



iNode™ TRAFFIC DATA ANALYTICS

*Bluetooth and WiFi
Re-identification Sensors*



SMATS



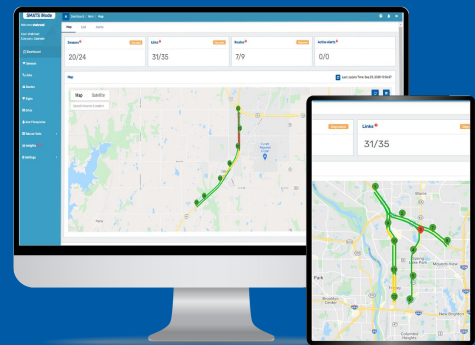
Wi-Fi and Bluetooth Travel Time Sensors

SMATS travel time sensors detect Bluetooth and Wi-Fi signals MAC address (fingerprints) emitted from smart devices. The sensors can detect three types of Bluetooth and Wi-Fi signals offering the highest detection rate on the market:

- *Bluetooth Classic* (e.g. hands-free headphones)
 - Discoverable Mode
 - Connected Mode
- *Bluetooth Low Energy* (e.g. smartwatches and beacons)
- *WiFi* (e.g. cell phones and tablets)

What is iNode™?

iNode™ is a cloud-based traffic data analytics application for Traffic Management Offices. It provides all the Departments – including Traffic Operation, Engineering, Federal, State, and Planning – accurate and robust real-time traffic information for better management of traffic congestion.



iNode™ + Bluetooth and WiFi Sensor Data

SMATS iNode™ sensors is a powerful processing platform that uses advanced filtering and data mining algorithms to provide accurate and robust travel-time and origin-destination data collected from SMATS Bluetooth and Wi-Fi sensors with the leading detection rate on the market. By providing 24/7 real-time traffic data from iNode our customers can make data-driven decisions to reduce congestion.

Technology

SMATS sensors can be adjusted to cover a specific circular or directional area where Bluetooth and Wi-Fi devices can be detected. Then, iNode™ data analytics platform can aggregate and analyze the data collected.

When compared to ordinary Bluetooth-only sensors, one of the main advantages of SMATS' sensors is their enhanced detection rates. The detection rate is the percentage of cars identified and matched by two sensors relative to the actual volume of traffic.

Each SMATS device's hybrid Bluetooth and Wi-Fi scanning yields an average detection rate between 30-40%, compared to 2-5% for Bluetooth-only legacy devices.

