European Network on New Sensing Technologies for Air Pollution Control and Environmental Sustainability - *EuNetAir*

COST Action TD1105

WGs and MC Meeting at Cambridge, 18-20 December 2013

Action Start date: 01/07/2012 - Action End date: 30/06/2016

Year 2: 1 July 2013 - 30 June 2014 (*Ongoing Action*)

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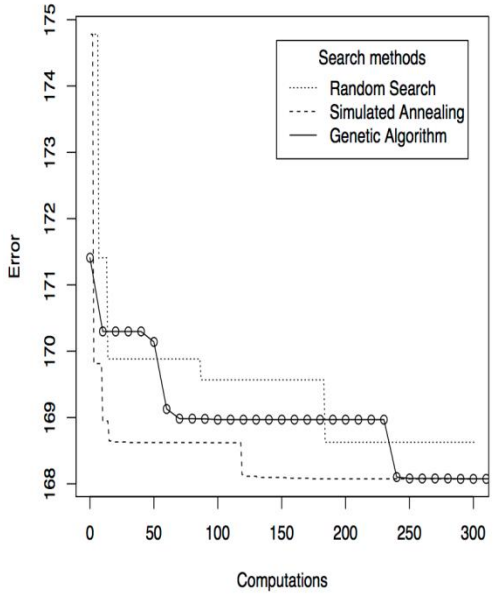
Scientific context and objectives in the Action

- **Background:** *Distributed computing workstations:* ***artificial intelligence algorithms***, ***pattern recognition, neural networks***, *electronic circuit simulation, wireless communication suites, sensor network designer, ad-hoc firmware,* ***ad-hoc software***, *etc*.
- **WG2**: Sensors, Devices & Systems for AQC

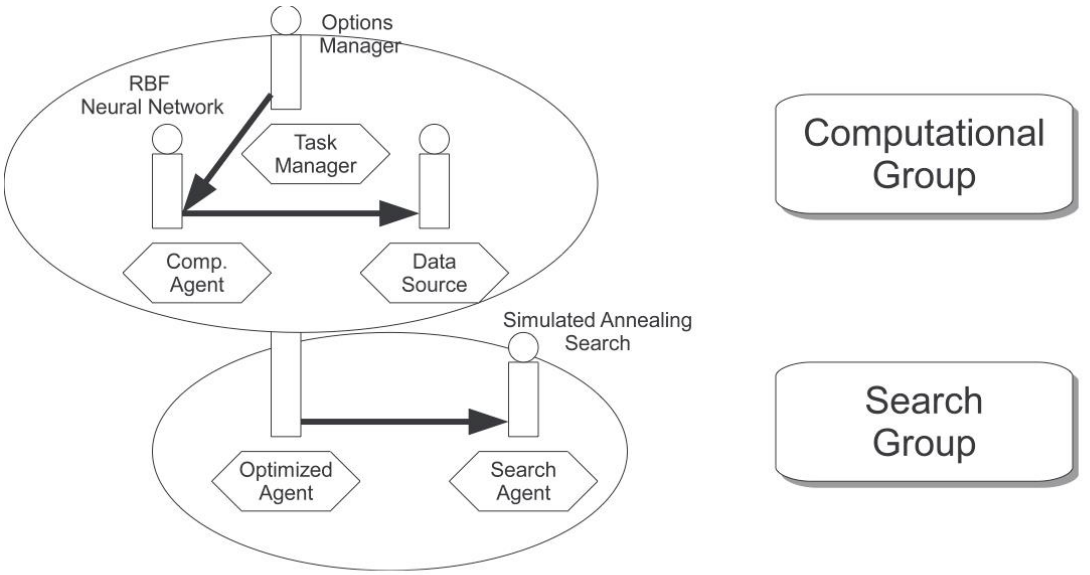
  The usage of fully autonomous systems for analysis, pattern recognition, sensor networks.



Current research activities of the Partner (1/2)

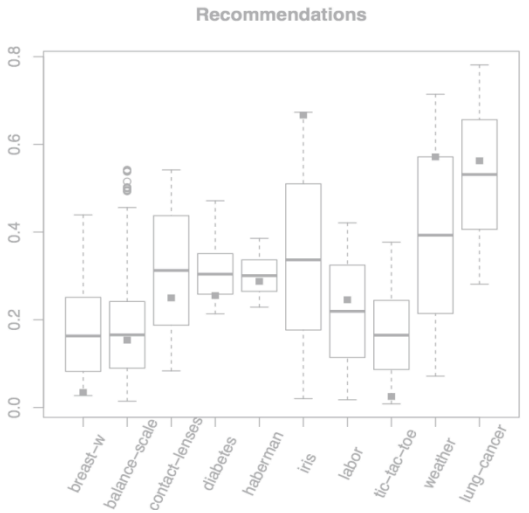
Development of new hybrid, data-dependent machine learning algorithms with possible applications for autonomous data mining approaches.

- **Machine learning**
- **Data mining**
- **Computational intelligence**
- **Meta learning**
  - Method recommendation
  - Parameter space search



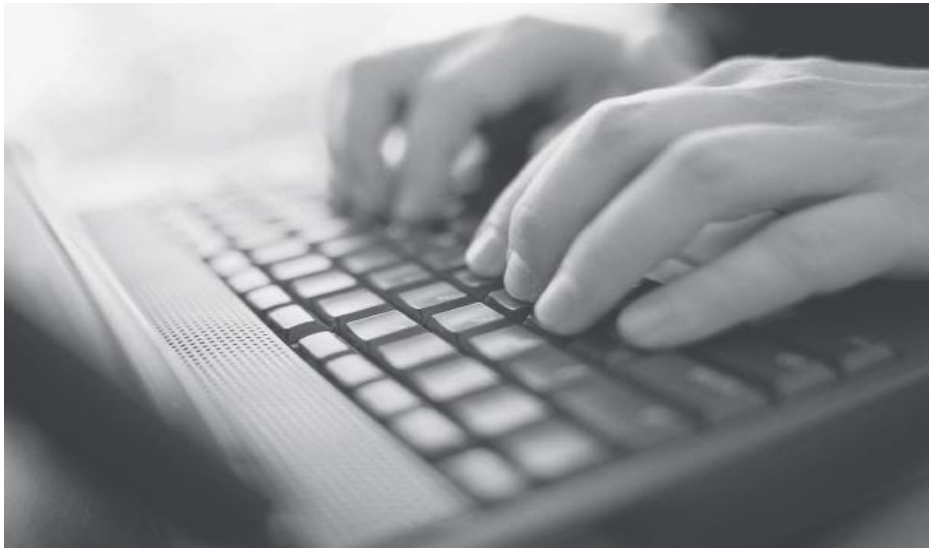
Current research activities of the Partner (2/2)

- **Meta data features identification**
  - statistical, information theoretical features
  - metric defining distance of data sets, evolution
- **Method recommendation**
  - zooming - identifying the nearest data,
  - ranking - recommending the best method according to different criteria (multi objective evolutionary algorithms)
- **Computational intelligence**
  - neural nets, clustering, ensembles, preprocessing, combinations
  - Performance sampling: 1mil records, 10s methods, 100s data



Research Facilities available for the Partner

- **Algorithms proposal, design, testing**, … application
- **Meta-learning** for data mining - tests on real-world data
- Good **model and parameter** setting by autonomous search



Suggested R&I Needs for future research

Research directions as R&I NEEDS:

- Usage of meta-learning approaches of machine learning for data mining of relevant data of other Action parties.
  - Description of data and meta data features
  - Classification and regression problems
- Utilization of autonomous agents and multi-agent systems for sensor networks organization.