Royal Netherlands
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Ministry of Infrastructure and the Environment

Car sensors as mobile meteorological network

The potential of car sensor data for meteorological observations

Internet of Things (IoT) is emerging and more and more car sensor data come available. To investigate the potential of car sensor data for meteorological observations, KNMI and Beijer Automotive started a public-private collaborative experiment.

Beijer Automotive has developed Vetuda (www.vetuda.com) that collects car sensor data using CAN-bus, a controlled area network to exchange sensor data within a car. Although CAN-bus is standardized, there are different implementations by car manufacturers. Beijer Vetuda can handle these differences and is therefore applicable for a fleet of cars (e.g. taxi's). The collected car sensor data are made available on their private cloud.

KNMI has used air temperature sensor data (car bumper) and wiper sensor data to investigate their usability in measuring road conditions. Currently, stations that measure road conditions are hardly available outside highways. Car sensors can offer a valuable contribution because of their potential to measure road conditions at any road. The sensor data is of interest to traffic control rooms that warn car drivers for bad road conditions. Car sensor data can also contribute to high resolution weather forecasting.

' KNMI Datalab, a better prospect'

KNMI DATALAB

KNMI DataLab
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vetuda®
by **Beijer** automotive

Applications

Car sensor data are a valuable source of data for meteorology when available at a high temporal and spatial resolution. Car sensor data, for example, can be used to measure road conditions on all roads and urban heat islands in cities during summertime. The current use is still experimental with focus on quality and reliability of measurements. Given the growing availability of car sensor data, it is expected that this source of data will provide on short term temporal/ spatial data at a resolution that will offer new applications in meteorology and climatology.

Users

The users of car sensors data for meteorological purposes are the traffic control rooms and weather rooms that warn for dangerous road and weather conditions. Car sensor data is also valuable for climate researchers who study city climate (Urban Heat Islands).

Future

The availability of car sensor data is emerging. Over time the quality and applicability of car sensor data for meteorological and air quality purposes will increase as well as the temporal and spatial resolution (any time, any place). This will create a mobile meteorological network based on car sensor data.
Collection of car sensor data will improve due to seemless integration of smartphones with car control systems (fully-linked).
In any case, the collection of car sensor data must be safe, secure and respect the privacy of car drivers.

This is a publication by KNMI
datalab.knmi.nl
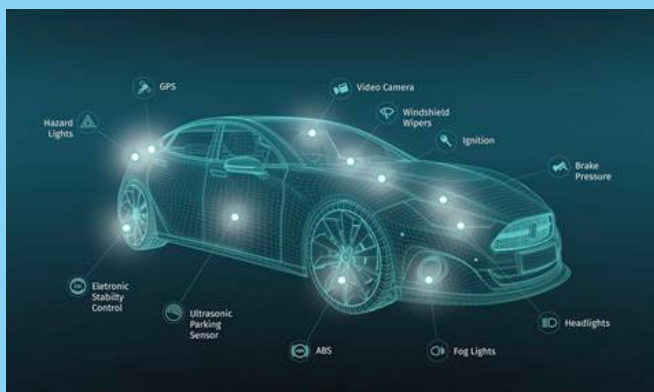*October 2017*

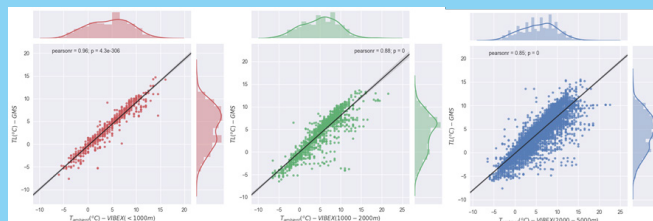Figure 1. Car sensors.

Figure 2. Wet road conditions.

Figure 3. Correlation of air temperature (car sensor) and air temperature of a nearby station (at 1, 2 and 5 km).
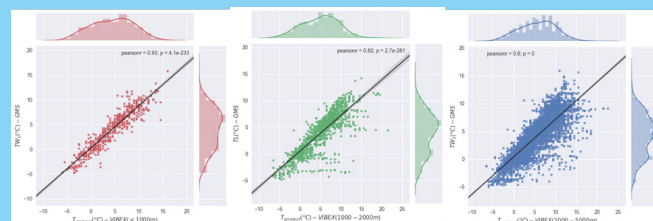

Figure 4. Correlation of air temperature (car sensor) and road temperature of a nearby station (at 1, 2 and 5 km).