Data set used in paper:

A comparative study of calibration methods for low-cost ozone sensors in IoT platforms

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There are two types of nodes:

Captor nodes were built by UPC (Universitat Politecnica de Catalunya), Barcelona, Spain, http://sans.ac.upc.edu/ following the DIY (Do It Yourself) philosophy, uses Arduino technology with a sensor shield board that attaches four SGX Sensortech MICS 2614 metal-oxide O_3 sensors in each Captor node, a temperature (Temp) sensor and a relative humidity (RH) sensor.

Raptor nodes have been built by Universite Clermont Auvergne (UCA) in France, http://edss.isima.fr/sites/smir/. Each Raptor node uses Raspberry Pi technology with one Alphasense OX-B431 electro-chemical O_3 sensor, one Alphasense NO2-B43F electro-chemical NO_2 sensor, a temperature sensor and a relative humidity sensor. Alphasense OX-B431 and NO2-B43F electro-chemical sensors use the Alphasense support circuits Individual Sensor Board (ISB) that outputs two signals for each sensor. The signals are called the working electrode (WE) and the auxiliary electrode (AE) used to compensate for zero current and both give values in the range of milivolts. The NO_2 sensor raw measures are the difference between the WE and AE NO_2 values, it is to say, $s_{no2}=(WE_{NO_2} - AE_{NO_2})$. The O_3 sensor raw measures are the difference between the WE and AE NO_2 and the WE and AE O_3 values, it is to say: $s_{o3}=(WE_{O_3} - AE_{O_3}) - (WE_{NO_2} - AE_{NO_2})$, after passing through an A/D converter.

The information described below is related to the ozone data captured by these nodes.

- **Filename:** There are files containing sensor information for captor nodes and raptor nodes. Three captor data sets are available;

  CAP-17013_ TodoManlleu.csv,
  CAP-17016_ TodoVic.csv,
  CAP-17017_ TodoTona.csv,

  for Captor nodes C17013, C17016 and C17017 respectively. Besides, there are five files containing sensor data for raptor nodes;

  R69-17.csv,
  R212-18.csv,
  R202-18.csv,
  R308-17.csv,
  R69-18.csv,

  for raptors R69-17, R212-18, R202-18, R308-17 and R69-18 respectively.

- **Project Information:** CAPTOR project is funded by the European Union's Horizon 2020 Programme under the Grant Agreement No. 688110, https://www.captor-project.eu/en/

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- **File fortmats and attributes:**
  - **CAPTOR**
    - timestamp: UTC timestamps, the date format is dd/mm/YYYY hh:mm
    - sensor 1: metal-oxide ozone sensor 1 reading, the units are kiloohms.
    - sensor 2: metal-oxide ozone sensor 2 reading, the units are kiloohms.
    - sensor 3: metal-oxide ozone sensor 3 reading, the units are kiloohms.
    - sensor 4: metal-oxide ozone sensor 4 reading, the units are kiloohms.
    - temperature: temperature reading, the units are celcius degrees.
    - relative humidity: relative humidity reading, the units are percentage.
  - **RAPTOR**
    - timestamp: UTC timestamps, the date format is YYYY-mm-dd hh:mm:ss
    - sensor 1: electro-chemical s_{o3} sensor reading.
    - sensor 2: electro-chemical s_{no2} sensor reading.
    - temperature : temperature reading, the units are celcius degrees.
    - relative humidity: relative humidity reading , the units are percentage.

- **Testbed location description:**

Node name	Location	GPS coordinates
C17013	Manlleu (Spain)	42°0'6.966"N 2°17'13.7868"E
C17016	Vic (Spain)	41°56'08.4"N 2°14'18.8"E
C17017	Tona (Spain)	41°50'49.7796"N 2°13'14.7864"E
R69-17	MonteCucco (Italy)	45°02'18.8"N 9°40'09.7"E
R308-17	Weiz Bahnhof (Austria)	47°12' 56.412"N 15°37'41.016"E
R69-18	MonteCucco (Italy)	45°02'18.8"N 9°40'09.7"E
R202-18	Colli Euganei (Italy)	45°17'21.76"N 11°38'32.43"E
R212-18	Osio Sotto (Italy)	45°37'14.1"N 9°36'41.6"E

- **Deployment dates:**
  - C17013: 08/05/2017 - 04/10/2017
  - C17016: 26/05/2017 - 05/10/2017
  - C17017: 08/05/2017 - 5/10/2017
  - R69-17: 06/07/2017 - 11/10/2017
  - R308-17: 06/07/2017 - 27/09/2017
  - R69-18: 20/06/2018 - 26/09/2018

  - R202-18: 18/06/2018 - 30/09/2018
  - R212-18: 26/06/2018 - 25/09/2018

- **How to get the reference values ?** The reference station values used were obtained from open repositories in local or European agencies. Almost all European countries publish their environmental data in the repository of the Environmental European Agency (EEA), https://www.eea.europa.eu/data-and-maps. Researchers can ask for a token and download these data.

  Moreover, some local agencies also publish some of the reference stations data. For example, the Catalan local government, publish data used in the Spanish testbed reference stations at http://mediambient.gencat.cat/es/05_ambits_dactuacio/atmosfera/qualitat_de_laire/vols-saber-que-respires/.

  Other example, are some of the reference stations in Italy. Every region gives access to their reference station data with different conditions. ARPAE (Regional Agency for Prevention, Environment and Energy of Emilia-Romagna) publish the data of Emilia Romagna region (MonteCucco reference station) at https://www.arpae.it/v2_rete_di_monitoraggio.asp?p=PC&s=5000065&idlivello=134&w=7#param.