

COIL2000 Report

Purpose of COIL2000

CoIL 2000 Symposium on Computational Intelligence and Learning and the European Best Practice Workshops took place in Chios, Greece during 19.06.2000 - 23.06.2000. The event was organised on behalf of CoIL by ELITE foundation (ERUDIT node) with the collaboration of the Department of Business Administration from the University of the Aegean (Chios, Greece). CoIL2000 and combined two major events:

- a) The Best Practice Workshops during 19.06.2000 - 21.06.2000 at the premises of the Business Administration Department of the Aegean University
- b) The Symposium on Computational Intelligence during 21.06.2000 - 23.06.2000 at Homerion cultural centre

During COIL2000 the goals were to disseminate CoIL technologies to potential users from industry and academia, to present latest achievements and applications with emphasis to the integration of methods (hybrid systems) and strengthen the liaisons between the scientific communities.

Workshops

During the first three days three workshops took place where experienced researchers presented the main soft computing and machine learning methodologies, together with successful hybrid approaches. Participants were introduced to a number of example applications and had the opportunity to complete several practical exercises.

Workshop I: Extraction of Rules from Data

19.06.2000, 09:00:00 22 participants

Lecturers: **Peter Krause** (University of Dortmund, Germany) and **Robert Babuska** (Delft University of Technology, The Netherlands)

This workshop intended to give a state-of-the-art overview of data-driven techniques for the generation of rule-based models. The workshop was organised in two parts:

- a) In the first part, the Lecturers gave an introduction to fuzzy logic models for prediction and classification and presented data-driven rule generation methods. There was a presentation of relevant S/W (MATLAB-based software, Winrosa)
- b) In the second part the participants had the possibility to experiment on exercises with the software tools and discuss about the presented methods.

Workshop II: Machine Learning and Neuro-Fuzzy Data Analysis

20.06.2000 (and 21.06.2000), 28 participants

Lecturers: **Stefan Wrobel** (University of Magdeburg, Germany), **Rudolf Kruse** (University of Magdeburg, Germany), **Marc Krogel** (University of Magdeburg, Germany) and **Detlef Nauck** (British Telecommunications plc, UK)

Workshop II was divided in four parts and intended to provide an introduction into some popular machine learning and computational intelligence algorithms that are used in data analysis and data mining.

Parts I&II were introductory and theoretical and provided an overview on machine learning approaches like induction of decision trees (Decision tree algorithms, k-nearest-neighbour methods), multi-relational approaches, neuro-fuzzy systems and possibilistic networks.

Parts III&IV introduced concepts with practical examples where with the aid of software tools the participants had the possibility to analyse well-known benchmark data.

Workshop III: Customer Classification for Business Applications

21.06.2000, 17 participants

Lecturers: **Martin Nelke** (MIT GmbH, Germany), **Jens Strackeljan** (Technical University of Clausthal, Germany)

This workshop aimed to present data mining methods for business applications. The steps of a data mining process from data selection to model application were analysed providing the potential of data mining for applications in the area of credit risk analysis, churn management and database marketing.

The second part had to be rescheduled for the next day due to a problem with the power supply in the computer centre. This part comprised a practical exercise where participants had to develop a model for customer segmentation based on a bank database.

CoIL 2000 Symposium

Presentations/Papers: 25

Participants: 50

During Thursday and Friday the CoIL 2000 Symposium took place at Homerion centre (Chios city). Participants from several European countries (see Appendix 11) registered for the event which started with an introduction to CoIL presented by **Maarten van Someren** the CoIL co-ordinator. **Pekka Karp** from the European Commission presented the initiatives of FET (Future and Emerging Technologies unit) and initiatives related to the FET call on Neuroinformatics. The invited speaker **James Bezdek** gave a live style speech on Computational Intelligence (CI) and raised our awareness on the possible noxious consequences that CI can induce in our lives specially in the way we learn (education).

