UNIVERZA V MARIBORU

FAKULTETA ZA ELEKTROTEHNIKO, RAČUNALNIŠTVO IN INFORMATIKO
Smetanova ulica 17, 2000 Maribor

Maribor, Slovenia, May 2008

TEMPUS JEP project

SLOVENIA – SERBIA EXPERT VISIT REPORT

Project number: JEP 41016-2006 (RS)

Authors:
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University of Maribor, Faculty of Electrical Engineering and Computer Science

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Executive Summary

This short report brings together the various aspects, contents and conclusions of the expert visit at the Faculty of Electrical Engineering and Computer Science, University of Maribor, which was held in Maribor from 26h May to 30th May 2008. The report includes a summary of the presentations that were given, the programme and materials that were prepared and distributed before the expert visit began. Furthermore, the report contains the updated participants list.

Workshop Preparation

THE PROGRAMME: INTRODUCTION

The programme for the expert visit was prepared by Matjaž Debevc and Sinja Leskovec, Faculty of Electrical Engineering and Computer Science, University of Maribor, in May 2008 (See Annex I for the final programme). This workshop was intended for the Serbian experts from Niš to experience eLearning, distance learning, learning of distance mechatronics control, visiting virtual distance laboratories, multimedia classroom, remote laboratories etc. All this with the objective of exchanging information, best practice experience and resources of the faculties of Maribor, Slovenia, and those in Serbia.

THE PARTICIPANTS

Six Serbian experts from Niš came to Maribor, Slovenia, to experience the above-mentioned subjects. These were:

- **Prof. Milena Stanković** – Professor at the Faculty of Electronic Engineering, University of Niš, Serbia.
- **Prof. Radomir Stanković** – Professor at the Faculty of Electronic Engineering, University of Niš, Serbia.
- **Prof. Dragan Janković** – Dean at the Faculty of Electronic Engineering, University of Niš, Serbia.
- **M. Sc. Dušan Vučković** – Researcher at the Faculty of Electronic Engineering, University of Niš, Serbia.
- **Martin Jovanović** – Researcher at the Faculty of Electronic Engineering, University of Niš, Serbia.

The list of participants is included in Annex II.

Seminar Report

MONDAY, 26th May 2008

Presentations

The meeting started at 9:00 with a short introduction by Primož Kosec, young researcher at UM FERI.

Presentation 7: Video filming system (Primož Kosec)

The vELAP system was presented by young researcher Primož Kosec. This system is intended for filming, transmitting and managing of the lectures in a simple and efficient way.
The system enables live and on demand transmission. The needs for post-production are non-existent because it is not automated. The added value of the sole system is in the support it gives to persons with special needs.
Thus, it is possible to co-operate at the lectures via the web page, no matter the user's disabilities.

TUESDAY, 27th May 2008

Visit of the University of Ljubljana.

WEDNESDAY, 28th May 2008

Presentations

The meeting started at 10:00 with a short introduction by Dr. Matjaž Debevc at the Faculty of Electrical Engineering and Computer Science. After that, the presentations followed.

Presentation 1: Remote control laboratories and Remote mechatronic course: Control of non-linear mechanism (Dr. Andreja Rojko)

This presentation contained an overview of "DSP-based Remote Control Laboratory" (http://remotelab.ro.feri.uni-mb.si) that was developed at the University of Maribor. Remote lab is based on two well-known, commercially available software packages, i.e. MATLAB/Simulink and LabVIEW, and a custom-made hardware, i.e. DSP based motion controller. The presented remote laboratory is used for the educational process at the University of Maribor, mainly in the field of automatic control. In addition to the remote laboratory presentation, a presentation of an overview of the existing remote laboratory solutions, precedences and weaknesses of remote laboratories, etc. was included.

In the second presentation, the experience with the use of remote laboratories were explained and presented. As an example, a mechatronics course which is used in local teaching process but is also available to the students from geographically distant contries has been presented. The organisation of the course and the web page for the course, as well as the adavantages and disadvantages of the application of remote experiments were discussed.

Presentation 2: Principles of distance learning and Human-Computer Interaction (Dr. Matjaž Debevc)

After wide overview on activities being held for deaf and hard of hearing people in Slovenia, the Ukrainian experts have been given a short insight into the activities which are being performed at the Faculty of Electrical Engineering and Computer Science in Maribor. Dr. Debevc has started with the presentation of the common problems in the distance learning and e-education of deaf and hard of hearing people. Furthermore, he has presented the way the course Human-Computer

Interaction is being implemented at UM FERI, Maribor, and explained the methods of teching this course that he is using.

