

Artificial intelligence and robotics



Artificial Intelligence and Robotics Demetria Rupkey INF103 Professor Robin Jones August 28, 2010 Artificial Intelligence and Robotics What is Artificial Intelligence? This is an age old question and the answer lies in the eyes of the beholder. The dictionary's definition of Artificial Intelligence states that AI is " The ability of a computer or other machine to perform actions thought to require intelligence.

Among these actions are logical deduction and inference, creativity, the ability to make decisions based on past experience or insufficient or conflicting information, and the ability to understand spoken language. " (dictionary. com). Artificial Intelligence seems to have come the farthest through the field of Robotics. The earliest known robot invention was in 1495, a robotic man devised by Leonardo da Vinci. ([http://www. used-robots. com/robot-education. php? page= robot+timeline](http://www.used-robots.com/robot-education.php?page=robot+timeline)).

From this one creation the human race has devised numerous robots throughout history with the single thought of making robots have the ability to think and behave as a human, Artificial Intelligence. Throughout this paper we will be taking a journey through the numerous robots created as well as the advancements made in robotic technology and Artificial Intelligence. As it was mentioned above Leonardo da Vinci created what was called " Anthrobot" in 1495. Leonardo created a machine that was assumedly to be used to carry man from one place to another, as you can see in the picture.

Mark Elling Rosheim describes this rendering of Leonardo's creation as an " automaton featuring nothing less than front wheel drive and rack-and-pinion control. " [(Rosheim, 2000)] Of course, these terms were not known in 1495 but it is amazing how this early technology is still used in our automobiles. In

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1772 Pierre & Henri Jaquet-Droz invented a robotic child; in fact they invented three robotic children. The robotic child we speak of had the capability to write. This child was built with a very complex set of gears, cams and levers inside his body to achieve the ability to dip his pen in the ink well and write on a tablet. (Zielinska, 2007). In less than 300 years robotics went from a primitive creation to one with the ability to move and perform actions. This is amazing to say the least. Grey Walter was interested in creating self regulating animals in the 1940's which led to the creation of Elsie the Tortoise. (Becker, Slabosky & Umpleby, 2006). The way Walter designed Elsie to live is much like a child. A child requires food to live and grow; Elsie requires light which she then transferred to electrical energy which charges the accumulator in her body. (Becker, Slabosky & Umpleby, 2006).

Elsie napped like a child and fed like a child, in her own way. (Becker, Slabosky & Umpleby, 2006). If this technology was available and usable in the 1940's then it is reasonable to conclude that in this day and age, the sky is the limit. Skipping ahead to 1969-70 we will now take a look at " Shakey" who was designed at Stanford University. Shakey was experimented and tested at the Stanford Research institute. Shakey operates on several computer programs issuing commands for actions. Low level commands issued would be PAN and TLT which, of course, would command Shakey to pan the area or tilt it's robotic head.

There are intermediate level commands such as GOTO , BLOCK and GOTHRU. These commands make it possible for Shakey to move about his environment and record errors as he moves. There are numerous programs

that run Shakey and command him what to do. (Hart & Nilsson, 1969). Shakey was a great robotic masterpiece of the time but still required a human being present to send the commands to Shakey. Much advancement has been made since 1970; however, Shakey will always be a monumental advancement in Robotics.

Perhaps one of the most used and important a robotic invention of our time is PUMA, the Programmable Universal Machine for Assembly. The PUMA was first used by General Motors in 1979 for assembly of their vehicles and is still in use today in many factories and laboratories. Below are two views different PUMA machines. (Robot Timeline - Robotic History) In 1992 Dante I explored Mt. Erebrus in Antarctica until the tether broke ending Dante's mission. Dante was an eight legged robotic machine designed to reach places that we could not. (History of Robotics: Timeline).

There is not an abundance of information available about Dante I at this time because Robotics is a fast paced world. Bigger and better things have come along and I have a sneaking suspicion that the world of science does not like to brag about the failed experiments. In 1994 Dante II was used to explore Mt. Spurr in Alaska. Dante II was a more robust form of Dante I. Eight volcanologists were killed in 1993 before Dante II came into the picture. The use of Dante II and other robots like it has enabled scientists to research places that they would have otherwise not had the ability to.

In fact, the primary objective of robots such as Dante II is to have the ability to research and explore places that may not be safely accessible to humans. (Dante II, 2010) Here we are in 2010 and in January there was the unveiling of the first Robotic Girlfriend. She goes by the name Roxxy and she sells for

just under \$7, 000. Roxxy has the ability to carry on conversations and respond to touch. Roxxy has been under development for years and thousands of men have already ordered a Roxxy of their own. (True Companion) If robotics has the technology to build a Girlfriend where are we headed next?

I would include a photograph of Roxxy; however, the photographs are not suitable for an academic paper. From the beginning of the Robotics industry until the current time robots have come a long way, we can only imagine what the next big thing will be. The history of Robotics is nothing less than amazing and extraordinary. We have gone from the primitive robots that required humans present to issue commands to robots that do not require our presence at all. I have to ask, where will we be in the year 2020 in the field of robotics? Will we have jobs or will robots have the ability to replace us?

The field of Robotics is governed by what is called the Laws of Robotics. These laws were created by Isaac Asimov, a writer. Even though Asimov was a writer of what appears to be science fiction these Laws of Robotics have stuck with the scientific community. (History) These laws are as follows: Law One: A robot may not injure a human being, or, through inaction, allow a human being to come to harm, unless this would violate a higher order law. Law Two: A robot must obey orders given it by human beings, except where such orders would conflict with a higher order law.

Law Three: A robot must protect its own existence as long as such protection does not conflict with a higher order law. Asimov later went on to include Law Zero which reads: A robot may not injure humanity, or, through inaction,

allow humanity to come to harm. (History) Whatever our personal views are regarding Robotics we do have to give props to those who have come so far. Robotics has helped tremendously in numerous fields including, healthcare, space exploration, manufacturing, agriculture, military defense, children's entertainment as well as being useful to those with handicaps.

As you can see from the journey we took robotics is still only in its toddler stages. Scientists and mathematicians have made enormous leaps and bounds in the field of robotics with many more to come in the future. Do you ever wonder how long before a robot is serving your food or performing your surgery? We don't know these answers yet but my guess is, sooner than we think. References Becker, C. , Slabosky, M. , & Umpleby, S. (2006). The History and Development of Cybernetics. Dante II. (2010). Retrieved August 30, 2010, from The Field Robotics Center :

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