

Teaching robotics and embedded systems as a learning chain of different subjects

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MOTIVATION

- Students are **not interested** in learning mere **theory**
 - The formulas are **not seen necessary** nor linked to their study area or future job
- Theory that is not used will be **forgotten** quickly. In a few years students won't even remember if a specific topic was covered or not.

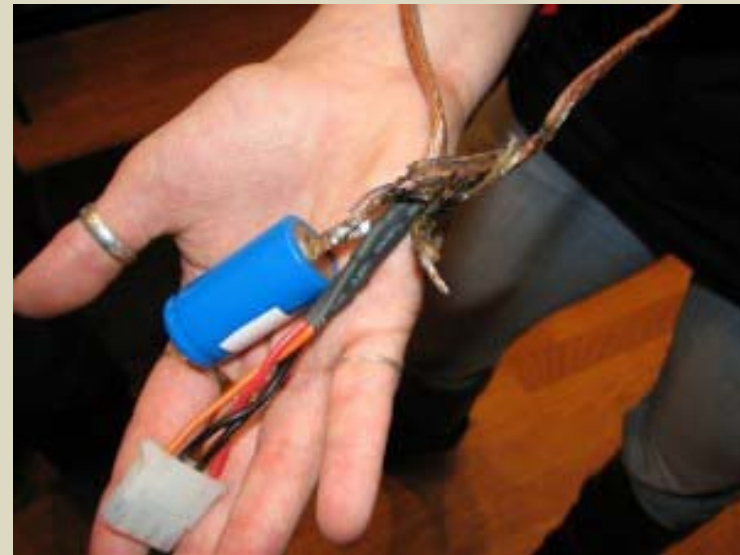
Motivation

- **Interest** towards technical and natural sciences **is not high** enough which can be seen in the applicants' motivation.
- There are not enough applicants to fulfill available student places in technical and natural sciences.
 - Many people opt for ICT specialty because they can count on getting a job that pays well but they won't have enough inner motivation to get to know the given area.

Ideas

Learning has to be **playful**, fun and interesting

Have students do **practical work**, measure, solder, and assemble robotics kits.



Ideas

Involve more experienced students in teaching of others, using Web2.0 means such as **weblogs, forums, wikis**, etc.

The tasks students are going to solve have to be **associated** with the **practical applicability** of the theoretical knowledge.

Mathematically formulated problems should be avoided letting students discover the task formalism by themselves.