Session I started with **Liam Maguire's** presentation on "Hybrid Intelligent Architectures Using a Neurofuzzy Approach" where he demonstrated the advantage of a neuro-fuzzy architecture and highlighted its advantages for a hardware realisation. **Alessandro Rizzo**, presented a new type of Reaction-Diffusion Fuzzy Cellular Network, suitable to describe complex phenomena. **Christophe Giraud-Carrier** showed the use and effect of Baldwinian and Lamarckian evolution in the design of the hidden layer of an RBF network. In his presentation **Christer Carlsson** referred to the possible way to reduce the "bullwhip effect" - the phenomenon where orders to the supplier in a supply chain tend to have larger variance than sales to the buyer. He showed that the "bullwhip effect" can be reduced, if the members of the supply chain share information and agree on better fuzzy estimates (as time advances) on future sales.

In **Session II** **Andrea Tettamanzi**, presented a system capable of learning models expressed in the form of fuzzy rule bases from large data sets optimised by evolutionary algorithms. He described a practical use of this system in credit scoring. **George Paliouras**, showed two approaches for learning named-entity recognition rules from text: a) a decision-tree induction method and b) a multi-layered feed-forward neural network. He compared the performance of the two methods on a large English test text and presented the results. Session II was concluded with **Marc Thuillard's** paper dealing with the integration of genetic algorithms into multiresolution wavelet analysis.

Jens Strackeljan started **Session III** with his presentation stressing the fact that feature selection is crucial to applications that reduction of dimensionality is necessary. He proposed a concept for the automatic selection of features for a Neural Network classifier using a evolutionary strategy. **Ivan Kojadinovic**, addressed the problem of input variable selection in regression problems. He proposed an estimator of the mutual information of input data and showed how it can be used in combination with a genetic algorithm to perform input variable selection. In the presentation of **Peter van de Putten**, a data fusion procedure based on a nearest neighbor algorithm was presented, with a demonstration to a problem of identifying credit card holdership. Session III ended with the presentation of **Mariagrazia Dotoli**, describing a procedure where genetic algorithms were applied in the design of fuzzy sliding mode (FSM) controllers. In **Session IV** we had three presentations: First, **Mahdi Mahfouf** proposed to exploit neural network models in order to determine the optimal alloy composition and heat treatment temperatures required, while using genetic algorithms to find optimal model inputs given their constraints. **Ronald Westra**, described the application of fractal wavelet analysis and neurofuzzy classification techniques, in order to identify printing defects of printed decoration obtained by CCD-images. **Jan Jantzen** concluded Session IV by presenting example solutions using a neural network and a fuzzy model on the medical problem of Aphasia diagnosis. He proposed to enrich further the tools for diagnosis as the main purpose is to use the problem on the web for benchmark studies.

Session V was more dedicated to financial applications of Hybrid Systems and started with the presentation of **Georg Dorffner**, describing a framework for trading volatility of financial indexes using Markov models, fractal classification machines and neural network-based predictors. **Gerhard Paas** presented a Bayesian classification procedure using an ensemble of models which is representative for the distribution of model parameters. He applied his approach in a real-world credit-scoring task with encouraging results. **Athanasios Tsakonas**, proposed a decision support system for short-medium term prediction on financial time-series data from the Greek stockmarket. For acquiring his predictions he used wavelet filtering and a combination of neural networks and fuzzy rule based system.

The **Roadmap Session**, was comprised of two papers describing applications of CoIL techniques in business and technical field. **Martin Nelke**, showed how practically FCM can be used for customer segmentation. Based on these results, a decision tree model is used for database marketing of direct

marketing products. **Georgios Tselentis** presented the work undertaken by INTESA consortium (a group of 5 partners from UK, Germany and Italy) in order to exploit the power of Intelligent Technologies in the process and classification of odorous data. The purpose of the consortium is to build an electronic nose able to classify odours with a success similar to a human panel. At the end of the Roadmap Session **Georgios Tselentis** presented the purpose and the structure of CoIL Roadmap and using the previous two examples applications on Business and Technical Intelligence he showed how they can be modeled in a common framework the so-called Problem Solving Process.

