To: Ms. Hardie

From: Dillon Welch

Subject: Technical Report Proposal

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Introduction

The purpose of this proposal is to approve research into why personal robots have not advanced to the point society dreams about in Hollywood movies and potential ideas that could move research forward.

Mechanical devices that we would consider robot-like have been around since Archytas of Tarentum built a steam propelled mechanical bird in ~350 B.C., but the term robot did not come to mean what it does today until 1921 when Czech playwright Karel Capek introduced the word in the play R.U.R (Rossuum's Universal Robots) and the word robot means compulsory labor in Czech (Isom). In 1947, Issac Asimov finished his famous *I, Robot*, which contains the Three Laws of Robotics, a philosophy on the laws that should guide the actions of robots that continues to influence development today (Murphy 14). Robotics continued to develop at a steady pace until the 90's, when new findings became scarcer and the severe limitations of the current frame of thought became known.

Statement of the Problem

Personal robots are not living up to customer and business expectations for two reasons. First of all they are too expensive, and second of all they do not live up to what society thinks of as a robot. While we at Hanson Robotics have made many advancements in the field of making robots look lifelike, our market is limited to universities and research facilities. The microprocessors required to make robots able to do the few things they can do now are prohibitively expensive, and that is before counting in developing the software (Ingebretsen 90-91).

As well as being very expensive, the capabilities of robots currently are not where we want them to be. The ability to walk is a very complex ability, and engineers have not figured out how to make robots do it well yet. Robots like Asimo do fairly well in the tightly controlled test labs, but in the normal world would fall without control. Dexterity is fairly limited as well; there is a robot that can deal with staplers and that is about it. Sight is merely a video feed that robots can react to in preprogrammed ways, and robots are nowhere near being self-aware

thinking beings (What became of the Personal Robot?). Even Sony had to close down their robotics division in 2006 after not being able to live up to expectations.

Proposed Solution

One day we may have Terminator-equivalent robots walking down our streets, but we need to move in tiny steps to get to that point. Much R&D needs to be put into fixing the robot's mobility problems and improving its social interaction abilities. While we at Hanson Robotics have made great strides in this field, it is not enough. Personal robots are the key to the future of AI. NextGen Research estimates that 2009 sales of personal robotics reached $1.28 billion, and forecast $5 billion in sales by 2015. Focusing on developing single purpose products for consumer and business use may lead to future breakthroughs, as well as creating a cheaper and easier product to sell to fund more research. Over 900,000 Roombas, an automatic household vacuum cleaner, were sold in 2008. Open source robot software may eventually be developed, which would greatly reduce development costs. There are other markets to explore as well, including military drones, surgery assistants, and home-care robots (Ingebretsen 91).

Consumer opinion about robots needs to be altered as well before any mainstream adoption will happen. The Japanese have always been infatuated with robots. They have a big advantage over us in robotics because of this love, and if we don't start putting more effort into research, we could be left behind. In Europe they are dispassionately viewed as industrial tools though, and here in the US the view is somewhere in between as cool reflections of Hollywood movies. Some feel that the key to success lies in creating feelings of love and affection towards robots with the current generation of children, who will become willing consumers when they reach adulthood and hopefully robots have developed to meet their expectations (Ingebretsen 92).

Scope and Methodology

This report will go into detail about why the personal robot has failed to meet expectations, and why R&D into new ideas and philosophies on design will help improve the capabilities of robots. There will be coverage on past paradigms of development, as well as new ideas that might spark progress. Many articles from IEEE's Intelligent Systems will be consulted, as well as the websites for current high-end robots such as Asimo, and the technology sections of reputable news organizations such as the BBC.

Qualifications

I am a freshman double Computer Science/Math major. In my CSC 100 class we covered the basics of AI and why development has stagnated. This basic but ultimately small base of knowledge means that I am open to new ideas of doing things, and will not reject them just because they have not worked in the past or they contradict a beloved principal from the

1980s. Also, I have a personal interest in the subject, as I have been captivated ever since I watched Terminator. I may decide to go into a career working on AI and robot development as well. Therefore I feel I am qualified to write this report.

Conclusion

Personal robots have not been a successful business because currently they are too expensive to produce and are too limited in capability. If we spend more money in R&D with more realistic expectations of the results, we may slowly inch our way towards the dream of fully functional robots.

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