Cyclepods

Transforming bike storage

lumiguide

BIKE DETECTION

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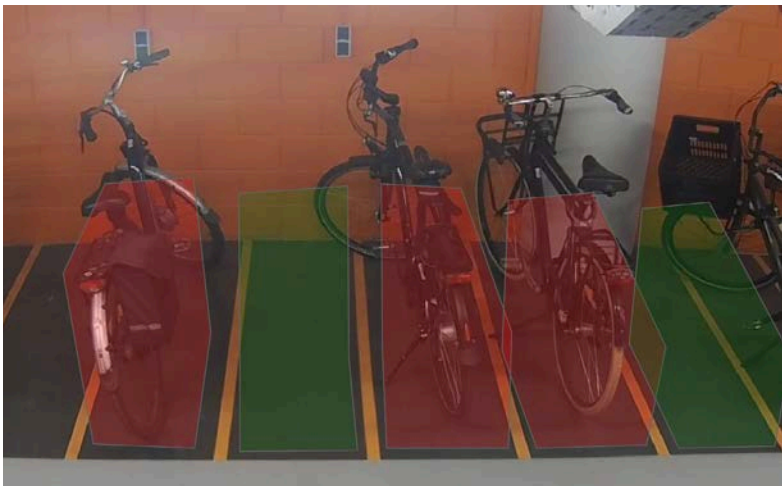
Our Bike Detection Systems collect and monitor occupancy data in cycle parking facilities. We use this data to enable you to effectively manage your facilities, by providing information on the number of spaces in use to be fed into smartphone apps & digital displays in Cycle Hubs and along cycle routes. This information assists and directs your cyclists, highlights areas for necessary maintenance (for example vandalism or abandoned cycles) and provides policy makers with analytics when it comes to making important traffic and funding decisions. There are two detection systems for collecting occupancy data;

Physical sensors; these sensors are installed into the racks for each bike space. There are two types, one is pressure controlled and is activated when a bicycle is placed on it and the other uses an infrared beam to detect the bicycle.

Optical sensors: optical sensors are a pair of cameras that can "see" in 3D. Each sensor monitors a section of the facility (around 5-25 spaces per sensor depending on layout).

Each facility has a single computer which performs the image analysis. The cameras stream their images to the local facility server. A Computer Vision algorithm then constructs a 3D model of each parking space and determines if it's free or occupied. Images are deleted from memory directly after they're processed.

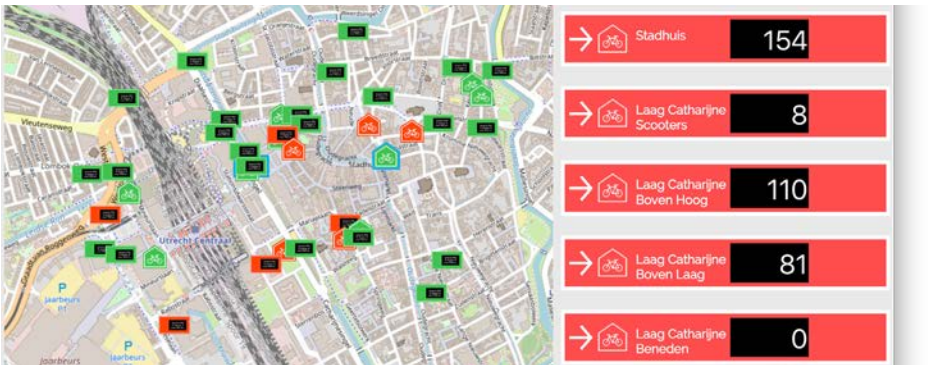


- **Optimize usage of bicycle parking facilities** by guiding cyclists to them thereby increasing the return on investment.
- **Create connected paths through towns and cities** using the real-time digital displays placed along cycle routes or with the free smartphone customer app.
- **Allow facility operators to more efficiently manage their facility** by providing tools such as the 'abandoned-bicycle-management' app.
- **Provide policymakers with advanced interactive analytics** with which they can make informed policy decisions regarding bicycle infrastructure.

The LumiGuide Bicycle Parking Data Platform is a SaaS (Software as a Service) comprehensive system for managing the data coming out of cycle parking facilities. The Bike Detection System installed in parking facilities collects information in real-time: each parking space becoming occupied or available will generate an event containing the time of the event, identification of the parking space and the status (occupied or available). Besides occupation data the system can optionally store images of abandoned bicycles. These can be used by facility operators to reliably check whether a bicycle has been parked longer than the maximum allowed parking time.