Debate on Intelligent Technologies

In COIL2000 debate which was moderated by **Jan Jantzen**, **Georg Dorffner** presented the views of Neural Networks' community, **Christer Carlsson** from Fuzzy Systems and **Maarten van Someren** from Machine Learning on the following questions:

- 1.Are there any big achievements of the COIL approaches?
- 2.Can effective models be developed without differential equations or natural laws?
- 3.How does one validate the succes of a COIL approach to a problem?
- 4.Are there examples where one or more COIL approaches are doomed to fail?
- 5.If a funding body offered you a five year grant, what would you use it for?

Their answers are recorded and are available via anonymous FTP in <ftp.mitgmbh.de> (/pub/Coil2000/debate)

At the end of the Debate **Jim Bezdek**, concluded the Session and the Symposium by giving the second part of his talk on the consequences of CI in our lives.

Bus Trip and Traditional Night in Anavatos

Participants who registered to social events had the chance after the end of the Symposium to visit the old monastery of "Nea Moni", the traditional villages of Anavatos and Avgonyma and participate in a traditional Greek night dinner.

Related Meetings

23 June 2000, 9:20 h CoIL Steering Committee Meeting

General conclusion and assessment

A questionnaire was handed to the participants of COIL2000 in order to assess the event and its activities. The general impression is very positive and met the expectations of the participants (Annex 2). Most people are thinking to participate in similar future events (Annex 4) and found correct the price for what they got (Annex 3). Organisation in general was judged positively (Annex 5, 7) as well as the workshops (Annex 8,9). The background of participants can be found in Annexes 11,12,13 and 14.

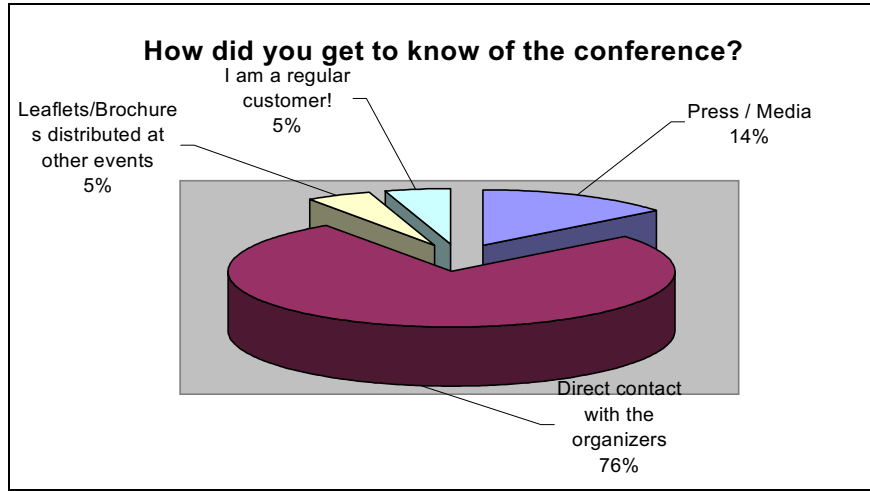
Georgios Tselentis

Annex

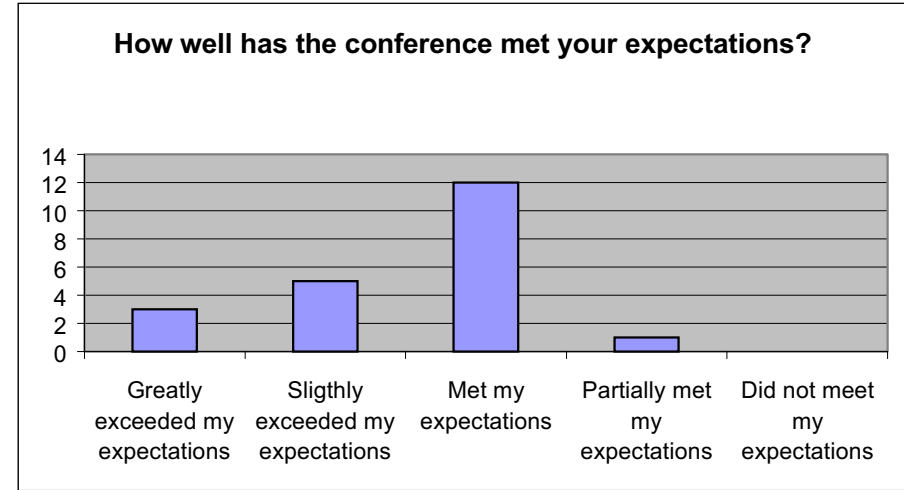
Results of questionnaire conducted at the end of COIL2000

