Context-aware Smart Object

Anna Maria Janaszkiewicz, 1111368

Hannes Harms, 1111817

Jana Valauskaitė, 1111819

Toomas Juht, 1111825

EPS@ISEP – European Project Semester at ISEP Spring 2012

isep Instituto Superior de Engenharia do Porto

Contents

- Introduction
- Problem
- Objectives
- State of the Art
- Development
- Information flow from the sensors to the PC
- Programming
- Marketing
- Eco-efficentcy
- Conclusion
- References & Bibliography

Introduction

Our group decided to construct a smart object for an interaction a virtual environment.

- The main purpose of the object is a professional use for CAD-program.
- The second use could be as an intuitive game controller.

Problem

User still holds his hand on the mouse and moves it on table, because he has only 2D movement freedom in x- and y-axis.

Objectives

Our objectives are:

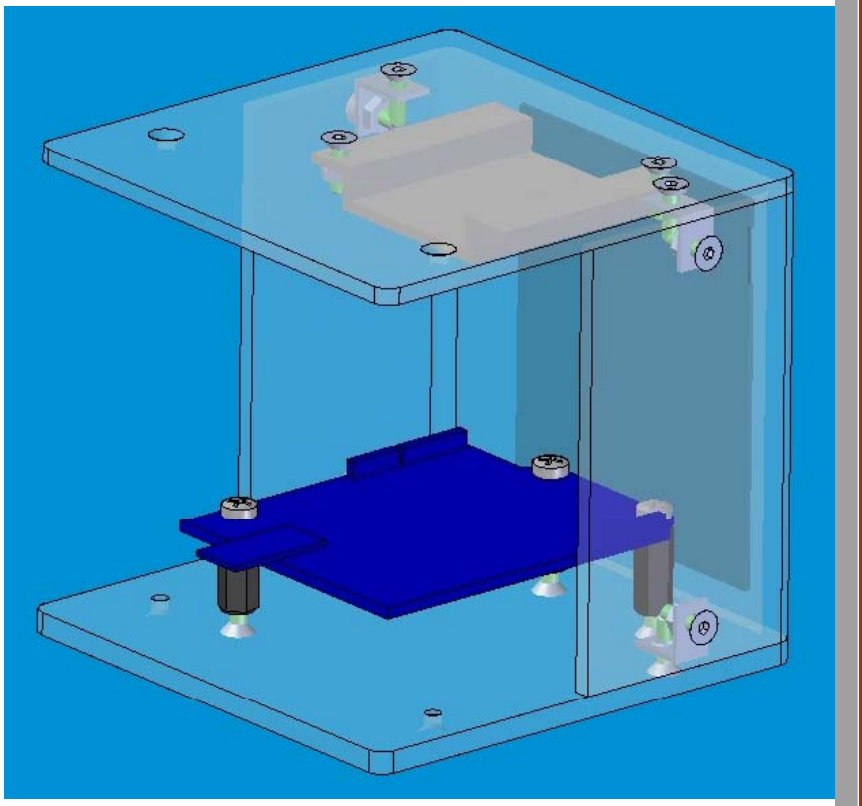
- To build a wireless interface for computer users.
- To give them ability to turn, rotate, zoom in and out when modeling an object in CAD- programs.

State of the Art

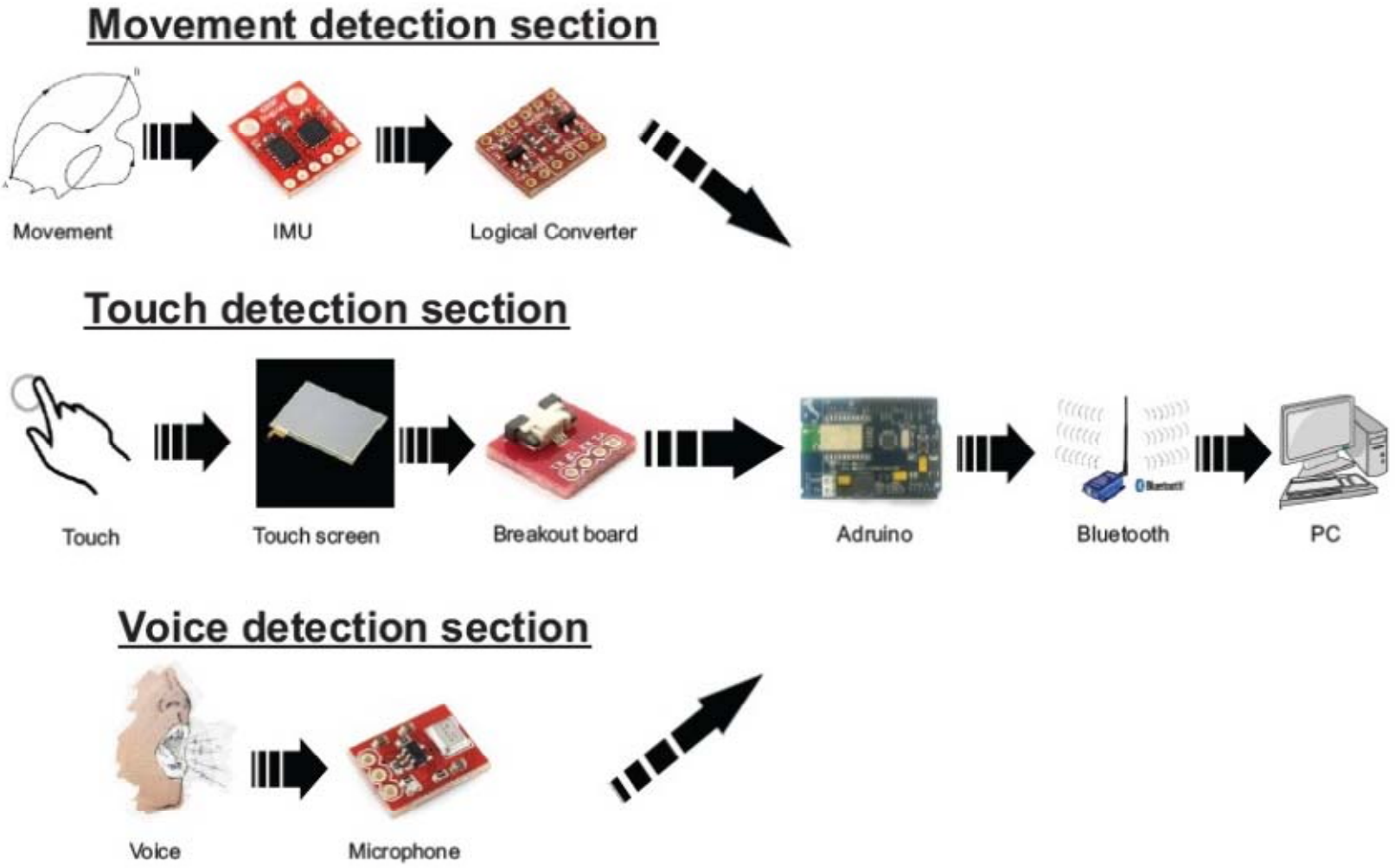
- **Microcontroller**
  - Arduino
- **Sensors**
  - IMU
  - Touch Screen
- **Power supply**
  - Lithium-ion polymer battery- LiPo battery
  - Solar panels
- **Wireless data connection**
  - Bluetooth

