Exploring science with low cost social robots

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Agenda

Social robots for education
Learning programming with robots
Learning science with robots
Exploring science with robots
Social robots for education: The road ahead
Other issues
Discussion
Social robots for education: Context

- Education: 19th century system, 20th century teachers, 21st century children
- New educational needs: More creative, critical minds for a digital world
- Multiple intelligences
- Learn through playing, be surprised, feel emotions

- Less interest in science and engineering
- High demand in science and engineering jobs

- ICT advances
  - Robotics
  - Analytics
  - Artificial Intelligence
  - Cheap(er) hardware
Social robots for education: Context

• **Structure**
  – Sensors: USB Camera, Microphone, Touch, Accelerometer
  – Actuators: Wheels, Moves parts of body, Voice, Screen, Chest with colours
  – Communication: HDMI, 3USB, Ethernet, WiFi
  – Raspberry Pi

• **Actions**
  – Listen and speak (SP,FR,EN,CAT), Converse
  – Makes decisions, learns
  – Emotional touch!!!
  – Move
  – Vision, Recognition (Face, QRs,...)

• **Programmable**
  – Scratch, Blockly
  – SDK in Python

• **Low cost**
Social robots for education: Context

<table>
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<tr>
<th>Product</th>
<th>Robotics</th>
<th>AI/Emotional Intelligence</th>
<th>Magical/Imaginative</th>
<th>Natural Language Interaction</th>
<th>Personalised learning strategy</th>
<th>Connected School-Home</th>
<th>Content Library</th>
<th>Accessories</th>
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Agenda

Social robots for education

**Learning Programming with robots**

Learning science with robots

Exploring science with robots

Social robots for education: vision

Other issues

Discussion
Programming with robots

- Scratch
- Blockly
- SDK
Programming with robots

- Program your play
- The robot as domotic hub

Results of improvement of the capacity of understanding, reasoning and problem solving
Agenda

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Programming with robots

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• (Affective) Math Academy
Agenda

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Game of colours
- Educational stage, Objectives, Competences, Learning standards, Didactical resources, Timing, Suggestions, Evaluation
- 30+ Game activities

Game of geometry
Exploring science with robots

- Understanding the concept of velocity
- Geometry concepts
- Probability concepts
- Newton laws
- Game theoretic concepts
- ....
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• Low cost. Important for CESAME centers!!!

350 € → 250€  School version
150 €  Family version
Agenda

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Other issues
Discussion
Other issues

• The gender issue
  – Our experience

• Children with special needs
  – ASD. Our hypothesis
Agenda

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Social robots for education: vision
Other issues

Discussion
Discussion

• Social robotics and AI
• Not just to learn technology, but to learn and explore science (and other subjects) in a fun way
• The affective bond
• Teaching assistants
• Mentor at home
• Low cost
Thanks!!

Collaborations welcome!!!

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