I General

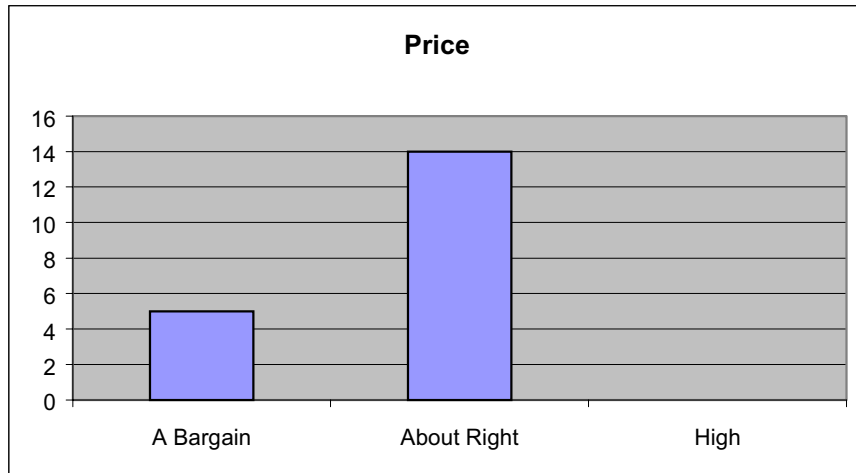
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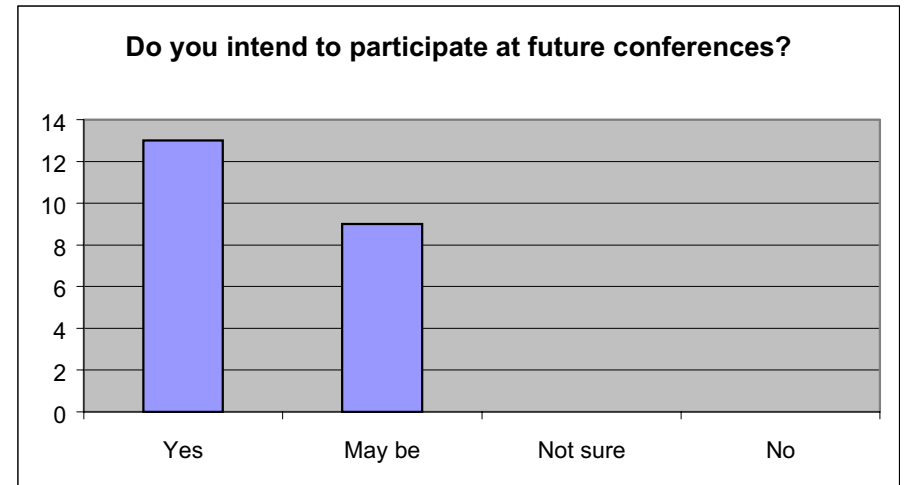
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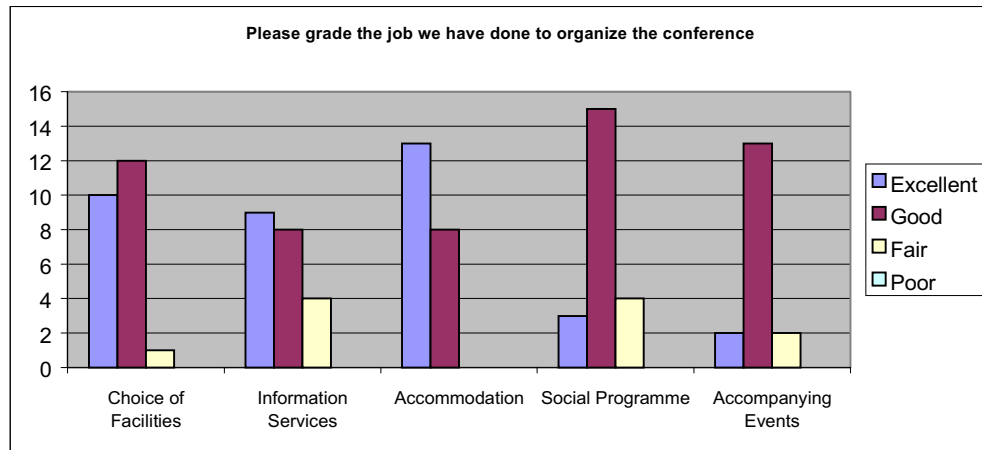


