

A Cloud Robotics Architecture to Foster Individual Child Partnership in Medical Facilities

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Problem statement

REDUCE DEPRESSION, ANXIETY & STRESS IN LONG TERM HOSPITALIZED CHILDREN



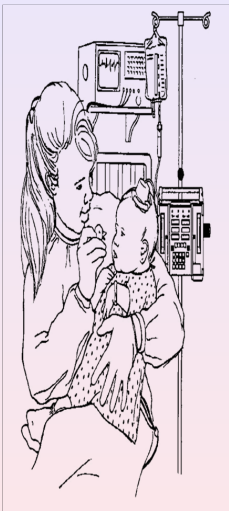
Personalized Treatment

- 1 Analyze child situation
- 2 Understand child needs
- 3 Design action plan
- 4 Conduct treatment activities

Some drawbacks...

- ✗ Several behavior variables
- ✗ Time consuming observation
- ✗ Expensive procedure

Proposed approach



Use a robot pet for every hospitalized child

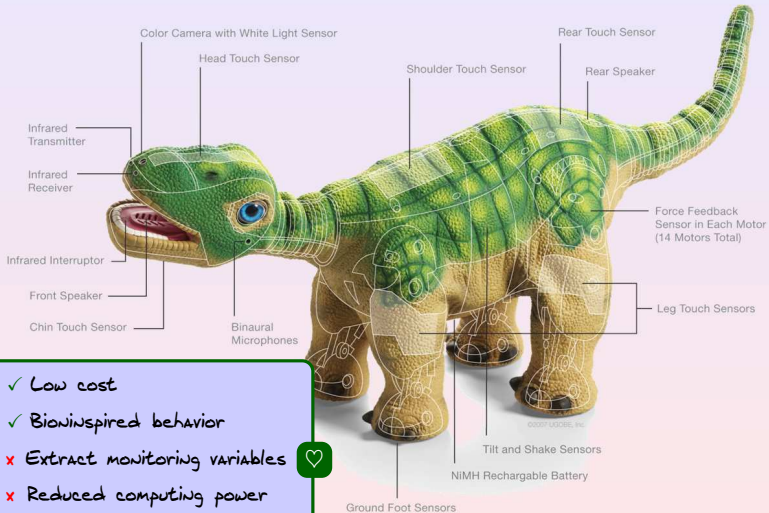
- ✓ **Therapy with animal pets** has been proved to be successful in several situations [1]
- ✓ Children tend to develop **engagement, empathy, and enjoyment feelings** with their animal pets [2]. These feelings **reduce their stress and anxiety**
- ✗ Animal pets demand **expensive professional care and training**
- ✗ There is still a **random component** in animal pets behavior

Can a bioinspired robot do the job?

[1] J. Gagnon et al. (2004), *Implementing a hospital-based animal therapy program for children with cancer: a descriptive study*, Canadian Oncology Nursing Journal—Revue Canadienne de Nursing Oncologique, 14, 4.

[2] M. A. Halm (2008), *The healing power of the human-animal connection*, American Journal of Critical Care, 17, 4.

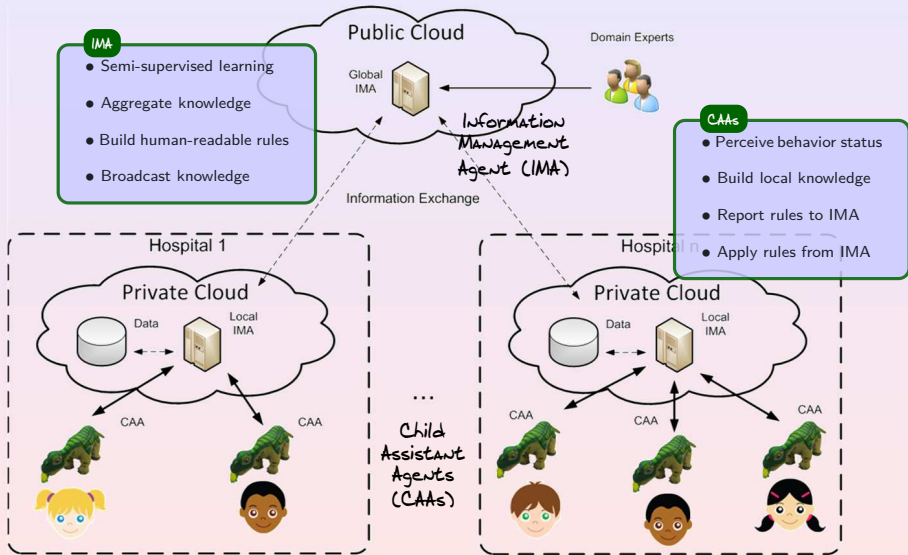
Pleo, the robot mate



- ✓ Low cost
- ✓ Bioninspired behavior
- ✗ Extract monitoring variables
- ✗ Reduced computing power
- ✗ Wired connection

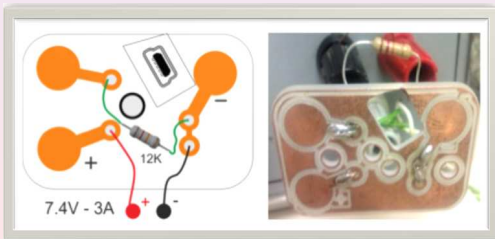
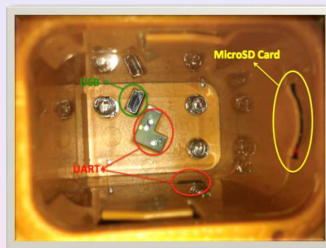


Boosting Pleo's capabilities: Cloud Robotics



Enhancing Pleo. Providing wireless connectivity

- There are two available data interfaces (USB, RS-232)
- Both data interfaces are hidden by the battery module in default Pleos
- No Internet or wireless connection available



- Custom and non-invasive battery module
- Usage of smaller battery
- Include a wi-fi modem
- Emulate LIFE OS commands to retrieve PLEO internal variables

Conclusions

- Scalable multi agent system inspired by cloud robotics to boost Pleo's capabilities
- Usage of semi supervised learning to perceive children status and deliver them the best stimulus
- Low cost solution to obtain ambitious outcomes

Future/current work

- Include a GPRS modem
- Use real data to extract knowledge
- Analyze real children interactions with the Pleo robot

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