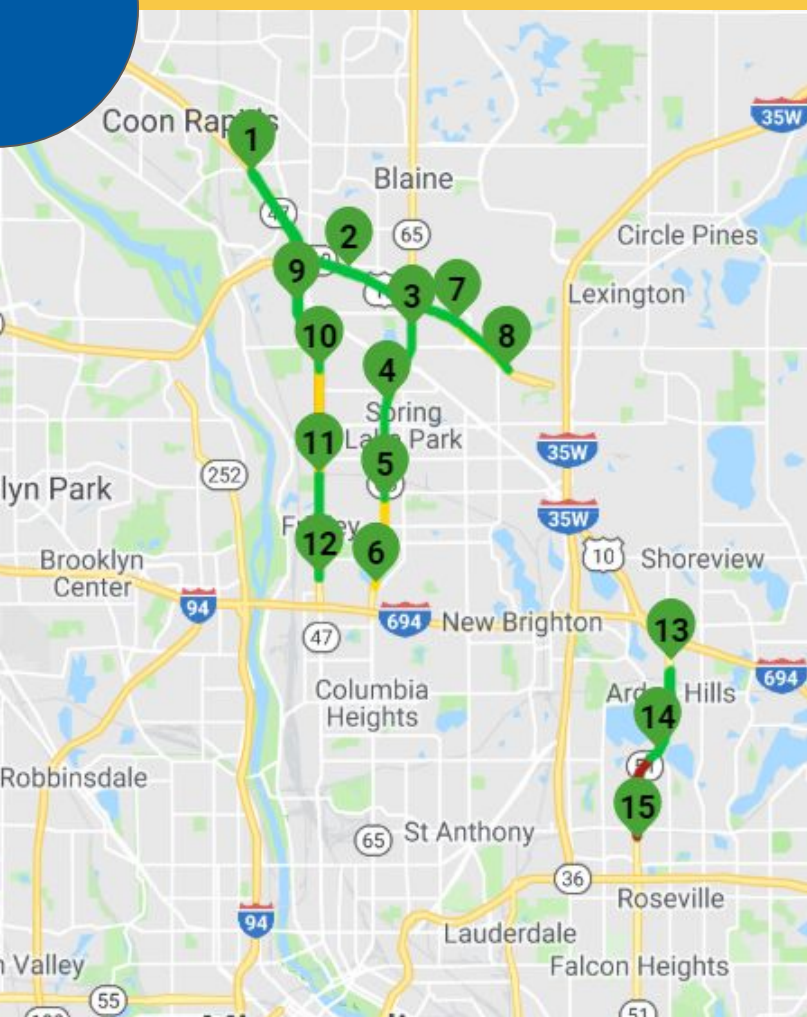
Outlier Detection

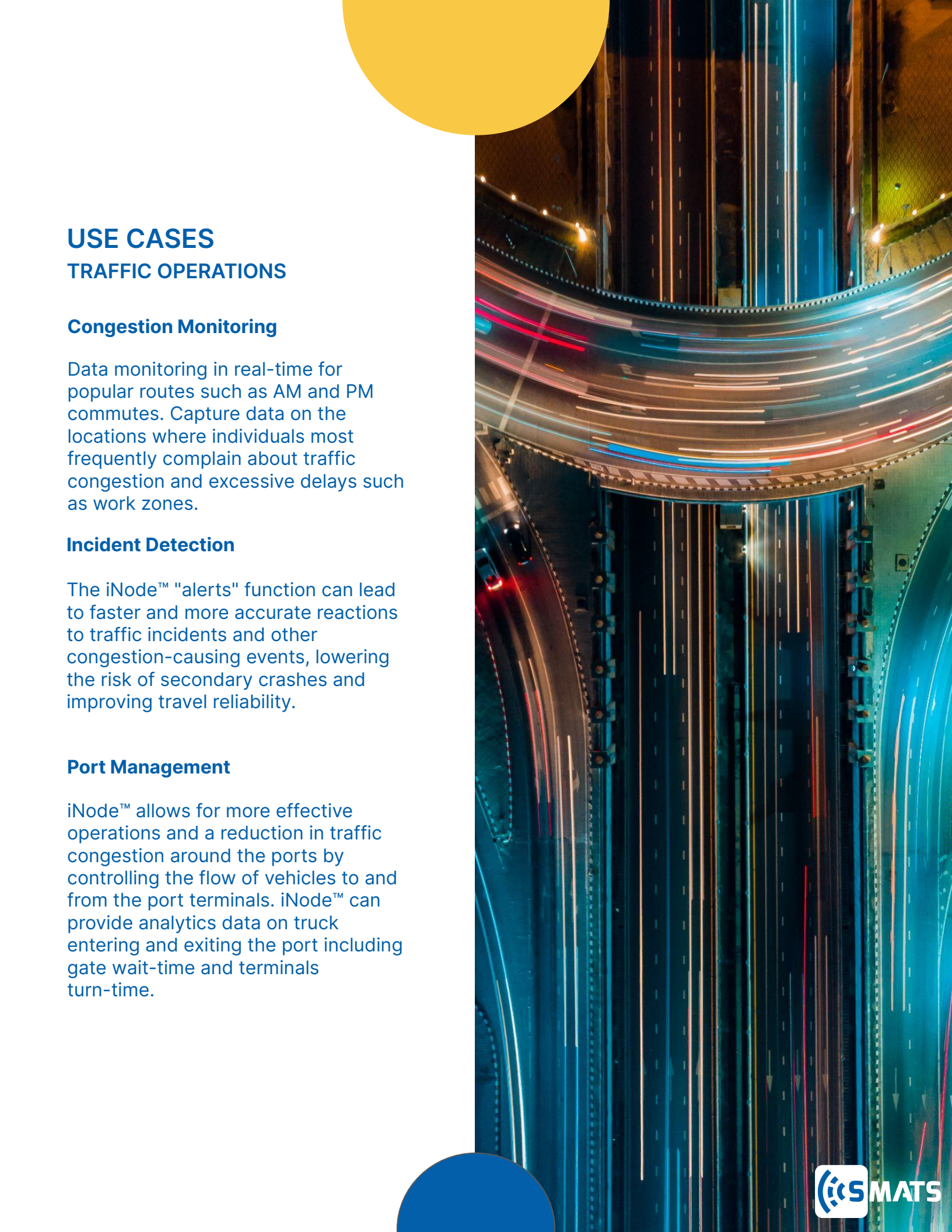
Filtering algorithms play an important role in detecting and excluding outliers from travel time data. The outliers are normally associated with high travel time values from vehicles stopping in the middle of the route and continuing their trip with a delay. However, it can sometimes be from faster-moving signal sources such as train passengers' electronic devices moving parallel near a congested road.

