The Case of the Artificial Human

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To tackle the question of humanity, the term "alive" must first be determined. To be biologically alive, one must have cells that are made up of tiny molecules that perform certain duties. These molecules are derived from a set of genetic codes known as DNA (Trefil 23). As robots do not have DNA, these machines cannot biologically be alive, but does that eliminate them from being a human? Or is there more to being a human than just biological processes? Can currently developed humanoids be considered human? If not, what are some of the barriers to humanity, or crucial milestones that this technology does not meet?

For simplicity, certain guidelines must first be set forth that differentiate humans from other living organisms. "Philosophers and scientists confidently offer up traits said to be uniquely human, and apes casually knock them down-toppling the pretension that humans constitute some sort of biological aristocracy." (Trefil 23) This argument is true on some of the most basic levels. Apes demonstrate a primitive use of tools and communication, but these skills can only develop to a certain point. At some level, the ape cannot function as a human does. In what ways do humans surpass even the intellectually advanced primates?

One major distinction between humans and other living organisms is imagination. Because animals are bound by instinct, their imagination takes on a more practical form; whereas humans have the ability to use imagination for more whimsical purposes (Cassirer 33). For example, a human can use his imagination to construct a story. An ape will not. Apes do not use their imagination to engage in a fantasy of any fashion. They merely use this as a skill to help them survive, a means to an end.

Another important distinction is language. Apes and other animals can communicate with each other in order to solve a certain problem or achieve a certain survival goal; however, an animal does not possess the ability or the capacity to speak English or any other human language (Cassirer 30). Animals communicate in rather primitive ways in order to get something done. They do not engage in small talk as humans often do.

Biologically, humans are also very different from animals. Homo sapiens have a very large, well-developed, and complicated cerebral cortex (Trefil 20). Other animals mimic certain other physical features that humans have, but the cerebral cortex is the most prominent difference. However, humans are not just defined by their physically well-developed brains (Trefil 5).

To some, humans are nothing more than a brain (Trefil 11). Despite the fact that this view is relatively depressing, it is not without merit. The great philosopher David Hume saw human thought processes as nothing more than a collection of experiences and impressions (Cassirer 150-151). But what of personal taste? Even Rene Descartes saw humans as having a separate mind and body (Trefil 181). This train of thought sees humans as nothing more than high-functioning biological machines. If homo-sapiens are merely networks of interlocking messages, then it should stand to reason that these processes can be mimicked by science.

Another major school of thought deals primarily with the emotional side of human beings. Traits that are almost exclusively human are selflessness, love, and admiration (Trefil 9). Other qualities that Homo sapiens singularly make use of are their ability to write, to pass down stories, to artificially construct natural processes, to rely on culture as a survival tool, and to think abstractly (Trefil 2). Animals do not tend to exhibit these kinds of behavior primarily because they have no need for these skills. This second school of thought focuses primarily on the belief that emotions and human nature are something greater than the biological processes of the human body.

So, now that the human and animal distinction has been made, a more specific focus on human traits must be presented. What types of traits should a man-made machine have in order to be considered human?

One of the first traits that homo-sapiens collectively have is the ability to comprehend and use symbols for both practical and non-practical purposes (Cassirer 35). A robot must be able to understand and apply the anthropological concept of symbolism. Also, humans have a tendency to name every object and living being that they encounter (Cassirer 34). So, in order for a machine to be more human, it must have this same innate need to name objects and beings that interact with it. It must also have the curiosity to ask the name of a foreign body. Naming lies at very foundation of human language and interaction and is crucial for humanity (Cassirer 34).

One of humans' evolutionary advantages over most any other animal is their ability to learn rather quickly (Trefil 31). As a whole, humans embody this trait. Of course, there are outliers in the human population, but as a species, the ability to learn and adapt quickly is what granted Homo sapiens intellectual superiority over other life forms. Therefore, a robot must also have this quality in order to function correctly in its interactions with humans. However, a robot must not be granted this knowledge. A truly human-like being will have to acquire new information and apply this knowledge through critical thinking.

The final guideline included in this paper for a machine to be a human is that the machine must possess the ability to overcome itself (Caputo 23). This trait is distinctly human. “The possibility of the human self-overcoming…reflects the idea that the human being is not a function of what it is, moral or rational, but of what else it could become, if only it keeps overcoming itself.” (Caputo 23) What this means is the humans are able to lie to themselves, and to construct a self-image that is more pleasing to their state of mind in order to move on in their lives. However, this self-overcoming is also tied to certain self-awareness. A human is not only able to overcome himself, but he is conscious of his doing so. On some level, each and every human knows when they are lying to themselves, or when they are constructing a different self-image.