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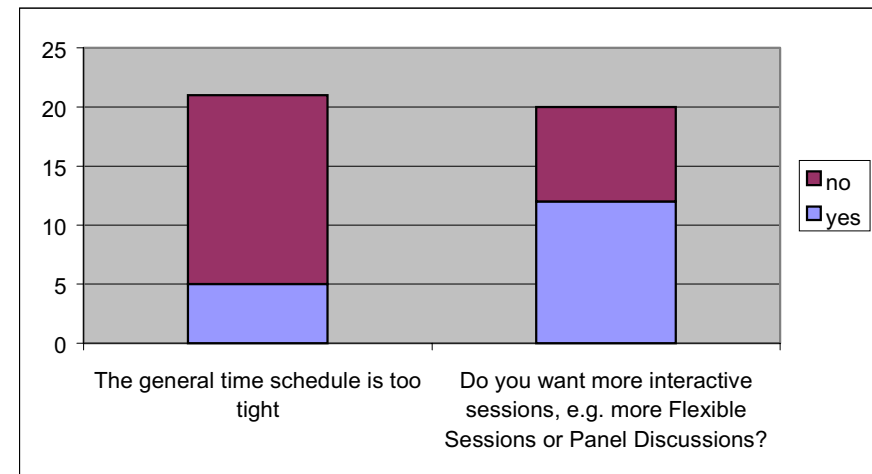
II Organisation

5.

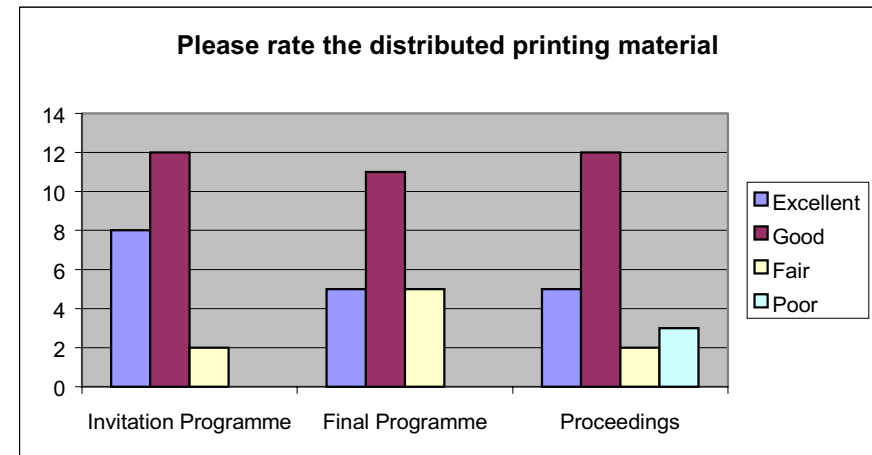


III Structure

6.