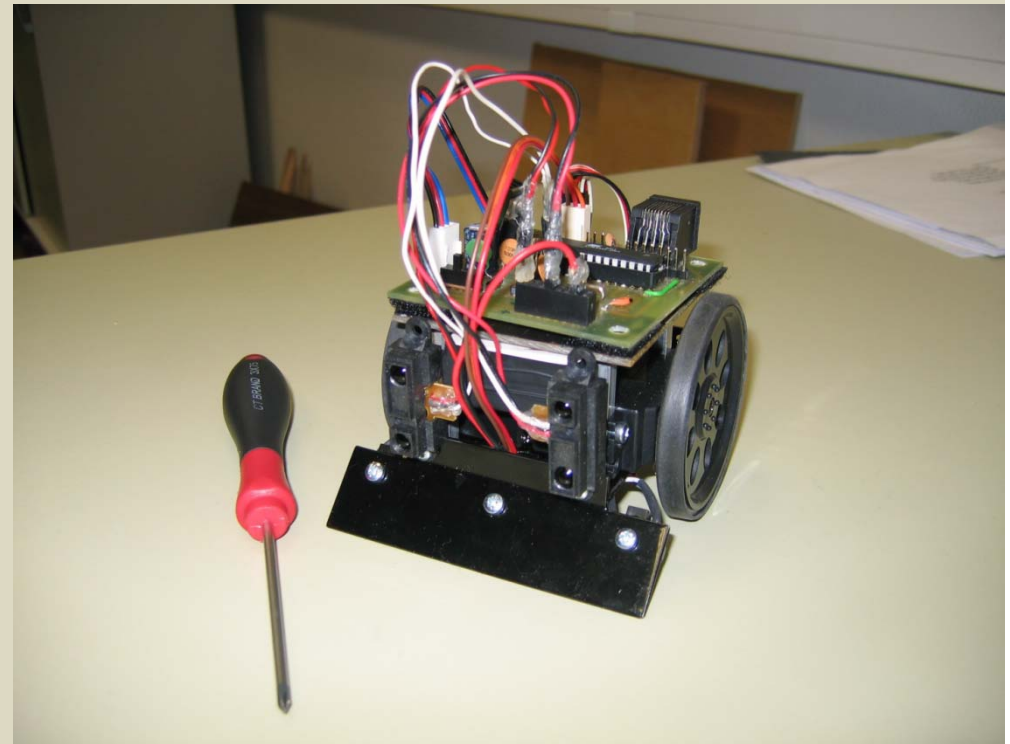
Ideas

- In order to increase pupils' interest toward technology, **involve pupils** of basic and secondary schools.
- Ask university students to help in running of workshops and classes of robotics.

SumoRobots

- Easy to program
- Playful
- Competition moment
- For children
- Sample program

```
forward();  
sleep(1000);  
left();  
sleep(1000);
```



RoboCode

- Robocode was created to **teach Java** programming language in a playful way.
- It is **open-source** software that is feasible even for a learner who does not know how to program.

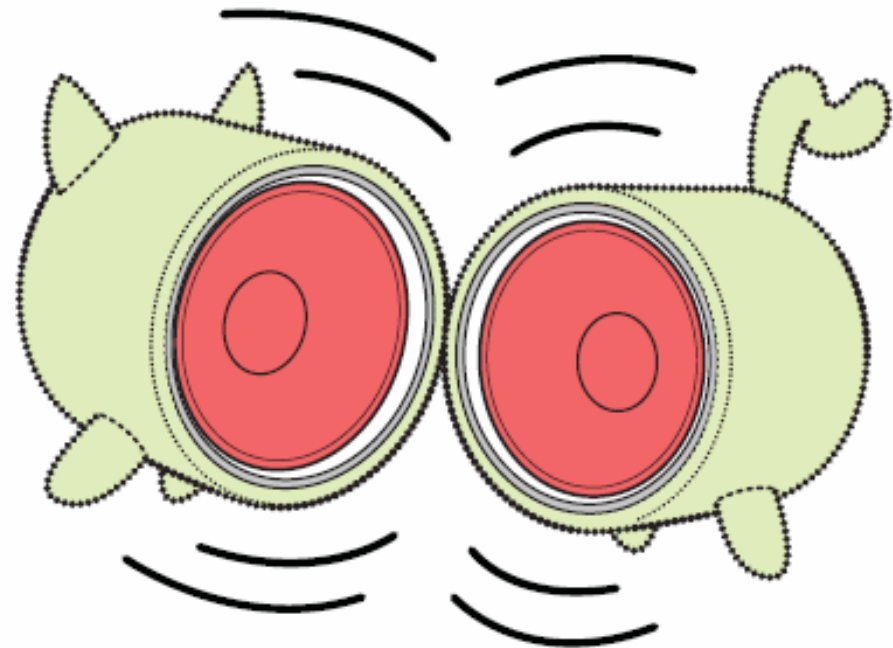


Project Smart Products

- The goal of the project is to develop on base of synergy between Estonian Art Academy and Estonian IT College specialties a joint educational and research domain.
- Partners:
 - Estonian Art Academy
 - Estonian IT college

