บทที่ 6 วิทยาการหุ่นยนต์และการรับรู้
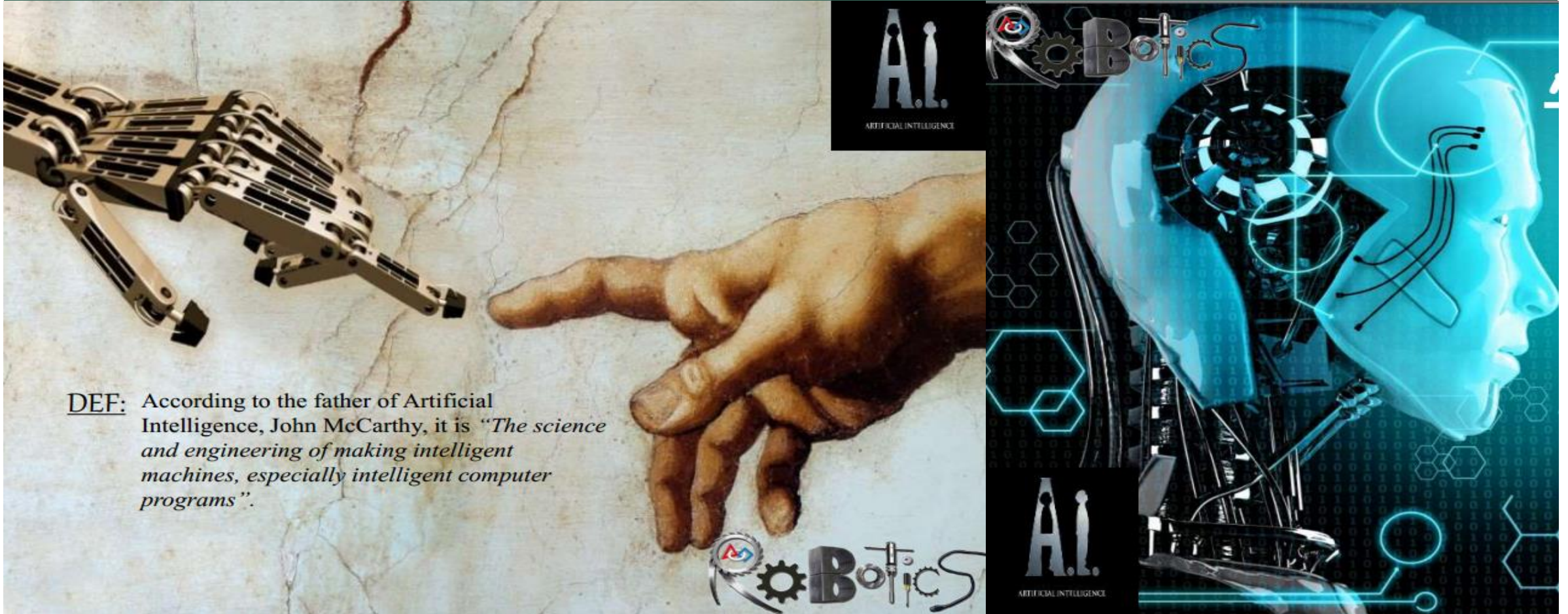
(Robotics and Perception)