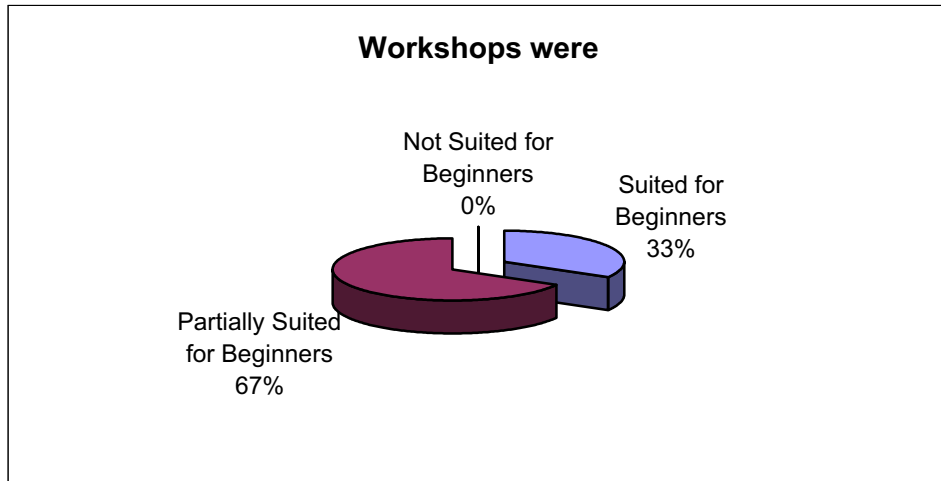


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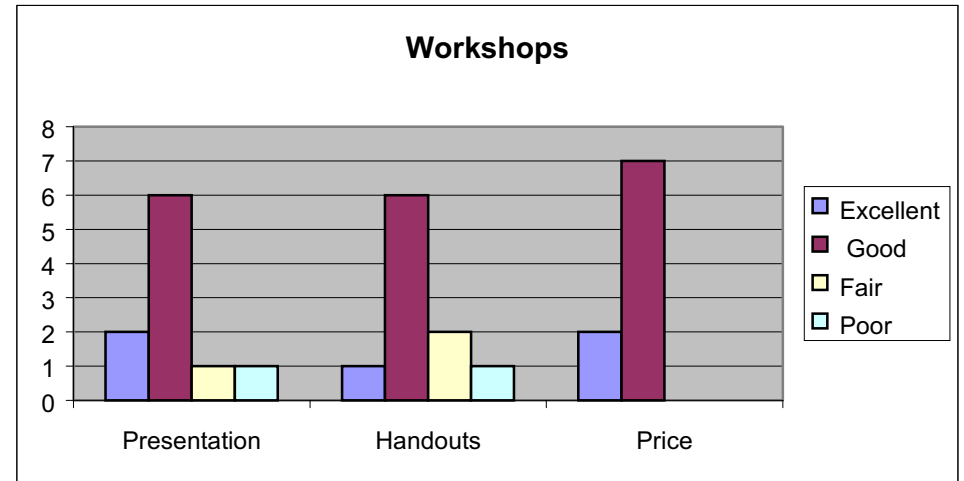


IV Workshops

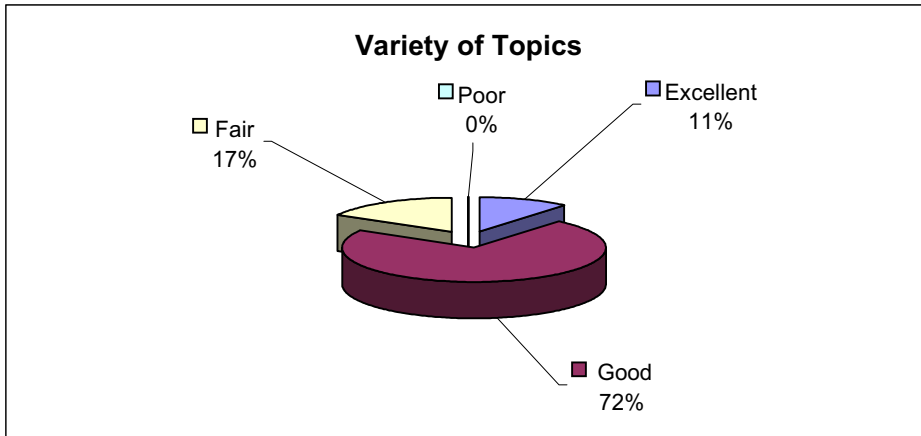
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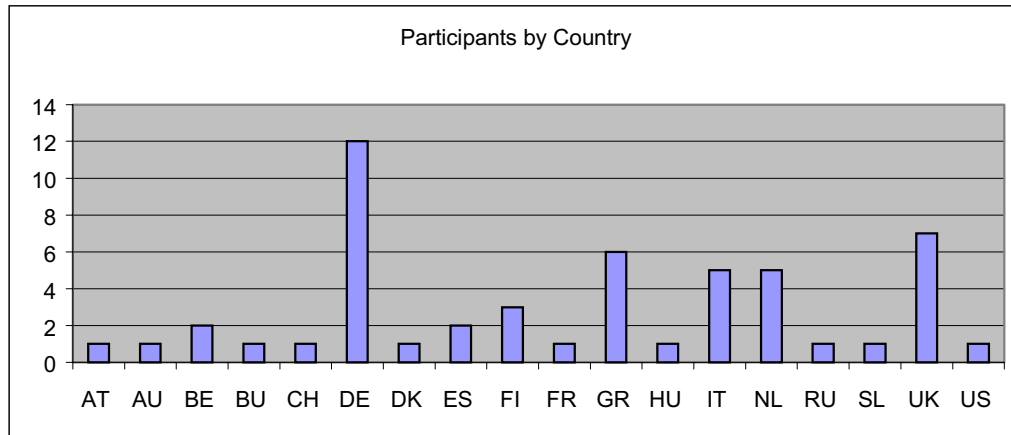