Trum and Cat

Hearing impaired people like music



Smart systems, with or without microcontroller-motors



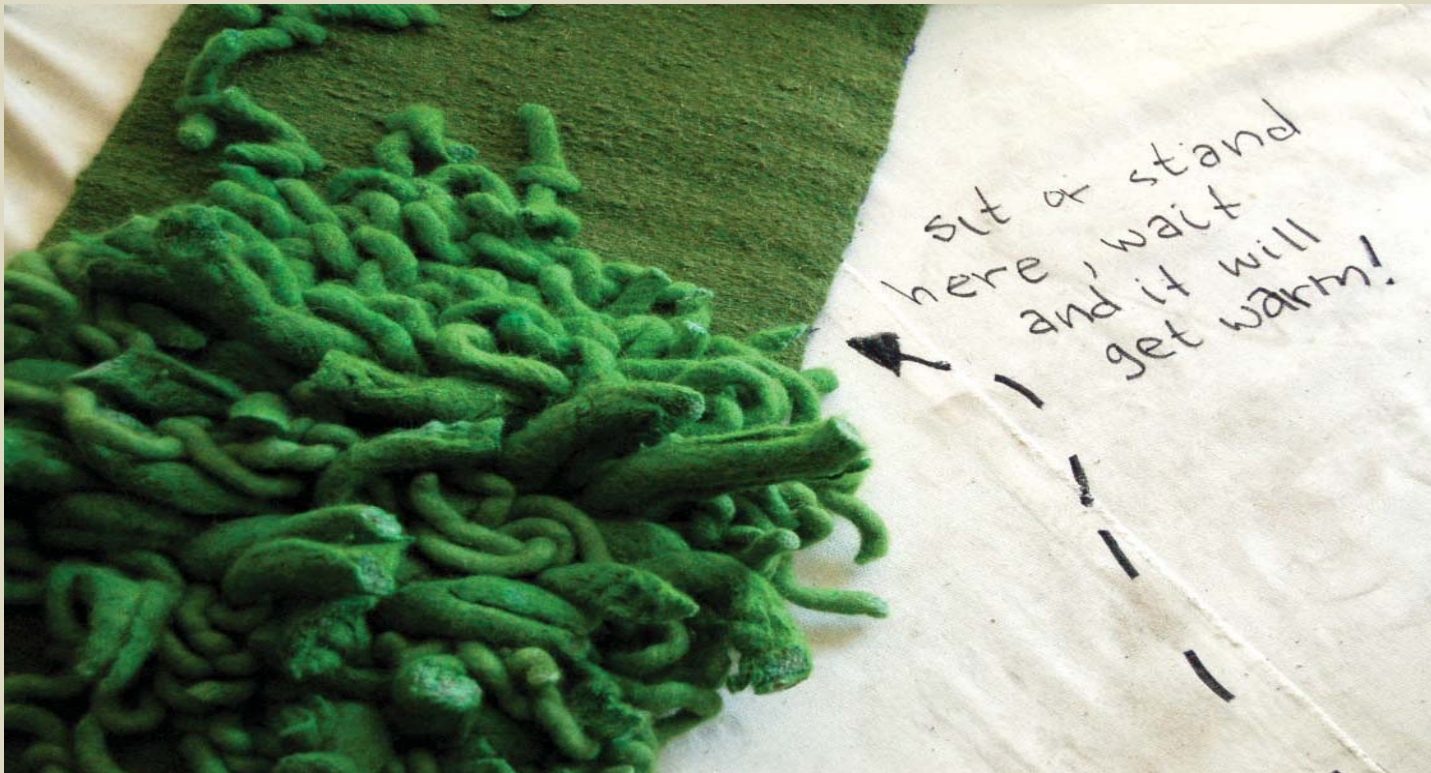
light sensitive curtain

Some ideas are too complicated for students



polyglot - translator

Some ideas are too simple



lawn rug

Art students can solder like ICT students. They are motivated



Web2.0

- Subject blog and wiki, content of which is developed and controlled by students themselves, encourages cooperation, is reducing teacher's load and keeps away boredom that so often emerges in theoretical lectures.
- **FreeMind** software is useful to give systematic view of subject.

Futurer work

- Our main goal is to **educate subject teachers** to recognize robotics and programming opportunities to enrich their own subject letting students to demonstrate usage of equations and rules on sumo-robot platforms or simulated tank combat sessions.

Using robotics

Children, basic and secondary school

ITC students

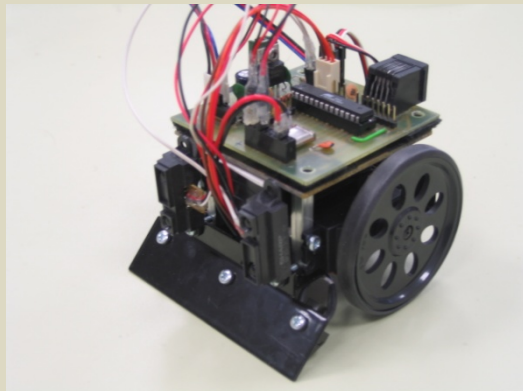
Students of other fields

Lectors

Workshops

Learning robotics and programming basics

Projects



CONCLUSION

- Robotics and embedded systems can be used to make studies more interesting both for students in different fields, for children and tutors.
- Since robotics is an interdisciplinary field covering different subjects areas, it can be used as glue to create a link between different courses over curriculum.
- Cooperation of curricula tutors is a key factor to achieve results and link curricula subjects.

Thank You