นำเสนอโดย

ผู้ช่วยศาสตราจารย์จุฑาวุฒิ จันทรมาลี

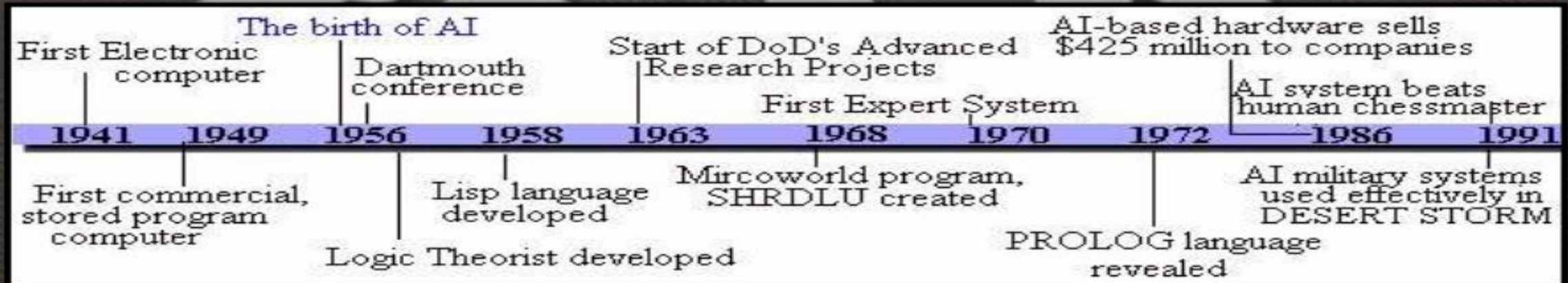หลักสูตรวิทยาการคอมพิวเตอร์

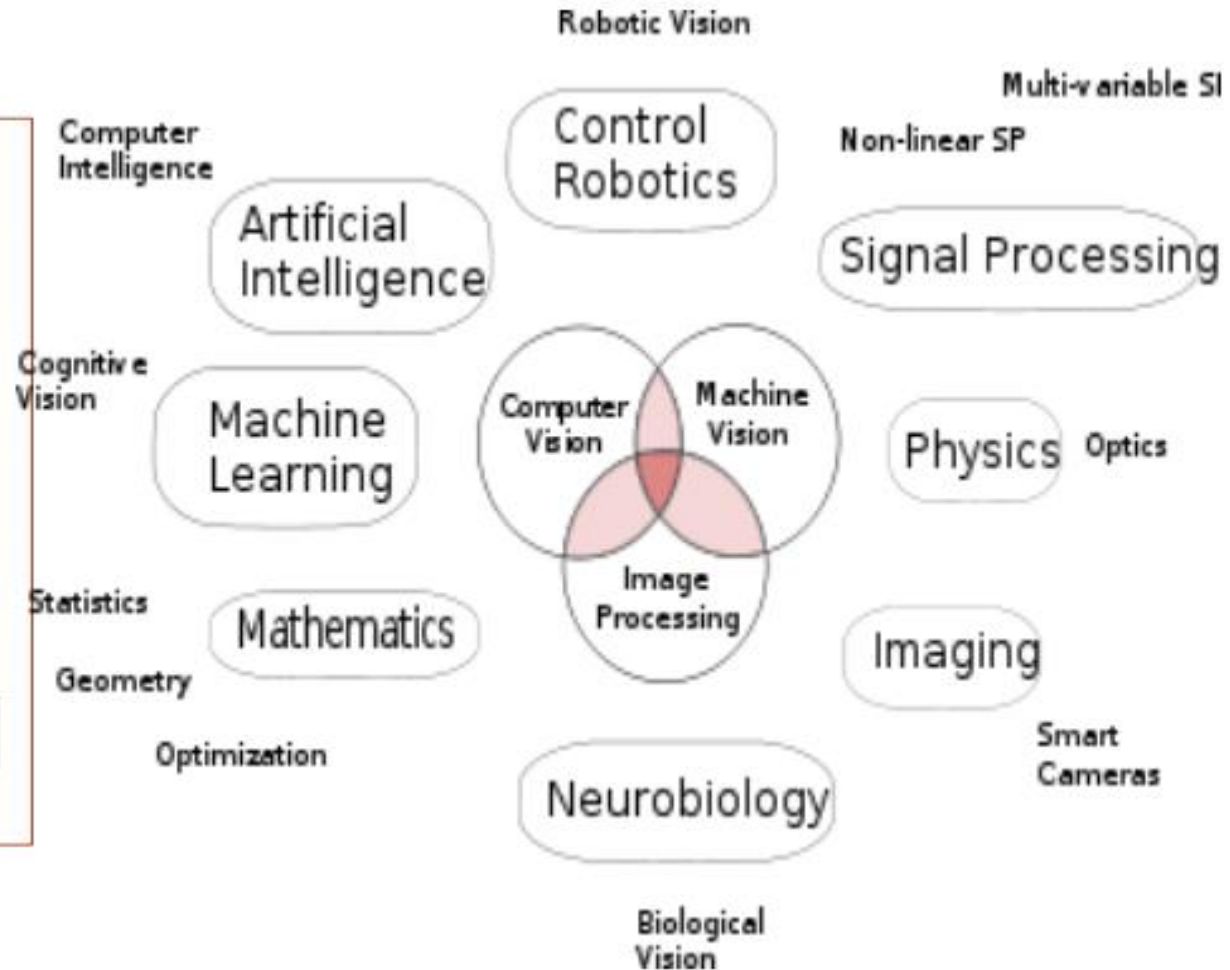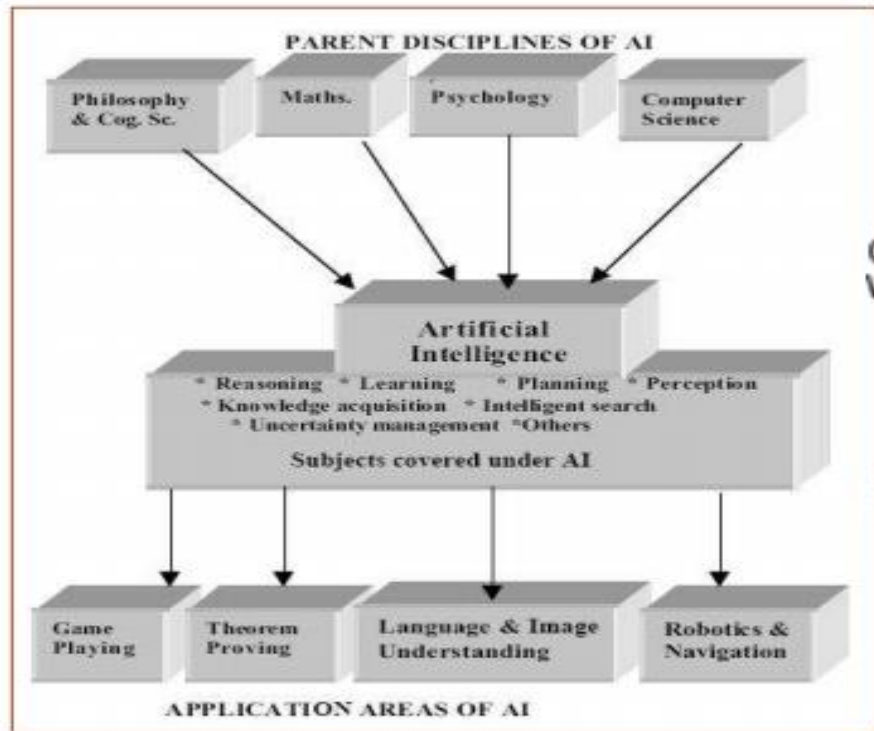มหาวิทยาลัยสวนดุสิต

ROBOTICS

DEF: According to the father of Artificial Intelligence, John McCarthy, it is *"The science and engineering of making intelligent machines, especially intelligent computer programs".*

HISTORY

➤John McCarthy is the father of Artificial Intelligence And developed the Lisp (List Processing) Programming Language, Which is the second oldest high-level Programming language.

➤Alan turning proposed the concept of Turning Test in Artificial Intelligence during the Second World War.

➤Other big names in AI research Include Marvin Minsky, Allen Newell & Herbert Simon.

		The birth of AI		Start of DoD's Advanced Research Projects		AI-based hardware sells $425 million to companies	
First Electronic computer		Dartmouth conference			First Expert System		AI system beats human chessmaster
1941	1949	1956	1958	1963	1968	1970	1972	1986	1991
	First commercial, stored program computer		Lisp language developed	Mircoworld program, SHRDLU created			AI military systems used effectively in DESERT STORM
		Logic Theorist developed				PROLOG language revealed	

LANGUAGE USED FOR ROBOTICS

- Lisp – List processing
- Prolog - **PRO**grammation en **LOG**ique
- Python
- Java
- C++

IT IS A BROAD FIELD WITH SO MANY SUBAREAS.

