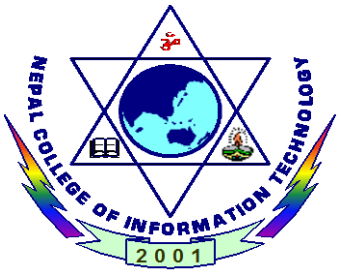

Nepal College of
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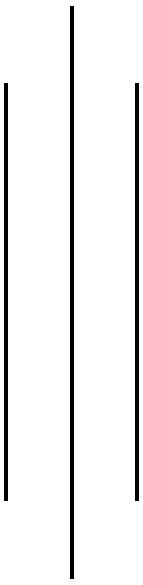
(Affiliated to Pokhara University)
Balkumari, Lalitpur

INTELLIGENT SYSTEMS [INTS]

Tutorial 2 (Turing Test)



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Q1. Explain about Turing Test.

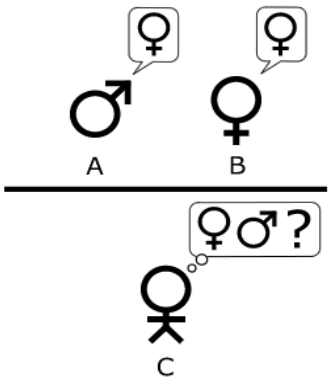
The Turing test is a test, developed by Alan Turing in 1950, of a machine's ability to exhibit intelligent behavior equivalent to, or indistinguishable from, that of a human. Turing proposed that a human evaluator would judge natural language conversations between a human and a machine that is designed to generate human-like responses. The evaluator would be aware that one of the two partners in conversation is a machine, and all participants would be separated from one another. If the evaluator cannot reliably tell the machine from the human (Turing originally suggested that the machine would convince a human 70% of the time after five minutes of conversation), the machine is said to have passed the test. The test does not check the ability to give correct answers to questions, only how closely answers resemble those a human would give.

The Turing test, 'a test for intelligence in a computer, requiring that a human being should be unable to distinguish the machine from another human being by using the replies to questions put to both', is commonly regarded as the barrier which a computer program must break to be considered an artificial intelligence.

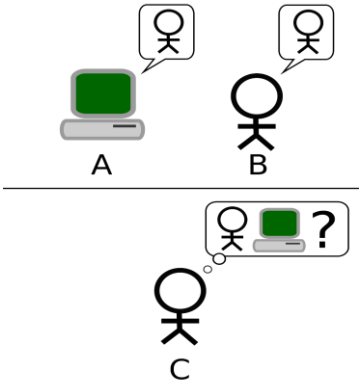
A chatbot called **Eugene Goostman** is said to be the first system to pass the Turing test.

Alan Turing and the Imitation Game

Alan Turing, in a 1951 paper, proposed a test called "The Imitation Game" that might finally settle the issue of machine intelligence. The first version of the game he explained involved no computer intelligence whatsoever. Imagine three rooms, each connected via computer screen and keyboard to the others. In one room sits a man, in the second a woman, and in the third sits a person - call him or her the "judge". The judge's job is to decide which of the two people talking to him through the computer is the man. The man will attempt to help the judge, offering whatever evidence he can (the computer terminals are used so that physical clues cannot be used) to prove his man-hood. The woman's job is to trick the judge, so she will attempt to deceive him, and counteract her opponent's claims, in hopes that the judge will erroneously identify her as the male.



What does any of this have to do with machine intelligence? Turing then proposed a modification of the game, in which instead of a man and a woman as contestants, there was a human, of either gender, and a computer at the other terminal. Now the judge's job is to decide which of the contestants is human, and which the machine. Turing proposed that if, under these conditions, a judge were less than 50% accurate, that is, if a judge is as likely to pick either human or computer, then the computer must be a passable simulation of a human being and hence, intelligent. The game has been



recently modified so that there is only one contestant, and the judge's job is not to choose between two contestants, but simply to decide whether the single contestant is human or machine.

Criticism of the Turing Test

The Turing Test has been criticized, in particular because the nature of the questioning must be limited in order for a computer to exhibit human-like intelligence. For example, a computer might score high when the questioner formulates the queries so they have "Yes" or "No" answers and pertain to a narrow field of knowledge, such as mathematical number theory. If response to questions of a broad-based, conversational nature, however, a computer would not be expected to perform like a human being. This is especially true if the subject is emotionally charged or socially sensitive.

In some specialized instances, a computer may perform so much better and faster than a human that the questioner can easily tell which is which. The Google search engine, for example, would dramatically outperform a human in a Turing Test based on information searches.

Q2. Based on the Turing Test Approach, can we infer machine as an intelligent entity? If yes, why? If no, Why?

Can machines think? That was the question posed by the great mathematician Alan Turing. Half a century later, we see some computers converse with human interrogators in an experiment that prove the answer is yes and hence we can infer machine as an intelligent entity.

In the Turing test a machine seeks to fool judges into believing that it could be human. Turing predicted that by the year 2000 a program would be made which would fool the "average interrogator" 30% of the time after five minutes of questioning. The test is performed by conducting a text-based conversation on any subject. If the computer's responses are indistinguishable from those of a human, it has passed the Turing test and can be said to be "thinking". If the interrogator can't tell which answers come from the human and which from the computer, then the computer must be thinking. Proponents of "strong AI" argue that such a computer isn't just mindlessly, mechanically, cranking out answers; it possesses subjective awareness, just as we do. If a machine could fool humans into thinking it's a human, then it must be at least as intelligent as a normal human.

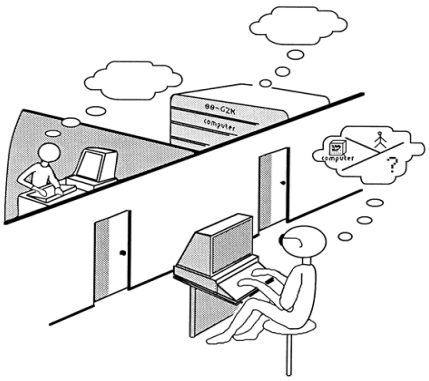
The Turing Test has been passed, after a computer program mimicked a 13-year-old Ukrainian boy called Eugene Goostman, fooling 33% of its interrogators into believing it was human after five minutes of questioning.

The Turing Test, even as envisaged by Turing, **has limitations.** As US philosopher John Searle and cognitive scientist Stevan Harnad have already pointed out, anything like human intelligence must be able to engage with the real world ("symbol grounding"), and the Turing Test doesn't test for that. My view is that they are right, but that passing a genuine Turing Test would nevertheless be a major achievement, sufficient to launch the Technological Singularity – the point when intelligence takes off exponentially in robots. The consequences of passing the true Turing Test and achieving a genuine Artificial Intelligence will be massive.

In his 1950 essay Turing acknowledged that, strictly speaking, the only way to be sure a machine thinks "is to be the machine and to feel oneself thinking. One could then describe these feelings to the world, but of course no one would be justified in taking any notice. Likewise according to this view the only way to know that a man thinks is to be that particular man. It is in fact the solipsist point of view. It may be the most logical view to hold but it makes communication of ideas difficult."

To pass the Turing test, the computer would need at least of the following skills:

- Natural Language processing: it needs to be able to communicate in a natural language like English.
- Knowledge Representation: it needs to be able to have knowledge and store it somewhere.
- Automated Reasoning: it needs to be able to do reasoning based on the stored knowledge.
- Machine learning: it needs to be able to learn from its environment.



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