Presentation 3: Learning of distance mechatronics control (Prof. Riko Šafarič)

In the presentation, the Virtual laboratory for teaching Control theory courses at the Faculty of Electrical Engineering and Computer Science, University of Maribor, Slovenia, has been presented. The MATLAB WEB server approach was shown. It allows the use of full MATLAB simulation tool, which is the basic tool for teching at our faculty, as a remote tool. Thus, the students do not need a licence to use MATLAB at home. They just need the Internet connection and Internet browser. Several already predefined applications done with WEBSISO application and also the e-homework system based on the WEBSISO application were presented.

The Serbian experts were also presented with the electrical bicycle and car which they had the chance to try out.

THURSDAY, 29th May 2008

Presentation

FBS Electronic, a Slovenian company, has presented its work on the Slovenian market. The presentation was held at the Faculty of Electrical Engineering and Computer Science, Maribor.

FRIDAY, 30th May 2008

Visit of the University of Graz.

Annex I: Meeting Agenda

Monday, 26th May 2008

9:00	Meeting at Hotel Bajt with Dr. Matjaž Debevc
9:00 – 12:30	Tour of UM Faculty of Electrical Engineering and Computer Science
13:00 – 15:00	Lunch at UM FERI with Dr. Matjaž Debevc and Primož Kosec, joung researcher
17:00 – 18:00	Visit of and wine tasting in the wine cellar Vinag (Phone no. in case of delay: +386 31 535 060 Maja)
In the evening	Dinner

Tuesday, 27th May 2008

	Visit of the University of Ljubljana

Wednesday, 28th May 2008

8:30	Meeting at UM FERI
9:00 – 13:00	Presentations of activities of various laboratories at UM FERI – 1st part
13:00 – 15:00	Lunch at UM FERI
15:00 – 16:00	Presentations of activities of various laboratories at UM FERI – 2nd part
evening	Free for sightseeing

Thursday, 29th February 2008

11:30	Meeting at UM FERI
12:00 – 14:00	Presentation of FBS ELEKTRONIK company's products (a company from Velenje)
14:00 – 15:00	Lunch
afternoon	Free for sightseeing in Maribor
18:00	Dinner at Pohorje

Friday, 30th May 2008

	Visit of the University of Graz.

Annex II: List of Participants

No.	Participant	Country	E-mail address
1	Milena Stanković	Serbia	milena.stankovic@elfak.ni.ac.yu
2	Radomir Stanković	Serbia	radomir.stankovic@elfak.ni.ac.yu
3	Dragan Janković	Serbia	dragan.jankovic@elfak.ni.ac.yu
4	Dušan Vučković	Serbia	dusan.vuckovic@elfak.ni.ac.yu
5	Martin Jovanović	Serbia	martin.jovanovic@elfak.ni.ac.yu

Annex III: Presentation Primož Kosec

SLOVENIAN RESEARCH AGENCY

UNIVERSITY OF MARIBOR
Faculty of Electrical Engineering and Computer Science

vELAP: video-based E-Lectures for All Participants

Matjaž Debevc, Primož Kosec, Boštjan Založnik, Dušan Klobasa, Janko Spasovski

Tempus Workshop, UM FERI, Maribor *12. February, '08*

Project CRP : Center znanja

Aims of the project

- To provide rich information for immersing deeper knowledge with the help of Information and communication technologies (ICTs)
- To design and implement a system for recording lectures in a simple and effective way

- To give students an on-line video-supported educational system, with live streaming and on-demand lectures
- To assure equal access of information to all students; persons with disabilities and person without disabilities

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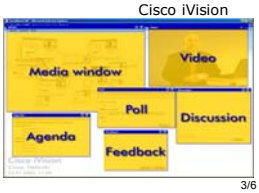
Commercial systems

Virage

HorizonWimba

Apreso

Cisco iVision



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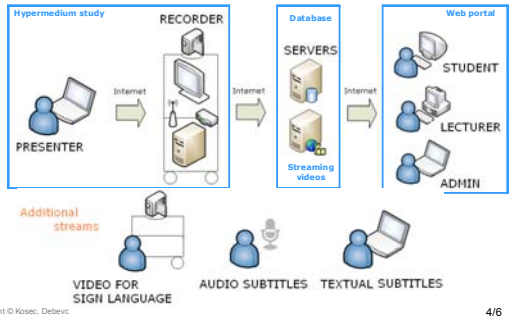
vELAP system

Webcasting idea:



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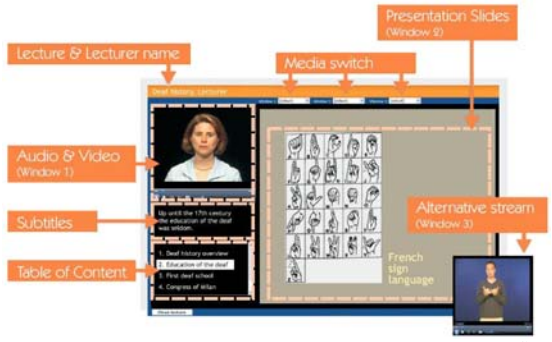
E-lecture

http://eqweb.uni-mb.si
Username: feri
Password: feriferi.