MEANING OF ROBOTS

A ROBOT is a mechanical or virtual artificial agent, usually an electro-mechanical machine that is guided by a computer program or electronic circuitry.

A Robots can be autonomous or semi-autonomous.

A Robot may convey a sense of intelligence or thought of its own.

• Honda's Advanced Step in Innovative Mobility (ASIMO) and TOSY's TOSY Ping Pong Playing Robot (TOPIO) to Industrial robots, medical operating robots, patent assist robots, dog therapy robots, collectively programmed Swarm robots, UAV drones such

TYPES AI WORKS IN ROBOTS

- Strong A.I. is intelligence that matches or exceeds that of human intelligence.
- Ultimate goal of A.I. research.
- Weak A.I. is narrow/more focused than strong A.I.
- **Whole Brain emulation**- Mapping and re-creating the human brain through neuro-imaging.

NATURAL LANGUAGE PROCESS IN ROBOTICS

Processing of Natural Language is required when you want an intelligent system like robot to perform as per your instructions, when you want to hear decision from a dialogue based clinical expert system, etc.

here are two components of NLP as given –

Natural Language Understanding (NLU)

Understanding involves the following tasks –Mapping the given input in natural language into useful representations . Analyzing different aspects of the language.

Natural Language Generation (NLG)

It is the process of producing meaningful phrases and sentences in the form of natural language from some internal representation.

INTELLIGENCE FOR ROBOTICS:

The ability of a system to calculate, reason, perceive relationships and analogies, learn from experience, store and retrieve information from memory, solve problems, comprehend complex ideas, use natural language fluently, classify, generalize, and adapt new situations

TYPES OF INTELLIGENCE FOR ROBOTICS:

1. Linguistic intelligence

2. Musical intelligence

3. Logical-mathematical intelligence

4. Spatial intelligence

5. Bodily-Kinesthetic intelligence

6. Intra-personal intelligence

INTELLIGENCE
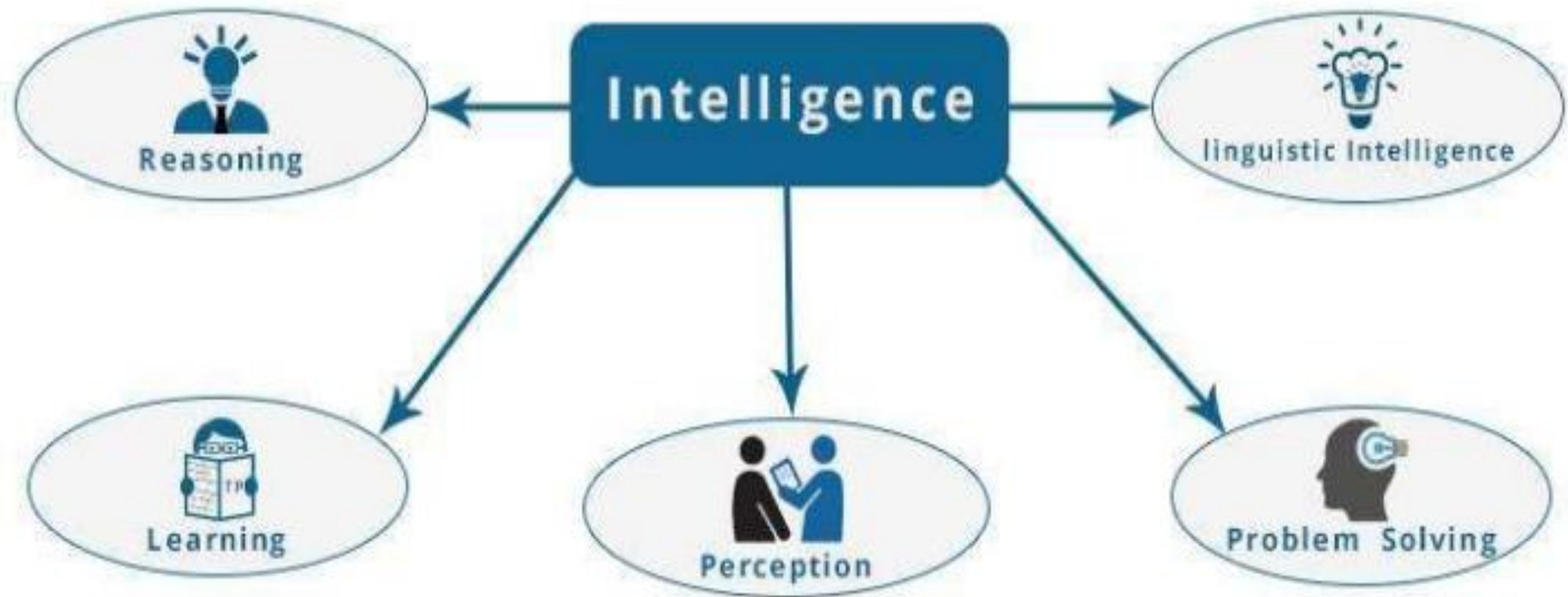
WHAT IS FUZZY LOGIC?

