or navigation device and receive real-time information about the parking space situation there.

Overhead radar sensors: a clear view from above
- The system can integrate various sensor types and technologies, which means it can be ideally adapted to the individual (e.g. topographical) requirements of any urban area.
- In comparison to ground sensors, overhead sensors can not only capture the occupancy of individually marked parking spaces but also monitor several spaces at the same time as well as the adjacent area (cycle paths, sidewalks or the road).
- What is more, the occupancy of parking capacity can also be reliably detected even when it is used flexibly by vehicles of various sizes, and the available space can be exploited to the full.
- The overhead system also detects the blocking of cycle paths, bus lanes, garages and driveways by illegally parked vehicles and passes this information on to the control center.
- The overhead sensor systems can be easily mounted on or in streetlights, so there is no need for major interference in the infrastructure. The sensors can be screwed onto the street light pole or integrated in the lamp housing itself.
- The radar system works without image capture. The privacy rights of individual road users are therefore respected.

- Radar technology is a very reliable detection method which, unlike optical sensors, is not impaired by light or weather conditions.

The advantages are obvious

- **Satisfied citizens:** The sensor-controlled parking management system provides road users with statistical and real-time data so that, from the start of their journey through to their final destination, they can effortlessly find out about current parking space availability or availability at a certain time of day. Route planner apps and in-car or infrastructure-based navigation systems reduce drivers' search times and ease the traffic burden.

- **Intermodal travel:** This solution also supports users when selecting their means of transportation. For example, before setting of on his journey, a commuter can find out about the current parking situation at his destination or about the walking distance from a potentially free parking space to the place he wants to go. However, at the same time he also receives information about the nearest P+R parking lot with the corresponding urban transport service. This gives a transparent, intelligent comparison of the modes of transportation, motivates people to use urban transport and ensures balanced utilization of the overall available urban parking capacity.

- **Intelligent planning and control of parking capacity:** The system supports the appropriate use of municipal resources as rules and prices can be based on valid parking data – for example to ensure that sufficient parking capacity is available for residents.

- Ideal utilization of available parking capacity thanks to a higher level of transparency for car drivers and travelers when planning their routes.

- The solution can also increase the profitability of the e-charging infrastructure because it immediately detects when e-parking spaces are occupied by vehicles that are not charging.

- **Cleaner towns and cities:** The amount of noise and exhaust fumes falls as there is no superfluous searching for parking spaces.

- **Safety:** Measures can be initiated immediately in the event of parking violations with an impact on safety: for example, nearby supervisory staff can be promptly informed and can clarify the situation personally. And of course, less traffic means more safety.

A glimpse into the future

- The system can do more than merely optimize the parking situation. It is also conceivable that the sensors could measure flowing traffic; in the more distant future they could facilitate autonomous driving at traffic hubs or monitor the availability of charging stations.

- It is also possible to forward the information on the parking situation and traffic volumes to the control centers for urban street lighting. The control centers can then adjust the lighting to vehicle movements for example, or inform drivers via an additional LED display whether they may park where they are right now.