If a machine can achieve these qualities, then it is well on its way to becoming human, but in what ways can a human know whether or not the machine functions on the same level? One of the first methods developed to gauge a robot’s humanity was a simple language test known as a Turing Test (Nilsson 68). To pass a Turing Test, the machine must be able to convince a human that it is not a machine through the use of language (Nilsson 68). When artificial intelligence was first being developed, this was a very useful tool in determining the success of a programmer that was aiming for a realistic humanoid. As technology progressed however, the need for a better test rose as well. An updated version of the Turing Test is being developed at the moment by the company that created the popular Angry Birds games for IPod and Android users (AI Birds 1). The company posed a challenge to programmers all over the world to create a program that can successfully play their Angry Birds challenge as a human would (AI Birds 1). The goal is to create a program that learns from its mistakes and eventually figures out how to win the game just like a human player would (AI Birds 1). The machine cannot simply win the game on the first try. It must have the ability to understand gravity and take that notion into account when playing the game. It must also be able to learn from its mistakes and perform the game differently each and every time it plays.

The Angry Birds demonstration is an example of artificial intelligence being required to possess more than just knowledge. The program must have the ability to learn, and this is a crucial step towards humanity. A truly useful humanoid must have the ability to be employed, just like a human is (Nilsson 68). However, the humanoid must not be limited to simple logical programs such as banking; it must progress beyond that and perform more domestic tasks like house-keeping and cooking (Nilsson 68). A human-like machine must possess emotion on some level and be able to care for its human and machine companions.

Now that a guide has been established, these ideas must be applied to the latest robotic technology. The first example is a robot called Roboy. Roboy is the product of a nine month long project (*Roboy* 1). He was unveiled in March at a robotics convention. He plays around with copy machines, feigns embarrassment, politely shakes hands with a human, sings to songs, and winks at people (*Roboy* 1). As of right now, Roboy is able to learn, use language, engage in cultural activities, and simulate emotion (*Roboy* 1). However, his actions and movements are the results of programmed triggers. His range of abilities is limited to his programmed reactions to certain stimuli. For example, his internal program reads in that an entity engages in a certain behavior that should trigger embarrassment (*Roboy* 1). A signal is sent to the robot to simulate the blood rushing to his cheeks.

The first school of thought on what it means to be human characterizes humanity as being nothing more than a slave of the brain's reactions. By this thought process, Roboy is well on his way to being a human, but by the second school of thought, he is not. To recall, the second school of thought saw humanity's emotions and tendencies as being part of a grander, more spiritual design. By this definition, Roboy does not even come close to being a real human. He merely simulates emotion. He does not truly feel it.

The second example is a humanoid known as Nao. He is more advanced than Roboy. He has the ability to learn, to write, and to spell (*Interaction* 1). He is also able to recognize and differentiate between words, objects, faces, and ideas (*Interaction* 1). He falls under the same category as Roboy. His programming is more complex, but it is also limited in some of the most basic ways that Roboy's was.

The third and final example is a humanoid by the name of iCub (*An Open Source Cognitive Humanoid Robotic Platform* 1). He is by far the most advanced of the previously mentioned examples, and he shows the most potential for humanity. He was developed by the Italian Institute of Technology, which gave the project to a group of

University of Illinois students to work on and develop (*An Open Source Cognitive Humanoid Robotic Platform* 1). This humanoid has an artificial skin that simulates touch (*An Open Source Cognitive Humanoid Robotic Platform* 1). The iCub also is designed to function like a human child (*An Open Source Cognitive Humanoid Robotic Platform* 1). It learns by example, and its first attempt at communication is usually through signals just like early humans (*An Open Source Cognitive Humanoid Robotic Platform* 1). The iCub then slowly starts to apply verbal names to objects and beings like a child does, and he eventually learns spoken languages. As of right now, iCub is able to reach for and grasp at objects, listen to and learn from humans, and move its head and eyes on its own (*An Open Source Cognitive Humanoid Robotic Platform* 1). The students at University of Illinois are in the process of teaching iCub to perform certain fun activities like juggling (*An Open Source Cognitive Humanoid Robotic Platform* 1). They are also hoping to teach the robot to walk just as one would teach their child, and they are hoping for it to develop a collection of images and impressions that serve as a memory for iCub (*An Open Source Cognitive Humanoid Robotic Platform* 1).

Of all the humanoids, iCub is the most human. He cannot yet think independently of his programmer, but he is well on his way to having this ability. However, studying these cases raises the question of knowledge. How does one know if the robot is a human? Could it simulate all the right moral, emotional, and logical responses and still not be human? Is emotion more than a few cogs in human's grand machine?

As of right now, none of human's technology can match him on every level. It is possible that someday technology could have the mental, emotional, and physical capabilities of a human, but as of right now, the humanoids are merely machines controlled by a superior biological race. The motives and consequences of creating a machine that functions as a human are obscure and fodder for another ten page paper. Perhaps it is not truly possible to know if a machine can feel as a human does, but if it aces each milestone and simulates the correct mental and emotional responses, then can it be called a human?

As with most abstract concepts, humanity is in part a socially constructed notion. A robot may pass every possible humanity test, but if human society rejects him, then he is no better than a machine. His mental and emotional progress is limited because he cannot fully engage in or understand the cultural aspect of humanity; as mentioned earlier, culture is a huge part of what it means to be it a human. If humanity progresses to a point where it accepts and assigns the same rights to a human-aspiring machine, then there exists true potential for growth and development into a true human.

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