Fuzzy Logic (FL) is a method of reasoning that resembles human reasoning. The approach of FL imitates the way of decision making in humans that involves all intermediate possibilities between digital values YES and NO. , such as –

CERTAINLY	YES
POSSIBLY	YES
CANNOT	SAY
POSSIBLY	NO
CERTAINLY	NO

APPLICATION AREAS OF FUZZY LOGIC

Automotive Systems

Automatic Gearboxes, Four-Wheel Steering, Vehicle environment control

Consumer Electronic Goods

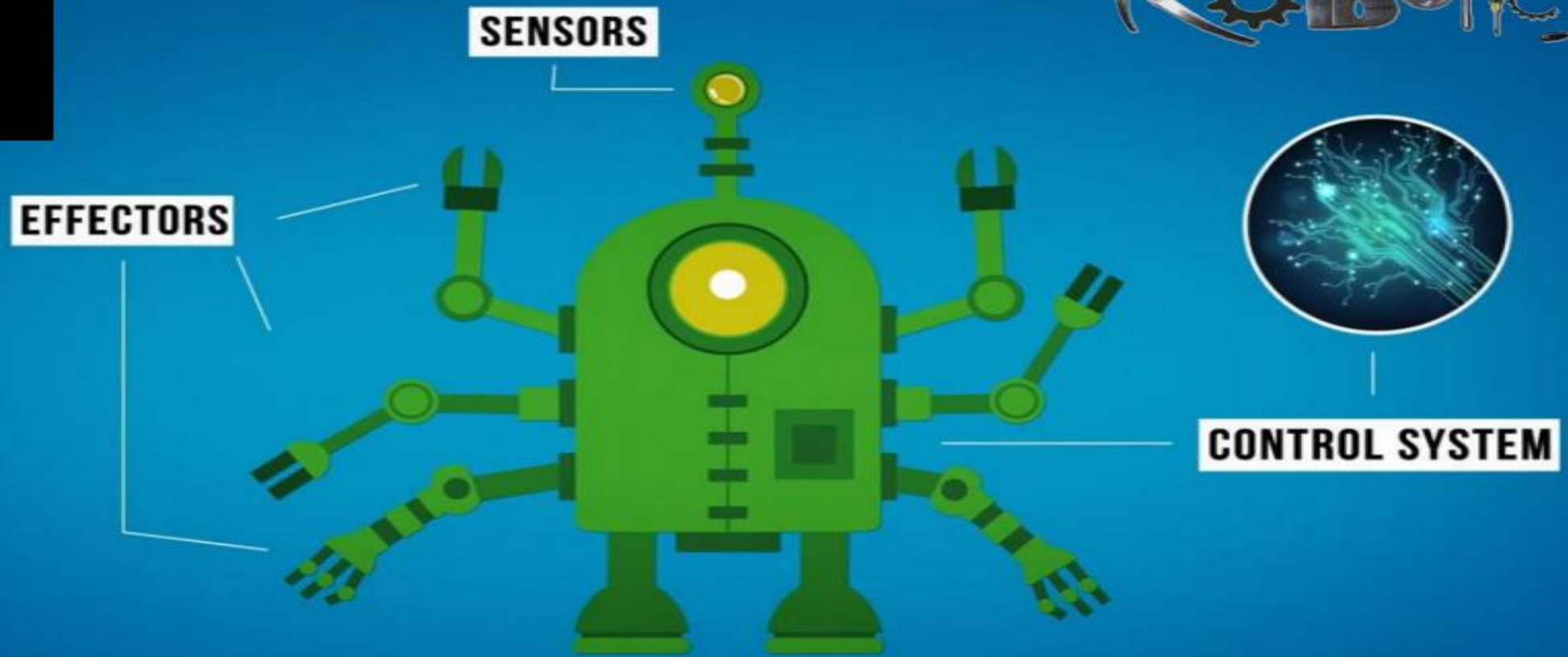Hi-Fi Systems, Photocopiers Still and Video Cameras, Television

