Name: Urvi Patel

1. What is Turing's "Imitation game" (AKA the Turing test)?

This was a test Turing designed to answer the question "Can machines think?". Turing introduces it with human players, where a man (A), a woman (B), and an interrogator (C) are in separate rooms. The interrogator's task is to determine the gender of the other 2 by asking a series of questions. Then Turing adds twist wherein the man is replaced by a machine and now the interrogator's job is to determine which is the machine and which is the human by asking questions and getting typewritten answers back. If the machine is able to fool the interrogator into thinking it is human, it has passed the Turing test. Turing predicted that a machine would be able to pass this test by the year 2000, however this has still not happened. He predicted that with the computer power available by the year 2000, the interrogator will not have more than a 70% chance of being right after 5 minutes of questioning.

2. What is the Singularity?

The point at which machines will much smarter than humans, which will lead to changes in human civilization itself. Ray Kurzweil hypothesized that this point will occur circa 2045

3. Summarize Goertzel's paper

There has been a resurgence in the field of AI in the area of Arfiticial General Intelligence (AGI) and Goertzel feels this area should get a lot of attention in the research community since progress in this area is very likely. He also mentions Kurzweil's book, The Singularity is Near, which predicts that machine intelligence will overtake human intelligence by 2045. He then introduces the term "scenario analysis" in which one lays out a "… series of future scenarios for a complex system", and goes on to list various scenarios that would apply to AI. In particular, he mentions the "Kurzweil Scenario", in which advanced brain scanning techniques will lead to resarchers being able to emulate the human brain. He feels Kurzweil did a good job defining his scenarios but felt that confidence intervals were also

needed. He mentions McDermott's critique of Kurzweil's paper that Kurzweil provides no proof that Singularity in on the horizon but reasons that Kurzweil only speaks of likelihoods and makes no claim to having proof. McDermott also criticized Kurzweil's dependence on brain scanning techniques since these techniques do not help to understanding the brain itself. However, Goertzel believes this a viable stepping stone to AGI.

Goertzel mentions his own path to AGI, namely, virtual world embodiment. Though embodiment is not new, Goertzel feels that embodying a virtual world woudl get more results as opposed to trying to embody actual, physical machines. He was (is?) working on a virtual talking parrot. He envisions millions of such parrots across different virtual worlds communicating in English. Each will have its own memories, knowledge, and preferences. An adaptive language learning alorithm will help the parrots broaden their knowledge of English based on interactions with human users. Geozel knows that humans will teach their parrots inappropiate things but feels that users will have more use for a parrot that can learn to communicate well.

In closing, though he and Kurzweil disagree on some points, Goertzel does have appreciation for Kurzweil for bringing attention and enthusiasm to the field of AI.

4. Why does Allen think the Singularity is not near?

Paul Allen takes issue with Kurzweil's claim that there will be exponential growth in the rate of progress. Allen feels that for this to happen, there will need to be more powerful computing capabilities. This doesn't just mean hardware, but software in the form of better programs that require a deep understanding of the human cognition, and Allen feels we are nowhere near to fulfilling that requirement.

5. Please describe briefly the paper you selected to read

Automatic adjustment of car body fixtures using artificial intelligence

https://www.sciencedirect.com/science/article/pii/S221282711630693X

Body shop fixtures are used to position and fix car body sheets to be joined. They are mostly rigid and are adapted based on component that is produced. They consist of positioning and fixing elements mounted on a plate. Components must be set and adjusted to within .1 mm. The, screws for the components are loosened and shims are inserted by hand. The screws are then retightened, which requires interruption on the production line. Components can be adjusted in up to 3 directions and this adjustment, which occurs repeatedly during production, involves removing components from teh production line at random and recording pertinent data. If measurements are not up to spec, fixtures must be adjusted, which can take over an hour. The adjustments needed are decided by the plant operator and are based on his/her experience. The plant operator decides which slampount needs to be adjusted and by how much.

Ideally, one would like to store the plant operator's experience in a database but this is not possible and there is no written record of it as it is all in the operator's brain. An artifcial neural network is created to simulate the learning process of a human. To find the best neural network, a protype component was created that had 16 measuring points and 11 clamping points. To simulate the past experience of a plant operator, fictious measurements were simulated and data sets are then simulated based on certain factors of the protoype. The neural network is then produced and a backpropagation algorithm was used for learning.

Results of the simulation showed that the errors for the neural network were very small compared to the theoretically correct dimensions. Artifical neural networks differ in the number of hidden layers and in this case, the network with 2 hidden layers gave better results than that which had only one layer, however, adding more than 2 layers did not lead to better results.

Today, there more studies being done with better trained and more optimized neural networks and experimental analyses are qualifying adjustments and verifying them in real components.

6. Which paper(s) did you agree with and why? Which did you disagree with and why?

I agree with Paul Allen in that The Singularity is not near. We do not know

how the brain works, how it retrieves information, or where human emotion originates. These are in my opinion, key factors in emulating human behaviour and there needs to be more research in these areas before we can conceive of creating machines that are as intelligent as humans.

I disagree with Goertzel's paper because I felt he was lending credence to Kurzweil's claim of achieving The Singularity by 2045.