Social Robots and Applications in Special Education

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1. Special Education

Special Education concerns at least 10% of the world's children; i.e., children with autism, dyslexia, dyscalculia etc.

Typically, in Special Education (human) teachers are employed for personal treatment.

Lately, Social Robots (including NAO by Aldebaran) are employed effectively in Special Education.

2. Social Robots Examples

- Jibo: video "Jibo.mp4"
- Pepper: video "Pepper.mp4"
- NAO: video "NAO.mp4"

3. Economic Perspectives

The development of social robot and supportive technologies applications in Special Education is a production with the following features:

- High added value.
- Multidisciplinary.
- The end-product concerns a substantial percentage (>10%) of the human population, worldwide.

4. Our Software

We pursue a multi-disciplinary collaboration of Special Education teachers, psychologists and other specialties with engineers to develop innovative applications.

We use Social Robots as tools/assistants to human teachers.

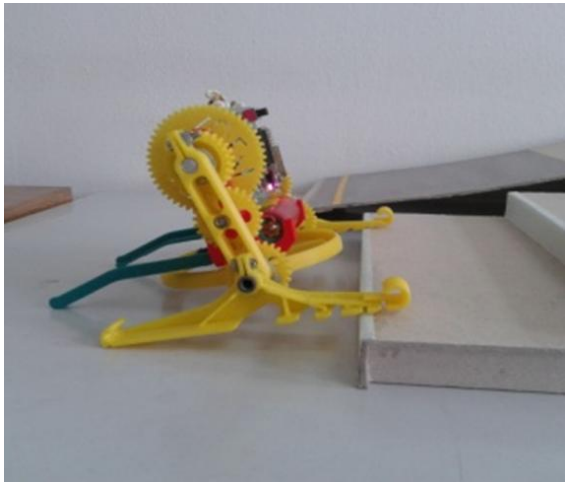
5. Our Application

NAO in autism: video “naoforchina3.mp4”

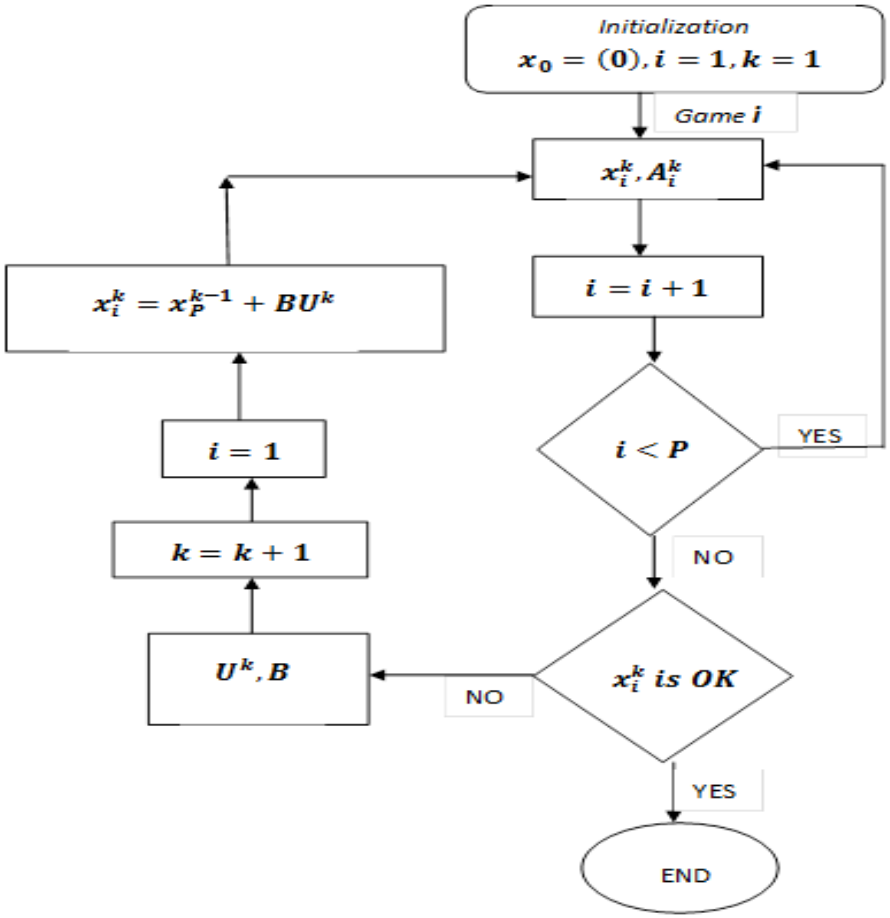
The NAO is **autonomous** rather than tele-operated.

