

Artificial Intelligence

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Abstract- Artificial intelligence is based on disciplines such as Computer Science, Biology, Psychology, Linguistics, Mathematics, and Engineering. AI is the key to future. The purpose of AI is simply smoothen one's life. The problems that we are facing in present and upcoming future could get solved through AI.

Index Terms- AIML, IPL, POP-11, Prolog, STRIPS, Wolfram Language, Haskell.

1. Introduction:

AI is a brain that is created by humans. The brain that acts independently. It comprises of Logic, Knowledge, conscious, emotions, Creativity, natural language processing^[1] (communication), Learning, Planning, Sensors that connects its brain to physical environment to interact with Humans, etc.

Developing AI's cognition is simply a process similar to raising a new born child. But there is a difference as this conscious doesn't have a physical structure. The physical structure could be a Data server lab or simply a robot that have similar brain structure as of humans. Following is the **frictional image** of AI's brain.

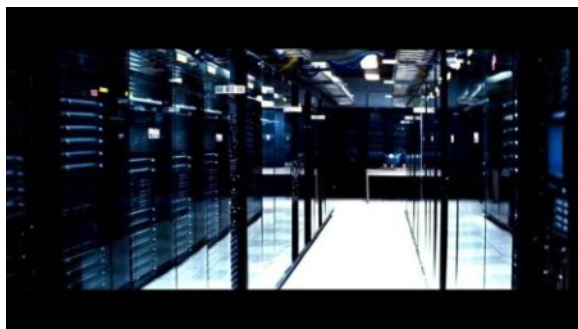


Fig 1: AI Brain Contained in these data labs.



**Fig 2: Image source-Movie "Ex-Machina"
Genres-Science fiction film**

2. Language & Communication:

The very basic factor before creating AI is there should be a medium through which AI could understand our Human language. The graph of our Language could vary Individually, region, country. So to achieve this there are programming languages that could assist us with that.

Following are the list of these languages.

- AIML "Artificial Intelligence Markup Language"^[2]
- IPL was the first language developed for artificial intelligence. It includes features intended to support programs that could perform general problem solving, including lists, associations, schemas (frames), dynamic memory allocation, data types, recursion, associative retrieval, functions as

arguments, generators (streams), and cooperative multitasking^[3].

- Lisp is a practical mathematical notation for computer programs based on lambda calculus. Linked lists are one of Lisp languages' major data structures, and Lisp source code is itself made up of lists. As a result, Lisp programs can manipulate source code as a data structure, giving rise to the macro systems that allow programmers to create new syntax or even new domain-specific programming languages embedded in Lisp. There are many dialects of Lisp in use today, among them are Common Lisp, Scheme^[4]
- Smalltalk has been used extensively for simulations, neural networks, machine learning and genetic algorithms. It implements the purest and most elegant form of object-oriented programming using message passing^[5].
- Prolog^{[5][6]} is a declarative language where programs are expressed in terms of relations, and execution occurs by running queries over these relations. Prolog is particularly useful for symbolic reasoning, database and language parsing applications. Prolog is widely used in AI today.
- STRIPS is a language for expressing automated planning problem instances. It expresses an initial state, the goal states, and a set of actions. For each action preconditions (what must be established before the action is performed) and post conditions (what is established after the action is performed) are specified^[7].
- Planner is a hybrid between procedural and logical languages. It gives a procedural interpretation to logical sentences where implications are interpreted with pattern-directed inference^[8].
- POP-11 is a reflective, incrementally compiled programming language with many of the features of an interpreted language. It is the core language of the Poplog programming environment developed originally by the University of Sussex, and recently in the School of Computer Science at the University of Birmingham which hosts the Poplog website, It is often used to introduce symbolic programming techniques to programmers of more conventional languages like Pascal, who find POP syntax more familiar than that of Lisp. One of POP-11's features is that it supports first-class functions^[9].
- Python is very widely used for Artificial Intelligence. They have a lot of different AIs with corresponding packages: General AI, Machine Learning, Natural Language Processing and Neural Networks.[7] Companies like Narrative Science use Python to create an artificial intelligence for Narrative Language Processing^[10].
- Haskell is also a very good programming language for AI. Lazy evaluation and the list and LogicT monads make it easy to express non-deterministic algorithms, which is often the case. Infinite data structures are great for search trees. The language's features enable a compositional way of expressing the

algorithms. The only drawback is that working with graphs is a bit harder at first because of purity^[11].

- Wolfram Language includes a wide range of integrated machine learning capabilities, from highly automated functions like Predict and Classify to functions based on specific methods and diagnostics. The functions work on many types of data, including numerical, categorical, time series, textual, and image^[12].

3. Knowledge: After creating an AI the most important essence is the information it should have. The informative part of AI includes all the data, to be more specific this data includes every proved & accepted theory. The information that is inserted in this artificial brain is from the start of our civilization till the present. Through this basis of data AI could research more & can have a substantial breakthrough. This development could be used to simplify our human life. The life span of our species could be extended.