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Features overview

BASIC FEATURES:

- Presentation slides
- Video and audio
- Table of contents
- Automated video recording (no need for post-production)
- Live or on-demand mode
- Animation support

ADDED VALUE:

- inclusion of additional streaming materials (video, audio, screen capturing)
- simultaneosly streaming of multiple videos
- accessibility options for persons with disabilities:

- colour schema adjustability
- live subtitling
- video navigation for visually impaired persons (JAWS)

- user-view customization and switching of presented media in different web parts

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Annex IV: Presentation Andreja Rojko

Andreja Rojko, Darko Hercog

Remote mechatronics course:
Control of nonlinear mechanism

Contents:

- Introduction
- Educational objectives
- Web page and documentation
- Educational strategy for remote students
- Educational strategy for local students
- Conclusion

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Introduction

Course is designed for:
- Geographically distant students from 11 countries (EDIPE "E-learning Distance Interactive Practical Education" project),
- for improvement of local education process,
- for foreign students who are taking courses at our faculty.

Goals:
- To build Web based course interesting for wide range of engineering students.
- To offer complete learning experience including theory and practice.
- To enable autonomous work to the students with diverse knowledge backgrounds and different problem solving approaches and to minimize necessary time for collaboration with tutor (for remote students).
- Course structure should preferably be flexible so that local and geographically distant teachers can adapt it to their needs

Educational objectives

- Modeling of mechatronics device with highly nonlinear dynamics.
- Design and application of linear motion controllers (cascade of PI current controller, PI velocity controller and P position controller) to the motion control of the nonlinear device.
- Design and application of model based nonlinear motion controller (computed torque position controller) for motion control of the nonlinear device.
- Understanding of discrepancy between applicability of the linear and nonlinear control methods.

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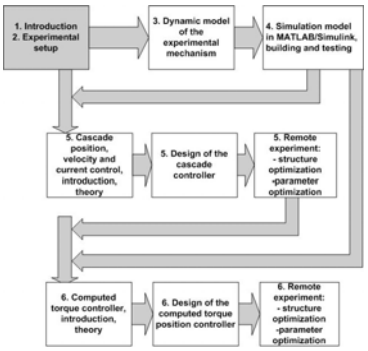

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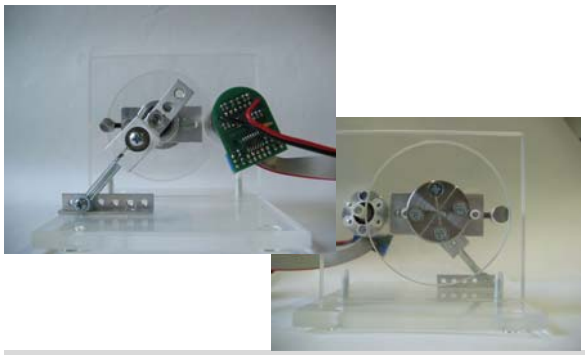
Course is suitable for students with preliminary knowledge:
- introductory course in mechanics (comparable to the BSc Electrical Engineering level),
- introductory course in linear algebra (comparable to the BSc Electrical Engineering level),
- physics course (secondary school level),
- modeling of the dynamic systems (comparable to the BSc Electrical Engineering level),
- introductory course in linear control theory (BSc Electrical Engineering level),
- basics of MATLAB/Simulink.



Web page and documentation

Moodle based Web page:

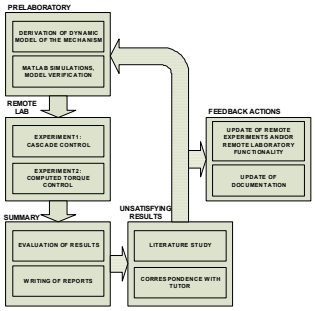
- Basic information for students and teachers: educational objectives, assumed entrance competencies, description of course structure, required time.
- Documentation for students and teachers (with results).
- Link to booking system and remote experiments.

Documentation

- Separate documentation for students and teachers.
- Includes theoretical background, literature, necessary derivations, assignment, results expected in report.
- Interactive materials in preparation.

Educational strategy for remote students

- The course can be adapted according to the teachers' needs.
- It is possible to apply only some modules or use remote experiments as an example shown within local lectures.
- The course can be also given to the students for their autonomous work (seminary work).