SMATS' iNode™ utilizes an Adaptive Filtering Algorithm to remove the outliers and has been tested for various scenarios including low sample sizes, arterial signalized intersections, highways, sudden changes in travel time due to incidences.

Methodology

Smartphones, tablets, wearable gadgets, and vehicle embedded systems constantly generate Bluetooth and Wi-Fi signals. A device's Media Access Control (MAC) address can be used to identify these signals. As each MAC address is unique to its own device and does not vary over time, sensors can detect and follow the device and the individual who moves with it. Drivers, passengers, pedestrians, and cyclists are all examples of potential use cases.





USE CASES

TRAFFIC OPERATIONS

Congestion Monitoring

Data monitoring in real-time for popular routes such as AM and PM commutes. Capture data on the locations where individuals most frequently complain about traffic congestion and excessive delays such as work zones.

Incident Detection

The iNode™ "alerts" function can lead to faster and more accurate reactions to traffic incidents and other congestion-causing events, lowering the risk of secondary crashes and improving travel reliability.

Port Management

iNode™ allows for more effective operations and a reduction in traffic congestion around the ports by controlling the flow of vehicles to and from the port terminals. iNode™ can provide analytics data on truck entering and exiting the port including gate wait-time and terminals turn-time.

TRAFFIC PLANNING

Bottleneck Detection

iNode™ can help traffic engineers identify bottlenecks and troublesome areas in their network. Determine congestion points in your current infrastructure, examine the data, and learn more about how to deal with it.

Origin-Destination Study

Origin-Destination (OD) studies provide data on where people start and end their journeys. This can be used to evaluate travel patterns, construct travel models, estimate travel demand, and aid traffic planning. iNode™ employs an innovative MAC address matching technique to detect origin-destination journeys and the matrix by deploying a network of sensors around the OD points of interest.

TRAFFIC ENGINEERING

Traffic Studies

Whether you're allocating new lanes or conducting a traffic impact assessment, iNode™ traffic data will assist you in making the best decision and effectively quantify the results.

Signal Retiming

Using travel-time, travel-time reliability, speed, and delay data for signalized arterial roads. Analyze delays, prioritize corridors in need of signal retiming, and run before and after studies to see the impact of signal retiming projects.

Sensor Features



Power Source

PoE
Solar
AC



Communication

LTE
Ethernet LAN
5Ghz WiFi



Configuration

Web-based remote and
local configuration



Compliance

FCC
IC



Detection

Adjustable
detection zone



Upgrades

Remote firmware
upgrades



Control

Remotely change settings
of your deployed sensors



Scanners

Bluetooth (3 Types)
WiFi

TrafficBox™ PORTABLE SENSOR

The Portable and Securable Scanner

TrafficBox™ is a pole-mount, battery operated Bluetooth and Wi-Fi sensor that operates inside of a ruggedized shockproof and waterproof carrying case. The TrafficBox™ is ideal for projects that require leaving the sensor at a location of interest to collect data for several days at a time.



TrafficXHub™ Cabinet PERMANENT SENSOR

Traffic Cabinet Integration

SMATS TrafficXHub™ Cabinet is a permanent, in-cabinet mount, Bluetooth, and WiFi sensor. The TrafficXHub™ Cabinet provides superior MAC address detection and matching. It also gives access to real-time data for live monitoring with iNode™.

The TrafficXHub™ Cabinet follows a card type form factor and is the perfect solution for ongoing projects where access to a traffic cabinet is available.

TrafficXHub™ PERMANENT SENSOR

A Roadside Scanner

SMATS TrafficXHub™ is a fixed Wi-Fi and Bluetooth scanner that provides superior MAC address detection and matching. In addition, it gives access to real-time data for live traffic monitoring with iNode™. From a fixed or solar power supply, the TrafficXHub™ is the perfect solution for ongoing projects, from small-scale to city-wide.





SMATS Traffic Solutions

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