What is AI?

In short and basic definition, it is a computer program that can act as a human person or an agent of a human so in some cases, other humans can talk to as they were other humans. Most people nowadays think that AI is or shortly will become a super intelligent computer which knows and calculates everything at runtime. Sooner or later it will become some kind of god which will push the limits of human civilization to its maximum or bring it to its knees by obliterating or enslaving us. This is the far-fetched science fiction that we see in Hollywood movies and doom saying posts and blogs on the internet.

Calm down though, since people who have studied the aspect of AI knows that isn't so… for the time being. The bad side effects of AI will most likely not be done by the AI itself because it is evil by default, rather because we might base it on wrong ethics or codes of conducts.

At the moment, I might give this as the base explanation for newcomers in the field.

"*AI is a collection of techniques and different study fields which ranges all the way from the basics of math to psychology and neuroscience that resembles or surpasses human knowledge"*

The basics of AI could be defined as a program that can react to a dynamic environment through its sensors based on past experience and also take educated decisions on how to keep evaluating new information. The technical aspects of AI vary and are based on a lot of math, statistics, Calculus, linear algebra and programming skills. There are certain topics of math in AI that have gained popularity in the past years such as methods from machine learning (regressions, PCA, Bayesian models) to more sophisticated Neural networks (CNN, GAN's, RNN) to be trained on a huge amount of data. The theoretical part of AI is more related to the social aspects of the human nature.

AI has touched and transformed subjects and professions as we know them today. They have not only appeared in text translation and classifying images but also helped a lot out in the financial industry, healthcare and even music. Personally I think the term AI used by the general population and media is kind of weird these days. Many startup companies and entrepreneurs seem to simply add "AI solutions" to their business model and talk about how "AI takes care of this and that" without really knowing what they are using or how it works. In most cases these are just machine learning algorithms instead of an AI application that can be more dynamic for the topic of the subject.

So in general, the dream is that the AI can act and represent us as agents or individuals with some sort of personality to take and make decisions, rather than just simply compute some values and give us answers for predefined tasks. *The sum of its parts are more than its whole.*

Question 1

In August 2017, a major breakthrough in AI was achieved when Elon Musk's AI beat the world best DOTA 2 middle lane player live in a best out of three, 1 vs 1 match at the world championship called The International. DOTA 2 is a 5 vs 5 player game where a map is split into three lanes with multiple hidden routes to travel between them. A player can choose over 113 different heroes to play with over 150 items to select. Each hero has 4 unique spells which can both affect units within area, a single hero or support them in a way.

The AI was constructed from a regression model that trained against itself for some months with a single selected hero. Both players competed using that same hero in the middle lane of the map. Even though the event really was a shock for the audience, many professionals in both the DOTA community and the AI field said that there is still a long way to go. Do you agree or not? Justify your answer.

The battle fought was an impressive show and demonstrated pure skills by the AI. But the problem about this solution was that the game is a team effort game and way more complex than just this single scenario. There are still 112 heroes left to fight with or against, and how would the AI deal with 2 heroes at the middle lane and or all of them at the same time? How would it behave if an ally told him to attack at the bottom lane or hide in the forest because he suspects incoming enemies?

Note: There are tons of different variations to this answer but the main point is that this was a solution to an isolated scenario from near infinite different problem domain. It only dealt with a single agent with very specific tasks but should need a well-trained multi agent system with broader knowledge.

Question 2

Name at least 3 reasons why AI became so popular in recent years and what might explain the rise of its development.

- Faster processing units makes algorithm calculate faster and do more computations
- More data is gathered every day and data generated in last two years is more than it was in the last decade
- Bigger memory in computers allows more information to be kept in concurrent runs
- Data storage is getting bigger and cheaper

Question 3

Why do we need to prepare the data that we want to train our AI / models / networks on rather than just feed it in the algorithm and get the answer we are looking for? Does your answer resemble human activity in any way?

If we do not prepare or know our data, we can't structure an answer to look for. The data might have several problems such as incorrect values written in the dataset which can be by a human cause. The data file itself might be corrupted in some way and in some cases the data might be duplicated which could lead to wrong statistical computations. It's a classic case of garbage in, garbage out.

This can also be related to the human brain. If we are fed the wrong information we are more likely to spread our false knowledge. The same goes for unstructured and possibly corrupt data. If we are in a situation where all of the information perceived is just confusing and not displayed in a "human friendly" way we will not get much out of it or it will simply confuse us.

Question 4

It seems with the possibilities of AI today, we are entering the fourth industrial wave and people are afraid of losing their jobs. What people find even scarier is the idea of "Terminator" or "The matrix", where the machines will go to war with the humans and eventually win. Can you name a reason why the machines would ever go to war with the humans, or at least, harm them in any way?

It will all depend on how the machines would originally be coded and structured. It could be that an AI had a very strict goals and definitions to complete a certain task which might be beneficial to it with no loss cost to us humans or so it thinks. If a machine needed to expand to space to gather resources and needed to build a rocket platform where the Eiffel tower is currently, it might think that demolishing and using the steel from the scraps to construct a rocket would be a good idea. Nobody lives in the Eiffel tower, thus it wouldn't hurt us humans at all (but we love the tower because of it's famous for the history and looks).

The second idea can be related to ants and humans vs humans and machines. When we, the humans, tend to build a new skyscraper we check if it is legal and okay by our terms so it doesn't hurt us in any way. We do not consult with the ants or other insects that are currently living there because we are the rulers of this planet/area and they are less intelligent that us. If this is the case, why can't it be the same for the machines when they have transcended to singularity?

Note: This is more of a theoretical and ethical science fiction question.

Question 5

AI solutions are largely built on neural networks which is based on Neuroscience. What similarities can we find between neuroscience and artificial intelligence?

Our mind can be viewed as a state machine functioning like a recurrent neural network. The input of the network can be viewed as time passing and one of those inputs as previous time passed. Thus, memory can serve as the function of changing your state of mind by reverting your state to a previous time passed. You are your state and your state largely determines the state at the next time step, which makes the mind's memory and the computation the same entity.

Or

The mathematical weights and biases inside a person's mind is what makes up the view of the world, the same as the weights of a neural network. A person will learn by experience, just like the network. These weights will in turn inform what one thinks and what decisions will be made. A person and an artificial neural network might likely hold false beliefs of the world as a result of over valuing or undervaluing certain aspects of life, just like the neural network might over fit and under fit data perceived. Similar case can be applied to garbage in, garbage out - but who determines what garbage is and what isn't? One man's garbage is another man's treasure ☺

"You act based on what you think you are and what you think the world is, not who you are or what the world is."