Educational strategy for local students

- The students must first attend the lectures.
- For laboratory sessions, two options are available:
  - The students with weak knowledge are advised to attend conventional laboratory sessions. After the sessions the students also execute remote experiment to obtain their individual results.
  - Better students can, according to their wish, also proceed with the remote execution of the laboratory exercises.
- Writing of reports and oral defense of laboratory exercises.

Conclusion

- Continuous improvement of the course (contents, technical solutions, course documentation) is based on the feedback information provided from the students.
- The course, especially remote experiments can be benefit in the case of large number of the students and limited quantity of the available experimental equipment, but still can not replace real laboratory experience.

Annex V: Presentation Matjaž Debevc

Designing and Implementation of E-Learning Materials - Some Practical Experiences

Matjaž Debevc

Faculty of Electical Engineering and Computer Science
University of Maribor
Slovenia

Course HCI

- course Human-Machine Communication in Moodle (5 ECTS)
- Mostly theoretical
- multidisciplinary

- ADDIE model (Analysis, Design, Development, Implementation, Evaluation)

- Participants:
  - teacher: author of e-learning materials, tutor and administrator in one person
  - students
  - Experts from other countries
  - Main administrator
  - Assistant for experiments

Running the course

- First two days: face-to-face (16 hours) with PowerPoints
  Students get book, copies of PowerPoint slides and CD with tools for experiments
- Rest: e-learning (the course was divided into two weeks phases (together 6 phases)
  - E-learning materials for self-study
    - E-materials
    - Scientific papers
  - Exercises, tasks and project
  - Discussion in forums

Student activity

Table 1. Student activities

Step	Activity	nlc	Duration (hours)
1	Reading relevant slides	n	4-6
2	E-material reading	n	
3	Answering abc questions in e-material	n	
4	Reading the book	n	
5	Reading additional scientific material	n	
6	Search for examples, adding own contribution to the discussion forum	c	4-6
7	Reading answering school mate's answers	n	
8	Reading exercise, task solving and end report writing	C	6-8
9	Completion of current project work and report writing	c	8-10
10	Answers to exam preparation	n	2

Phase:
from 24 till 32 hours

All: 150 hours:
5 ECTS

Interactive e-learning material

- e-learning material is a support and not a change for the book
- E-learning material should include animations, simulations and video
- structure of e-learning material
  - Length: up to two web pages
  - One to two figures
  - One to two examples (as pop-up window)
  - Question with answer (as pop-up window)
  - Questions for self-testing

Annex VI: Presentation Riko Šafarič

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Riko Šafarič, Darko Hercog, Andreja Rojko

Control theory E-learning

Maribor, february 2008

Virtual Lab: Riko Šafarič
Remote Lab: Darko Hercog
Educational issues: Andreja Rojko

E-learning definition

- The e-learning could be defined as a special kind of an educational work, where a teacher and a student are separated in a time and in a space.
- The students prepares themselves by help of an e-educational material.

ADVANTAGES OF THE E-LEARNING

- Lower costs for educational institutions.
- Lower costs for the student.
- Learning from everywhere and anytime.

DISADVANTAGES OF THE E-LEARNING

- An e-learning system is never better than a good teacher.
- Motivation done by e-learning system is lower than by a human teacher.
- It decrease ability of the students for team work.

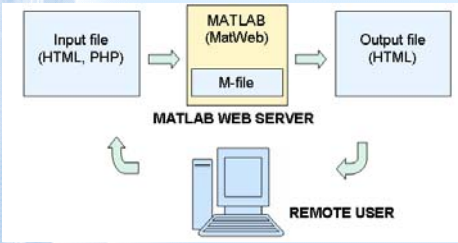
What we need to start e-learning?

- E-learning material
- Virtual lab
- Remote lab
- Knowledge, how to do it
- The maintenance team

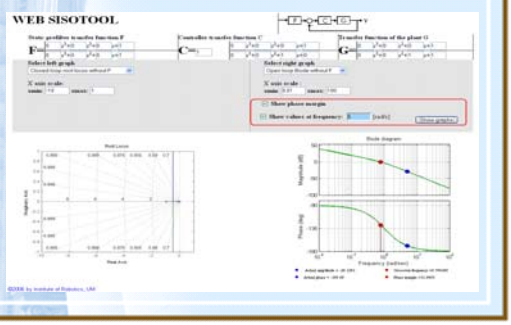
What are virtual and remote labs?

- A virtual lab is remotely operated lab for simulated experiments.
- A remote lab is remotely operated lab for real experiments.

Basic architecture of MATLAB WEB server application



WebSISO application



E-homework