Integrating Undergraduate Students into large Research Projects for Teaching Purposes.

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Introduction

Since almost ten years project based learning is one of the standard methods of teaching at the University of Applied Sciences – Technikum Wien. The course of Computer Science PBL and the course of Business Informatics widely use this form of teaching throughout the whole curriculum, although 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)

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).

Research Network COAST

COAST is organized as a society ("Verein") with a consortium of the industrial and scientific partners. The network is open to further partners in the form of a co-operation (outside the existing project consortium). Such partnerships should raise knowledge transfer (concerning speech recognition) and opportunities for joint international projects

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 parametrization.
- 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 optimization 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 following figure shows the structure of the research network COAST.

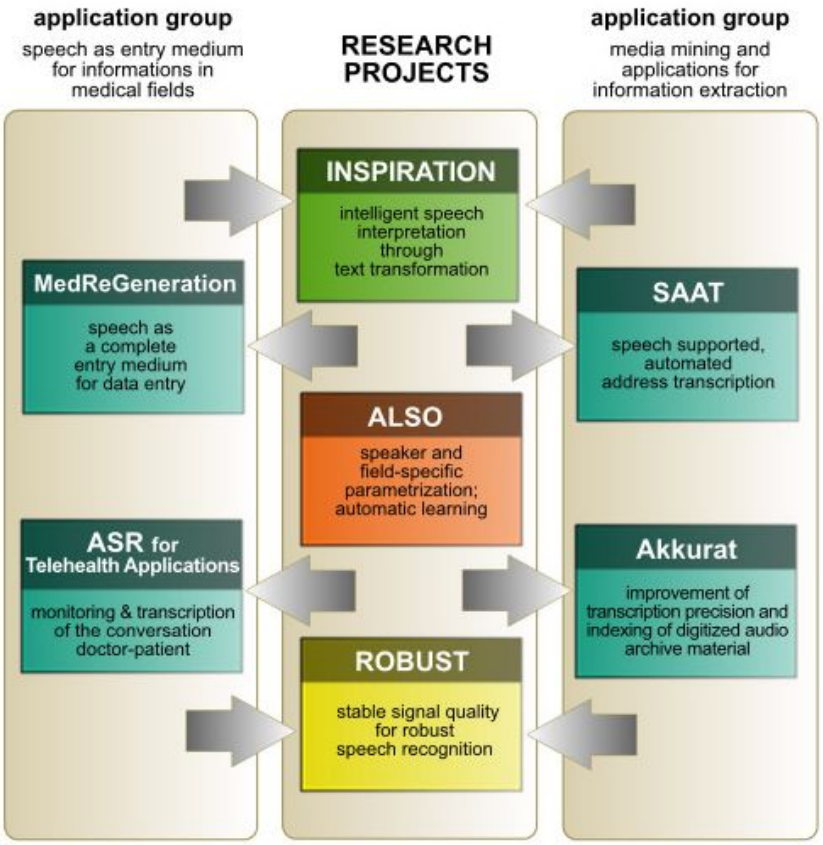

Figure 1: Structure of the Research Network COAST

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 in speech recognition. More details are available on http://www.coast.at .

Integrating Undergraduate Students

Six undergraduate Students work in the network. The six students are organized 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 allows to get 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, being coached by an experienced member of the faculty.

References

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