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Air Quality Data Set

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Abstract: Contains the responses of a gas multisensor device deployed on the field in an Italian city. Hourly responses averages are recorded along with gas concentrations references from a certified analyzer.

Data Set Characteristics:	Multivariate, Time-Series	Number of Instances:	9358	Area:	Computer
Attribute Characteristics:	Real	Number of Attributes:	15	Date Donated	2016-03-23
Associated Tasks:	Regression	Missing Values?	Yes	Number of Web Hits:	202194

Source:

Saverio De Vito ([saverio.devito '@' enea.it](mailto:saverio.devito@enea.it)), ENEA - National Agency for New Technologies, Energy and Sustainable Economic Development

Data Set Information:

The dataset contains 9358 instances of hourly averaged responses from an array of 5 metal oxide chemical sensors embedded in an Air Quality Chemical Multisensor Device. The device was located on the field in a significantly polluted area, at road level, within an Italian city. Data were recorded from March 2004 to February 2005 (one year) representing the longest freely available recordings of on field deployed air quality chemical sensor devices responses. Ground Truth hourly averaged concentrations for CO, Non Metanolic Hydrocarbons, Benzene, Total Nitrogen Oxides (NOx) and Nitrogen Dioxide (NO₂) and were provided by a co-located reference certified analyzer. Evidences of cross-sensitivities as well as both concept and sensor drifts are present as described in De Vito et al., Sens. And Act. B, Vol. 129,2,2008 (citation required) eventually affecting sensors concentration estimation capabilities. Missing values are tagged with -200 value.

This dataset can be used exclusively for research purposes. Commercial purposes are fully excluded.

Attribute Information:

- 0 Date (DD/MM/YYYY)
- 1 Time (HH.MM.SS)
- 2 True hourly averaged concentration CO in mg/m³ (reference analyzer)
- 3 PT08.S1 (tin oxide) hourly averaged sensor response (nominally CO targeted)
- 4 True hourly averaged overall Non Metanolic HydroCarbons concentration in microg/m³ (reference analyzer)
- 5 True hourly averaged Benzene concentration in microg/m³ (reference analyzer)
- 6 PT08.S2 (titania) hourly averaged sensor response (nominally NMHC targeted)
- 7 True hourly averaged NOx concentration in ppb (reference analyzer)
- 8 PT08.S3 (tungsten oxide) hourly averaged sensor response (nominally NOx targeted)
- 9 True hourly averaged NO₂ concentration in microg/m³ (reference analyzer)
- 10 PT08.S4 (tungsten oxide) hourly averaged sensor response (nominally NO₂ targeted)
- 11 PT08.S5 (indium oxide) hourly averaged sensor response (nominally O₃ targeted)
- 12 Temperature in Å°C

13 Relative Humidity (%)
14 AH Absolute Humidity

Relevant Papers:

S. De Vito, E. Massera, M. Piga, L. Martinotto, G. Di Francia, On field calibration of an electronic nose for benzene estimation in an urban pollution monitoring scenario, *Sensors and Actuators B: Chemical*, Volume 129, Issue 2, 22 February 2008, Pages 750-757, ISSN 0925-4005, [[Web Link](#)].
([[Web Link](#)])

Saverio De Vito, Marco Piga, Luca Martinotto, Girolamo Di Francia, CO, NO₂ and NO_x urban pollution monitoring with on-field calibrated electronic nose by automatic bayesian regularization, *Sensors and Actuators B: Chemical*, Volume 143, Issue 1, 4 December 2009, Pages 182-191, ISSN 0925-4005, [[Web Link](#)].
([[Web Link](#)])

S. De Vito, G. Fattoruso, M. Pardo, F. Tortorella and G. Di Francia, 'Semi-Supervised Learning Techniques in Artificial Olfaction: A Novel Approach to Classification Problems and Drift Counteraction,' in *IEEE Sensors Journal*, vol. 12, no. 11, pp. 3215-3224, Nov. 2012.
doi: 10.1109/JSEN.2012.2192425

Citation Request:

S. De Vito, E. Massera, M. Piga, L. Martinotto, G. Di Francia, On field calibration of an electronic nose for benzene estimation in an urban pollution monitoring scenario, *Sensors and Actuators B: Chemical*, Volume 129, Issue 2, 22 February 2008, Pages 750-757, ISSN 0925-4005, [[Web Link](#)].
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