All this data needs to be stored reliably (including backups) and made available to various systems downstream such as:

- **Indoor digital displays** in the cycle parking facilities guiding cyclists to available spaces.
- **Outdoor digital displays** on the streets and cycle routes guiding cyclists to available facilities.
- **Smartphone apps or 3rd party interfaces** showing which facilities have how much space available.
- **Management Information Systems** providing policymakers and facility operators with analytics.



LumiGuide developed a free smartphone app for the City of Utrecht that cyclists can use to find a free, nearby facility. The app is using the API to download the availability information in real-time, so cyclists can efficiently plan their journeys. This app is easily replicable for any city or organisation.

GET IT ON Google Play

DOWNLOAD ON THE App Store

Download from Windows Store

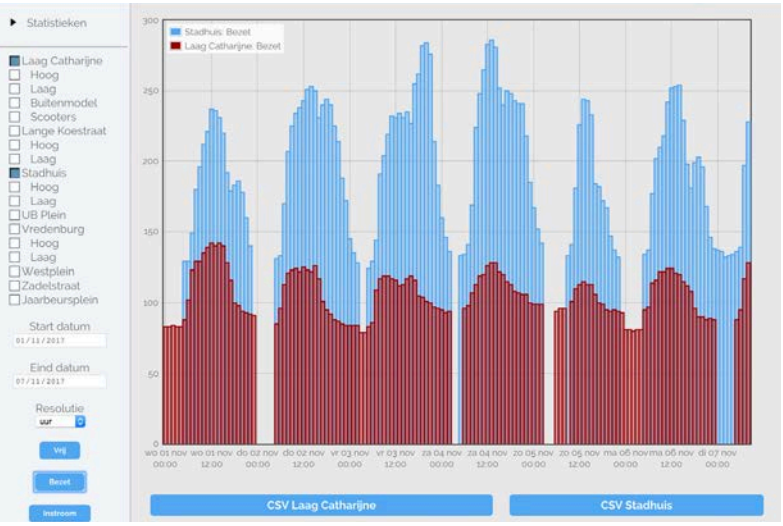
Analytics

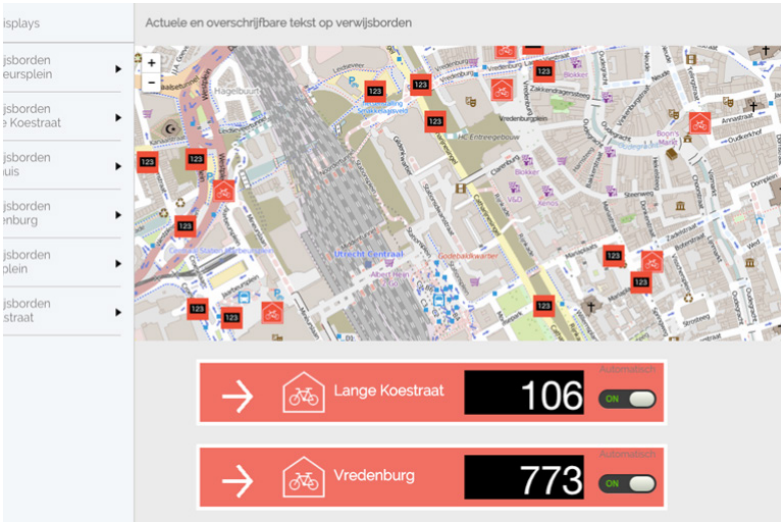
The LumiGuide Bicycle Parking Data Platform receives occupation data for all connected facilities. This data is processed continuously, and various statistics are generated in real-time. The statistical reports can be retrieved via the Management Information System.

Examples of reports are:
- Graphs of the occupation of one or more specified facilities over time. The time period can be chosen interactively.
- Graphs of the in and outflow of multiple facilities.

All graphs can be downloaded as images and the numerical data can be downloaded as .CSV files.

The user can also opt to receive reports on a monthly basis. The following graphs are included: occupancy graph, duration histogram and an end-of-month duration histogram which can be used to show the number of abandoned bicycles.





