Practicum HS 2014

Interaction, Collaboration and Virtual Reality
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Course objectives

In this course, the students learn the effect of computing and information technology on industry; from helping international companies to hold international, long distance meetings, to introducing new manufacturing processes. They will learn some introductory theory about Interaction, Communication and Virtual Reality (ICVR), and will be given small tasks to familiarize themselves with these concepts and technologies.

Course Content

As a 4-hour practicum, the course can only cover the basics. The following topics will be discussed:

Role of Computing in Industry 4.0

What makes computers such powerful tools in industry? What is the role of digital networks in industry? Where does interaction and virtual reality come in?

Interaction

• Theory
  How people interact with computers, how it evolved in the past, and how the future looks like. Here, the students will learn about familiar interfaces, such as monitors, keyboard and mouse, as well as more sophisticated, modern Natural User Interfaces, such as Kinect, Leap Motion, as well as touch screens and interactive displays.

• Practice
  Work with a Leap Motion based application to perform a simple task
Collaboration and Communication

- **Theory**
  How do computers communicate? What is the advantage of digital networks over analogue ones? What is Mobile Computing? What is the contribution of these technologies to human collaboration? What are pros and cons of such technologies?

- **Practice**
  Accomplish a collaborative task using video conferencing and interactive displays.

Virtual Reality

- **Theory**
  What is virtual reality? How does it contribute to the industry? What technologies are used to realize VR applications?

- **Demonstration**
  Demonstration of a virtual reality application, by showing videos of such applications.

Tasks

Students will perform three different tasks, in order to get familiar with concepts and tools introduced during the course. Here is a small description of these tasks.

**Task I**

**Preparation**

The students should be divided in two groups (groups A and B), sitting in different rooms. The groups should run Skype in voice call mode (with no video). A finished LEGO model is given to group A, and a 64-character passkey is given to group B. A set of LEGO parts required for duplicating the model should be handed to group B.

**Description**

They should perform the following tasks, in order.
• Group B should read the passkey to group A, and group A should write it down (1 minute)
• Group A should instruct group B to duplicate the model. All the required parts are given to group B (9 minutes)

Goal
Familiarizing students with audio communication and its limitations.

Duration
10 minutes

Task II

Preparation
The students should be divided in two groups (groups A and B), sitting in different rooms. Two colored image should be given to group B, and the same images, but uncolored, should be given to group A. Group B should have a LEAP motion connected to their computer. The groups should run Skype in video call mode.

Description
Group B should instruct group A to paint the images. The images are colored using basic colors, so that there is no confusion regarding the colors’ names. The task should be performed twice. Once using Skype video call (with first set of images), and once using Pointing gesture communication software and Skype video call (with second set of images). The instructor should measure the completion time of each run.

Goal
To show students how communicating non-verbal communication elements can help in accomplishing a collaborative task, and why video conferencing is not always enough.
Duration

20 minutes

Task III

Preparation

The students should be divided in two groups (groups A and B), sitting in different rooms. The groups should run Skype in video call mode, as well as SMART Notebook and Bridgit.

Description

Each group should come up with some new ideas for a future vending machine (10 minutes). They should present their ideas to the other group, using Bridgit, SMART Notebook and Skype, and the other group should provide them with solutions (designs) to realize their ideas (15 minutes). Afterwards, they will perform this task again, with the role of the groups being switched (15 minutes)

Goal

The students will learn how to use interactive white boards, how to work remotely, what problems they will face when working with remote groups.
Duration

40 minutes

Agenda

13:15 – 13:20 Introduction to the course
13:20 – 13:50 Computing and industry
13:50 – 14:10 Communication (Theory)
14:10 – 14:20 Task I
14:20 – 14:50 Interaction (Theory)
14:50 – 15:00 Pause
15:00 – 15:20 Virtual Reality (Theory and demo)
15:20 – 15:40 Task II
15:40 – 16:20 Examples of ICVR and the ongoing projects in the institute and other research groups
16:20 – 17:00 Task III