Integrating undergraduate project based learning in computer science with COAST: A research network

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Project based learning has become a standard method of teaching at the University of Applied Sciences - Technikum Wien. In the Computer Science course, PBL supports the teaching process throughout the whole curriculum. The focus of the projects differs from year to year. In the first year of study basic skills in managing IT projects is the main focus. In the third year, many Computer Science students carry out complex projects, a complete phase of planning and documentation is also required. The total number of projects carried out per year is around 100. Much attention is paid to the process of project selection. If students can select projects themselves, they are very interested in the results; therefore the results usually are very good. Details are described elsewhere (Pucher et. al 2003).

Supervised project based learning (PBL) can be used to integrate even undergraduate teaching into large scale research networks. At the department of Computer Science at the University of Applied Sciences - Technikum Wien at the moment six undergraduate students are integrated into a large research project, a competence network for advanced speech technologies (COAST). COAST deals mainly with:

- Redevelopment, improvement and refinement of implemented algorithms for speech recognition in the fields of statistics, acoustics and signal processing and their application specific parametrisation.
- Application of - in combination with speech recognition - new techniques of semantic interpretation using artificial intelligence to improve recognition results and their usability.
- Application specific advancement and optimisation of the use of speech recognition, i.e. analysis of the question as to how speech recognition can optimally support concrete applications. The main focus here is on professional transcription of documents, messages, meetings and media mining. The network is, however, open to other further applications.
- Testing of possibilities to implement speech recognition in other applications.

The whole project structure is large, consisting of two universities, one research institution and six companies. Teaching of the students is integrated into the project “Robust”. In Robust two universities and two companies are working together in developing robust algorithms for speech recognition. More details are given in the poster presentation.

The six students are organised by a member of the faculty. The main task in the project is the labelling of audio files. It is important to know exactly what type of disturbance can be found on the files. For example a single speaker is saying something about medical records, while in the background doors are opened and closed. These labelled files are being used to test the recognition engines.

For undergraduate students this research project offers many possibilities over traditional PBL projects. The most important ones are:

- Being ingested into a network of universities allows students to get important contacts.
- Better understanding of the needs of research projects.
- Being part of a professionally managed project develops deeper insight and understanding into methods of project management.

One of the students is physically handicapped. Especially for this person, working on a real world research project is a huge motivation.

In general, from the students' point of view, such supervised research projects are very motivating. They feel that their work is important. It is not only to achieve a simple remark for a subject, but it is a possibility to use what they have learned in a real world environment. However for undergraduate students it is essential that they be coached by an experienced member of the faculty.

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