Domestic Goods

Microwave Ovens, Refrigerators, Toasters, Vacuum Cleaners, Washing Machines

Environment Control

Air Conditioners/Dryers/Heaters

HOW DOES THE ROBOTS WORKS ?

DAILY LIFE APPLICATION

- Home Security
- Post office
- Digital cameras
- Financial trades
- Games and toys

- Bank
- Websites
- News and publishing
- Health and medicine

FIELDS OF ROBOTICS IN AI

Aviation & Automation:

- NASA's fight research centre
- Voice recognition in fighter jets
- Directions to A.I pilots through air traffic controllers
- Automatic Gearing System in Cars

FIELDS OF ROBOTICS IN AI
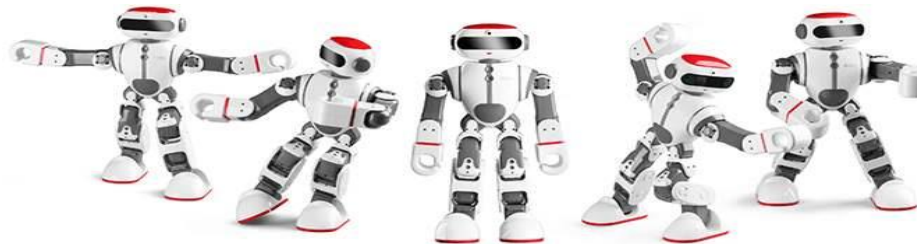
FIELDS OF ROBOTICS IN AI
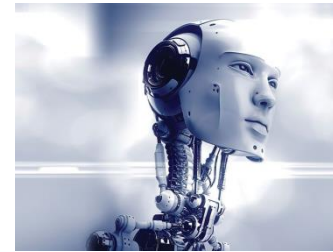

A.I In Medical Field

- Medical robots are becoming more common in medical field.
- They have many uses including :Helping doctors and patients.
- An example of robotics in medicine today is laser eye surgery
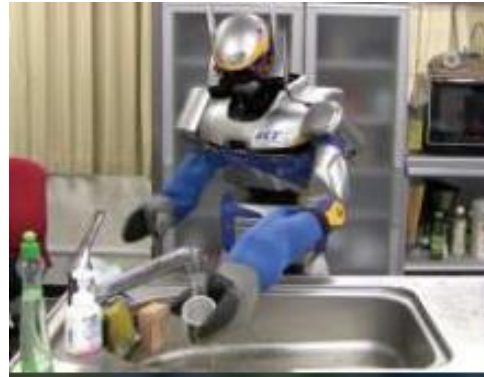
HARD-TASK ROBOT WITH AI

Robotics:

- Assembling Robots
- Welding Robots
- Behavior based robotics
- Dancing Robots
- Robot navigation

ROBOTIC IN HOUSE

These robots are used for house cleaning, serving , assisting people and Etc...