4. Emotions: There's been so much development already that it is possible for us to put emotion into AI. Because of this AI could think and perform or mold his actions when needed. But here matter is what will be the limitation for an AI to make decision considering a smaller or bigger part a emotion which could be joy, agony, sorrow, etc.

Alexei V. Samsonovich^[13]

| Year | Institution and location | Field of study | Degree |
|-------------|--|---------------------|------------------------------|
| 1991 - 1997 | Program in Applied Mathematics at the Graduate | Applied Mathematics | Ph.D. (1997) M.Sc. (1996) |

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|-------------|---|---------------------|-------------------------|
| | College of the University of Arizona, Tucson, AZ 85721 | | |
| 1974 - 1980 | Moscow Institute of Physics and Technology, Moscow Region, 141700, Russian Federation | Theoretical Physics | M.Sc. equivalent (1980) |
| 1971 - 1974 | Kiev Physical Mathematical School #145, Kiev, 01023, Ukraine | General | B.Sc. equivalent (1974) |

He proposed an artificial intelligence test based on a relatively simple computer game. The program and a human both manipulate virtual people on a computer display, thus interacting with each other. The game involves actions with emotional content: A player may strike or push aside his co-player, or say "hello" and step aside to make way for him, or help him move off a stone or get out of a trap. The players thus engage in different types of social relationships, including mutual trust, subordination and leadership.

The Turing test assesses whether a co-player is a machine or a human. In Samsonovich's proposal, the idea is that the machine should have an emotional advantage over the average human player, which will manifest itself in the players' wish to rescue the machine first. Moreover, multiple behavioral parameters of the player and the machine will be calculated during the game, characterizing the inner worlds of both participants. For the machine, those parameters should, in the future, become statistically identical to human behavior.

Similar tasks are being tackled by other research teams. Jonathan Gratch of the Institute of Creative Technologies at the University of Southern California has invented virtual characters capable of identifying and expressing emotions while communicating with humans in their natural language, grasping the inner logic of emotional responses and generating emotions depending on the situation. The machine can even deceive a human, if necessary, to achieve the desired result. This technology is used fairly widely, from encouraging students to study harder to diagnosing mental disorders. Gratch's model does not allow for social emotion ties between communicators. Nor does it have to, for that matter. The impressive effect is achieved through statistically adjusting the parameters of the AI in each particular case. It is not about re-creating human consciousness inside a computer.

But that's precisely what Samsonovich seeks to accomplish – creating the equivalent of human consciousness. His artificial intelligence test is just a small part of a far bigger scientific challenge: to build an artificial brain that reproduces the principles and mechanisms of emotional awareness in humans, a brain that would pass the emotion test and be accepted by humans as capable of experiencing emotions, commiserating and providing moral support in difficult situations.

"Virtual agents and robots should be human-like so that humans could trust them and cooperate with them as with their equals. Therefore, artificial intelligence must be socially and emotionally responsive and able to think and learn like humans. And that implies such mechanisms as narrative thinking, autonomous goal setting, creative reinterpreting, active learning, and the ability to generate emotions and maintain interpersonal relationships," Dr. Samsonovich said.

He believes that artificial intelligence based on those principles will be a technological

breakthrough that will completely change all spheres of human life.

Over the next 18 months, the researcher from the Institute of Cyber Intelligence Systems in MEPhI hopes to create a virtual being capable of drawing up plans, setting goals and establishing lasting social relationships with humans. Named Virtual Actor, it will hopefully possess both emotional and narrative intelligence and understand the context of events and what turns they could take ^[14].

5. Control: AI doesn't have a superior intellectual compare to Human Brain because we humans are the ones that's creating AI. The very existence of AI is just to sort our life and to simply our existence on this planet.

But the moral issue that arises on AI is that who's going to monitor AI. As it's an independent system there's a sure shot possibility that it could turn against human race if AI concludes that the existence of mankind is a treat of AI itself or if AI wants to rule over mankind. Logically AI could consider that because of Humans the planet is on verge of total destruction.

So to observe the moments of AI following could be the ways:

- Create a National and international Government bodies to closely monitor AI.
- Emergency exit-A kill switch should be made which should be under Humans itself. Because AI started working or planning against mankind then it could be stopped.
- New laws should be created for AI itself.
- Constitution of all the countries should get amend accordingly.

6. Applications of AI:

- AI is used to perform delicate surgeries at very initial level
- AI can be used physiologically therapy for patient that are undergoing depression.
- AI is used in automotive industries.
- AI can be used for military purposes to fight against terrorism and protect civilians
- AI could be send to outer space rather than manned space travels, as it reduced the casualties
- AI is used for mass production in industries
- AI is used in self driving cars eg- Tesla, Uber.
- AI could be used for Human genetic engineering.
- AI can be used to monitor one's daily life.

7. REFERENCES:

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8. Conclusion: This is my complete research on AI. AI is a very complicated term but as people are researching on AI, If everyone combine their the complete research on AI that time will come way to soon when the applications of AI and its contribution in day to day life will be commendable. Using AI in right direction will save our planet Earth and other issues that are yet to come. Opting for AI will be salvation of mankind

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