Development

- acrylic glass
- parts are inside
- except the touch screen.



Information flow from the sensors to the PC



Programming

Programming the SO:

Task:

- reading the data of the IMU over I^2C
- reading the coordinates from the touch pad (analog inputs)
- Reading the microphone values (analog input)
- Transferring all data via Bluetooth (using the SPP Profile)

Programming

Programming on the PC

Language: JAVA

Task:

- creating the object
- setting up the Bluetooth connection
- reading the incoming data
- Updating the visualization of the object in each step

Programming

object visualization:

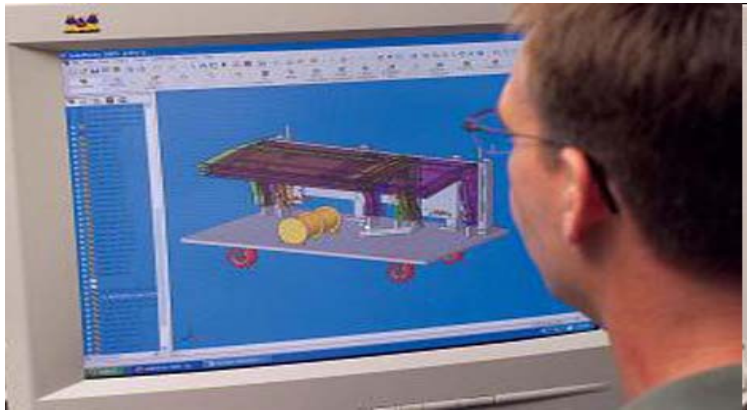
- OpenGL Engine
- rotation by changing the angles, translation by changing position
- zoom by changing the view port of the „player“

Marketing

The marketing plan is very important to sell our product successfully. It is important to concentrate on meeting the needs of our customers, therefore we included company's internal environment, suppliers, marketing intermediaries, customers, competitions, publics in market's micro in macro environment analysis.

Market segmentation

- Designers, architects, engineers.



- Young people, who use computers or mobile phones to play games.

Marketing MIX

1. Product / customer
2. Price / cost
3. Promotion / communication
4. Place / convenient

Eco-efficiency Measures for Sustainability

- **Design of the product**
  - we can't use renewable materials
  - we try to use materials that are recyclable.
    - acrylic glass/ABS-plastic
    - silicon
    - metals
    - thermoplastics

Packing, recycling and transporting

- recyclable materials
- from carton
- special bracket
- logistic company
  - more sustainable
  - cars/ trucks full of different packages to the same area.

Conclusion

We talked about:

- the problem that we see on the market of computer interfaces.
- parts we are planning to use
- how we are going market it
- Sustainability

References & Bibliography

- Java OpenGL Engine (April, 2012) http://jmonkeyengine.com/.
- Wikipedia, Computer mouse (April, 2012)http://en.wikipedia.org/wiki/Mouse_(computing)
- ITG-3200 Integrated Triple-Axis Digital-Output Gyroscope;(April,2012) http://invensense.com/mems/gyro/itg3200.htm
- Wikipedia,Wifi (April, 2012): http://en.wikipedia.org/wiki/Wi-Fi
- Wikipedia,Bluetooth (April, 2012): http://en.wikipedia.org/wiki/ Bluetooth
- 3D mouse (April, 2012): http://www.3dconnexion.com/products/what-is-a-3d-mouse.html
- JMonkey Engine(April, 2012): http://jmonkeyengine.com/
- 3DConnexion (April, 2012): http://www.3dconnexion.de/nc/videos.html

Do you have any questions??