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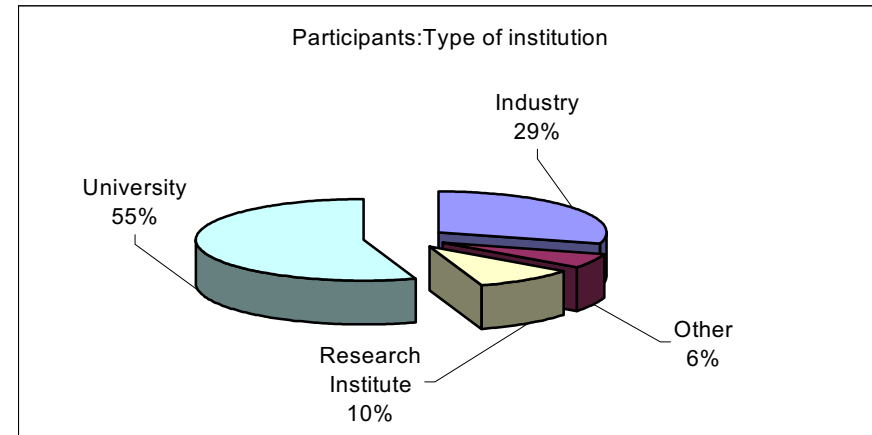


V Background information on participants

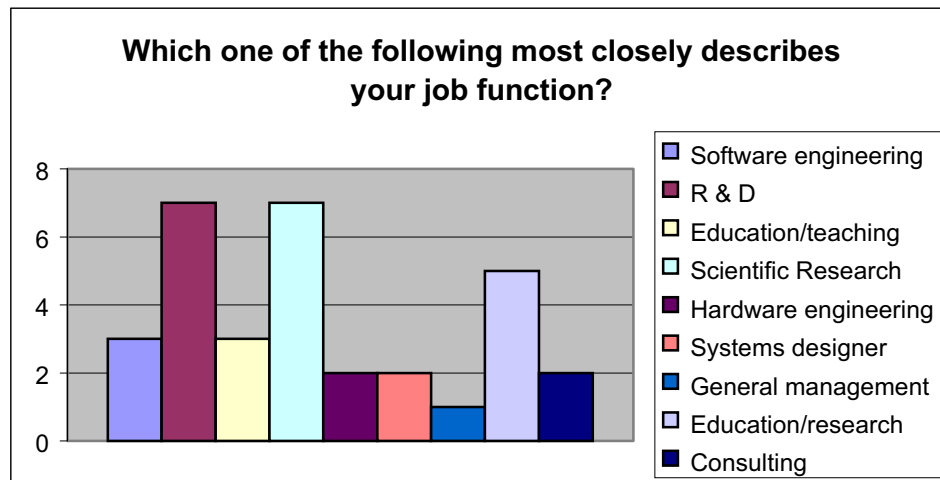
11.



12.



13.



14.