6. “Our” Hardware

Collaborating with colleagues from the Institute of Robotics, Bulgarian Academy of Sciences in Sofia, Bulgaria we develop simple Social Robots in a social context.



7. Evolving game design



8. Supportive Technologies

- Novel, supportive technologies in Special Education:

A number of useful (diagnostic and educational) practices in "paper and pencil" can be implemented using a combination of computing devices (e.g., Tablets) and advanced sensors (e.g., Kinect).

9. Social Robots in Europe

European Union

Paolo Dario

Robot Companions for Citizens ++

The interest focuses on the elderly.

We want to focus on Special Education.

10. Future Direction

It appears that the **critical obstacle** to the proliferation of social robots and supportive technologies in Special Education is their **intelligence**.

11. Future Direction

Perhaps, a new paradigm for modeling human intelligence is necessary.

https://repository.kallipos.gr/handle/11419/3443

12. Our Instrument

- We have introduced the "Lattice Computing (LC)" paradigm for rigorous modeling based on disparate types of data including numerical and/or non-numerical data.

See also in:

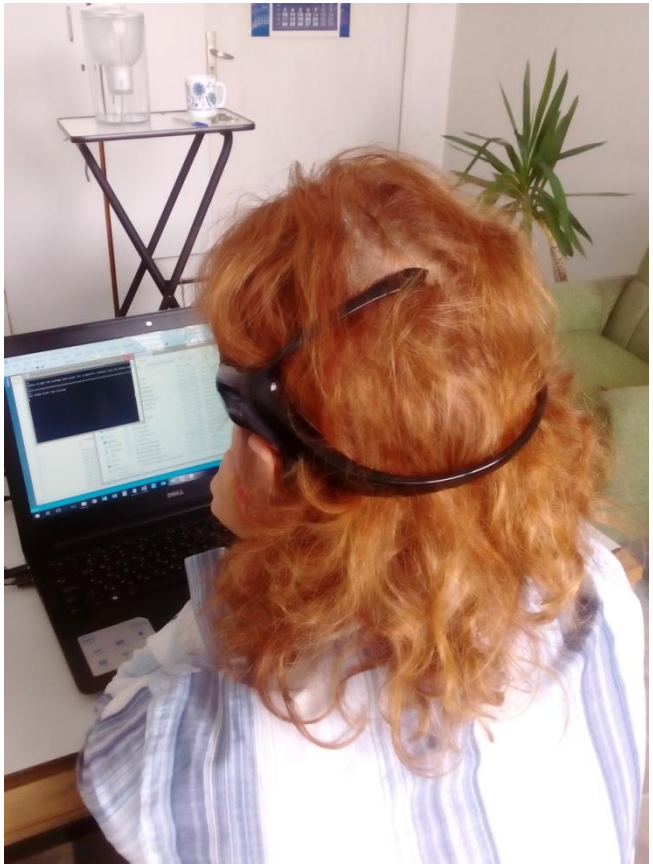
V.G. Kaburlasos, G.A. Papakostas, "Learning distributions of image features by interactive fuzzy lattice reasoning (FLR) in pattern recognition applications", *IEEE Computational Intelligence Magazine*, vol. 10, no. 3, pp. 42-51, 2015.

13. Our Proposal

- Our interest is in supporting an industrial production of innovative Social Robot platforms (build in China) driven by innovative human-machine interaction models in Special Education applications.

14. Brain-Robot Interfaces

Novel interfaces in brain-robot interaction – Emotiv.



Objective:
Issue commands to a robot from the brain

Thank you