Theoretical Consideration about the Role of Machine Intelligence in Creation of Humanoid Robots. (Humanoids are coming ….)

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Abstract: Humanoid Robots are matter of very intensive investigation in number of aspects. We do live a era when a question if humanoid robots ***should be created or not*** *is already overcome and answer is firm and clear "Yes". The "Yes" is supported by number of reasons and clear consequences are far unseen. The application potential of humanoid robots could be in number of fields as medical robotics, safety and critical systems, service robotics, entertainments robotics and other far unpredictable application. It must be stated that computational intelligence has an enormous potential and utilization of computational intelligence is the only possibility to make humanoid robotics learnable and intelligent. The expected era of humanoid robotics is not so far as maybe is thought and all applications will depend on commercial utilization of humanoids in various fields including military application especially after September11,2001.*

Keywords : humanoid robots, computational intelligence, applications

1 The State of the Art in Humanoid Robots

1.1 Research domain of Humanoid Robots.

The Humanoid Robotics is organized research community with the background of mechinary robotics and with number of indications that is will be pretty soon a really developed community. The community is in the phase of rapid development and there are number of events worldwide which are supporting these activitities. The World Symposium about Humanoid Robots are organized every year and the this event is trying to unify a community into a real research and scientific group. There are number of research groups regarding the research of humanoid robots.

Between leading groups is a Waseda University Humanoid Robotics Institute led by Prof. Shuji Hashimoto, Computer and AI lab where a AI robotics is led , also Prof. Dario lab in University of Pisa in Italy. Also there are number of groups working in this field.

1.2. Humanoid Robots as a technological systems

Humanoid robots are complex cybernetic systems which are remainding a humans and they are divided into 2 different groups

- Domain oriented – they have ambiution to serve a special domain for services and defined number of tasks
- Universal Humanoid robots which are oriented to be able to "live" like GPS – universal General Problem Solvers

Many labs and companies have already developed number of humanoid robots and these robots are able to solve number of interesting tasks including walking procedure which is very well solved with ASIMO – Honda Robot which is developed under strong support of Honda. Also number of other robots were developed including SONY AIBO robot dog which is not a humanoid robot but technologically is very interesting solution and will contribute to the humanoid robots.

Asimo Robot

Pino Robot

Meiji University Robot

1.3. Teleoperated or Self-organized Robots

The State of the Art of Humanoid robots are in controlling robots using

- Teleoperation – which is not so easy and number of implementation problems are beeing solved there including softness and precissnes of trajectories and so on.
- Self-organized operations – these are based on learnable technologie and these are mainly done using artificial and computational Intelligence

2. Computational Intelligence and its role in Humanoid Robots Development

There are number of fundamental problems which can be solved using computational intelligence tools. Basicly the problem of learnability is essencial and builfing Intelligent Systems. Number of different technologies are expected to be able to play and important role. The basic policy is Agent technology using number of techniques including Expert systems, Fuzzy systems, Neural networks, logic programing, and so on for tasks as planing and scedulling, Datamining , pattern recognition and classification and so on.

3. Social Implication of Humanoid Robots

The problem of Social Implication of Humanoid is a serious problem. Social Acceptance of Humanoid robots is and will be a very serious process. The Japan Government is strongly supporting of kids acceptance of robots events where kids are interacting with robots. There are number of project about future questions as living facilities for robots living with humans and so on.

There are number of questions about missuse of AI in many aspects in the future and an interesting way is to producing stories about AI impact. We are aware of many military applications and missuse of these technologies in military goals.

Conclusion

The role of this paper is to underline the meaning of Humanoid Robots research and leave a message that this research is underway. Computational Intelligence will play an extremely important role in building intelligent Humanoid Robots. We will also face a music to number of attempt to missuse the Humanoid Robots for military and teroristic goals as well. We must be ready for it in the future.