

Individual Task 1 : Module – 1

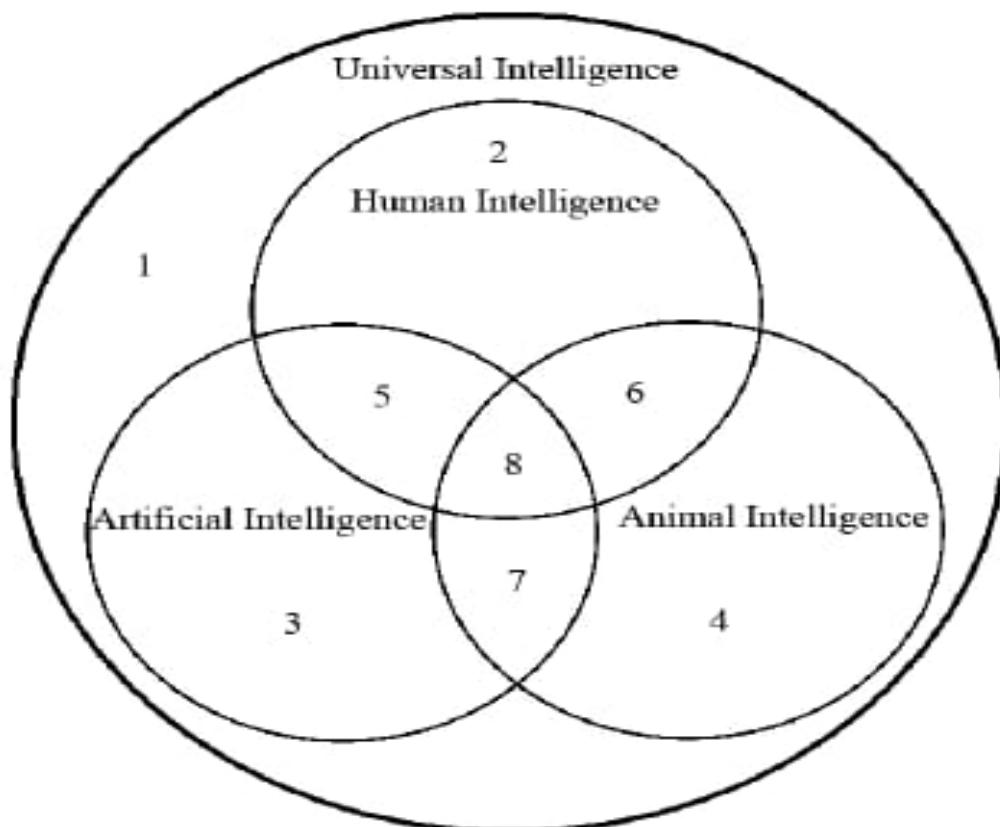
Foundations of AI: Historical milestones and Core Concepts

Compare different forms of intelligence using (human, animal, machine) using a chart or diagram.

⇒ Intelligence is the ability to learn from experience, understand information, think logically, solve problems and adapt to new situations.

Types of Intelligence

1. Human Intelligence: Natural intelligence possessed by humans.
2. Animal Intelligence: Intelligence shown by animals for survival.
3. Machine Intelligence: also called as Artificial intelligence. Intelligence demonstrated by machines to perform tasks.



* **Generalization (The Transfer in Abilities)**

Human: Human and Transfer learning: If you learn to draw a car, you can likely draw a girl next or a leaf with almost no extra training from scratch. The concept of drawing is transferable.

Animal: Animals show limited transfer skills. A dog trained to use a stick to get food might apply that tool concept to use a similar item, but it won't apply it to an unrelated task like building a shelter. Even apes stick only to tools.

Machine: Machines are highly task-specific. An AI trained to beat chess players in the world, won't help you at to play Checkers. It cannot transfer its knowledge from one game to another without being reprogrammed. Today's AI can't play Checkers.

* **Data Efficiency**

Human: If you can imagine a different child only need to see a lion in a picture book few times to recognize only one in the zoo, then you child learn often seeing "draw" out of their life so child learn often seeing "draw".

Machine: AI's data hungry. To recognize lion with high accuracy a neural network might need 100,000 labeled images of lions from every angle, through lighting conditions. Repeat the same over and over.

Animal: Animals sit in the middle; they are programmed by evolution with some innate data allowing them to avoid threats almost instantly from birth. Ex: Baby deer flees predators naturally.

* **Creativity and Innovation**

Human: The creative divergent thinking. Human can create something entirely new by combining two unrelated concepts. This driven by imagination etc. Through more time.

Animal: Animals show problem solving but rarely innovation at the scale of it. A chimpanzee might use a stick to reach a fruit but won't try to create the stick or improve its design unless it have immediate reward not long term imagination, no start new.

Machine: Machines exhibits generative models. It does create new style of art. It calculates the statistical patterns of training data and generate new combinations. But it doesn't understand the meaning of what it creates, it follows pattern. Eg: A painting.

*** Ethics and Moral Reasoning**

Human: We are moral framework, our intelligence allows us to ask “Should I do this” rather than “can I do this”. It is based on empathy guilt and justice. Ex: Returning a lost wallet.

Animal: Animals operate on moral instinct. In a wolf pack they are usually follow the pack hierarchy and group survival. They no abstract concept of universal human rights. It is the survival.

Machine: Machine have encoded constraints. An AI doesn't have a conscience. If it avoids saying something offensive, it's not because it feels it is wrong but because a human programmer instruct it to avoid it.

*** Scalability of Intelligence**

Human: Scalability of intelligence we solve through collaboration and technology. One human might go to the moon but by simply adding more human and data, it is the mind form. Eg: 100,000 humans working together can create a large product, a skyscraper or science.

Animal: Scalability is limited by biology. You cannot make a monkey smarter by adding 1,000 new brains to the pack.. Eg: A large AI, a super brain, can make tasks more.

Machine: Scalability linear and massive. You can double the intelligence of an AI by simply adding more GPUs and data. It the scalability from one AI right today could feed over a million users instantly. Ex: Adding GPUs makes AI more powerful.

*** Error Recovery**

Human: Humans exhibit flexible, contextual behavior. If you make a bad mistake, we apologize and adjust our behavior based on the other person's facial expression and adjust our behavior based on broader social norms. It we can learn our often mistakes on broader scale.

Animal: Even be trained as educational innovation. A dog to learn to fetch and return, but requires repetition and immediate physical feedback. It doesn't understand the abstract concept of “reward” or “punishment” in the same way as human. It will repeat that behavior million of times without understanding it was wrong. It requires a human to tell “good boy” or “bad boy”. Eg: adding rules the same word.

* Metacognition

Human: We have high metacognitive ability. It means we can question about our own knowledge and thoughts. You can intuitively say “I don’t know this answer. I should learn it” or “I am confused”.

Animal: Animals have functional awareness. A hunting dog knows it has a bad nose, it know a flying bird, but it don’t conceptualize lack of knowledge. It cannot jump out and self reflect.

Machine: AI suffer from hallucination because it is statistical pattern prediction. It often doesn’t know when it is wrong. It will confidently generate a fake fact because most previous data statistically plausible. Lacking the internal “check and balance” it doesn’t give an answer even when it is wrong