London Midland Case Study

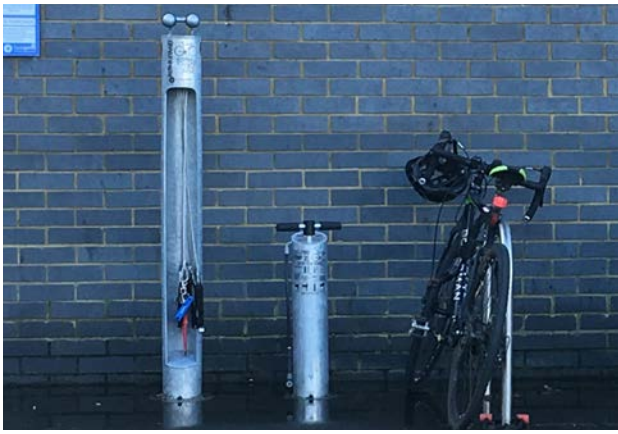
Cyclepods have recently completed a project with train operating company, London Midland. This involved the provision of 470 new cycle parking spaces at 6 stations in a limited timescale. These stations were; Watford Junction, Northampton, Bletchley, Walsall and Alvechurch.

London Midland opted for the CapaCITY two-tier system, due in part to the space efficient design. Northampton and Bletchley both had limited space. Cycle parking increased from 58 to 96 at Bletchley and almost doubled at Northampton, from 85 to 160.

There were derelict or redundant areas at three stations, Watford Junction, Walsall and Alvechurch. By clearing these areas and prepping with extensive groundworks, fresh spaces were created for the new cycle storage.

At each of these locations, Cyclepods worked with London Midland to ensure there was space for future growth. Considered planning meant future extensions are possible without relocating the racks and shelters.

As well as cycle storage, there was a need for public cycle pumps and repair stands. These tools allow cyclists to make minor repairs or carry out basic maintenance.



All racks, shelter, pumps and repair stand have a galvanised corrosion-resistant finish to BS EN ISO 1461. This was an important stipulation in London Midland's requirements.

CAPACITY TWO-TIER SYSTEM

The CapaCITY racks are of welded and bolted construction. All exposed nuts and threaded bolts fitted to frame have tamper proof caps/heads (Nyloc type). The track material required was aluminium or Galvanised Steel to BS EN ISO 1461, at least Grade 304.

For the installation to be successful, the racks need to be user friendly, so all cyclists can use them with confidence.

London Midland's requirements were;

- 375mm centre to centre spacing on the racks.
- Three separate locking on points (Bicycle wheels and frame) was also necessary.
- Ergonomic, polymer grip handles with steel support fitted to the upper channels for ease of use.
- Upper channels to operate on casters or stainless steel bearings for easy operation and noise dampening.
- Upper channels must reach floor level when completely extended for ease of loading.
- A gas assisted or pneumatic lowering mechanism on the upper channels to prevent uncontrolled lowering.
- The height x depth requirements were 2350mm x 1800mm with a stowed cycle. Operable within a two-tiered cycle shelter.
- Readily available replacement parts.

All these features are standard with the CapaCITY system.

As well as providing cycle storage, London Midland requested a brand new accompanying feature for four stations. At Watford Junction, Northampton, Walsall and Bletchley, Cyclepods installed our Bike Detection system.

BIKE DETECTION

Bike Detection is an optical sensor or pressure sensor driven system to determine occupied or vacant cycle parking space.

London Midland chose optical sensors for their racks. These consist of two cameras that "see" in 3D, each monitoring a section of the racks (around 5-25 spaces). The cameras can then determine occupied vs. free spaces in the racks and feeds this back to a local facility server.

This means real-time information on occupancy is available. This data will show trends in occupancy related to time of day, day of week etc., as well as a potential growth in cycle-rail journeys.

Understanding facility usage is vital in justifying investment in the facilities. This data helps to learn if facilities are in the right place and which racks are more popular than others. It also provides evidence on usage when considering future investment in facilities, particularly useful when negotiating for funding for expanding existing or new facilities.

Abandoned bikes is becoming more common. These are bikes left in racks, taking up valuable spaces from other users. In most cases, a bike is considered abandoned if left for more than two weeks. The optical sensors log where spaces are not vacated in a certain period and notify the system operative to remove abandoned bikes.

A stipulation of this project was delivery of everything within 6 to 8 weeks of the contract signing. This was an ambitious timescale dictated by London Midland's franchise end on December 10th 2017. Cyclepods delivered all products within the contracted timescale.

‘Walsall is one of the first Rail Stations in the UK to use the new analytic system and is providing continuous occupancy data, peak time occupancy, flow rates, a heat map occupancy, digital signage availability, abandoned cycles can be identified or bikes overstaying within a facility.’

‘With digital surveillance and analytic monitoring, crime prevention and the security of cyclists’ property are greatly enhanced and set new benchmarks for cycle facilities.’

Michael Byrne
Property Workstream Lead at West Midland Trains

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