AI IN BANK AND TRADING

Banks use artificial intelligence systems to organize operations, invest in stocks, and manage properties. In August 2001, robots beat humans in a simulated financial trading competition

CHAT BOT SOME VIRTUAL ASSISTANCE AVAILABLE
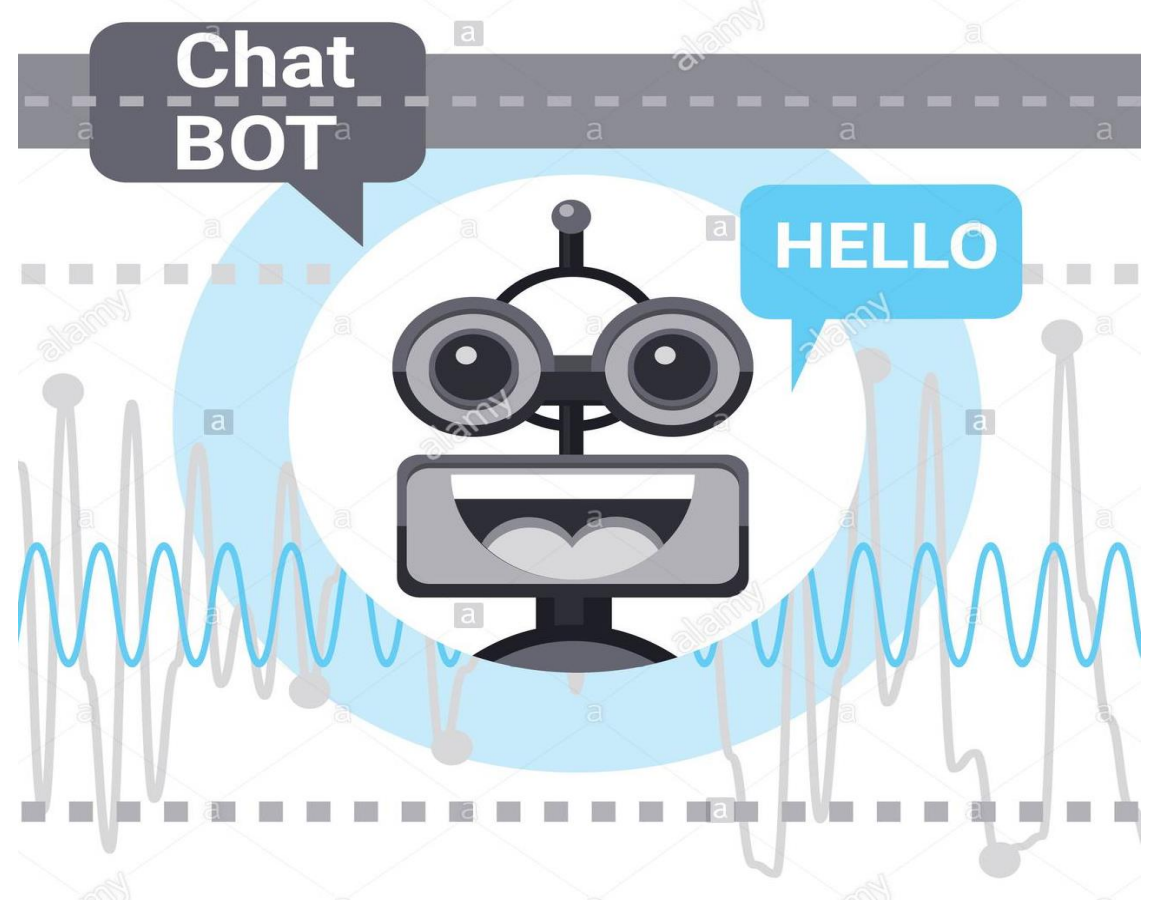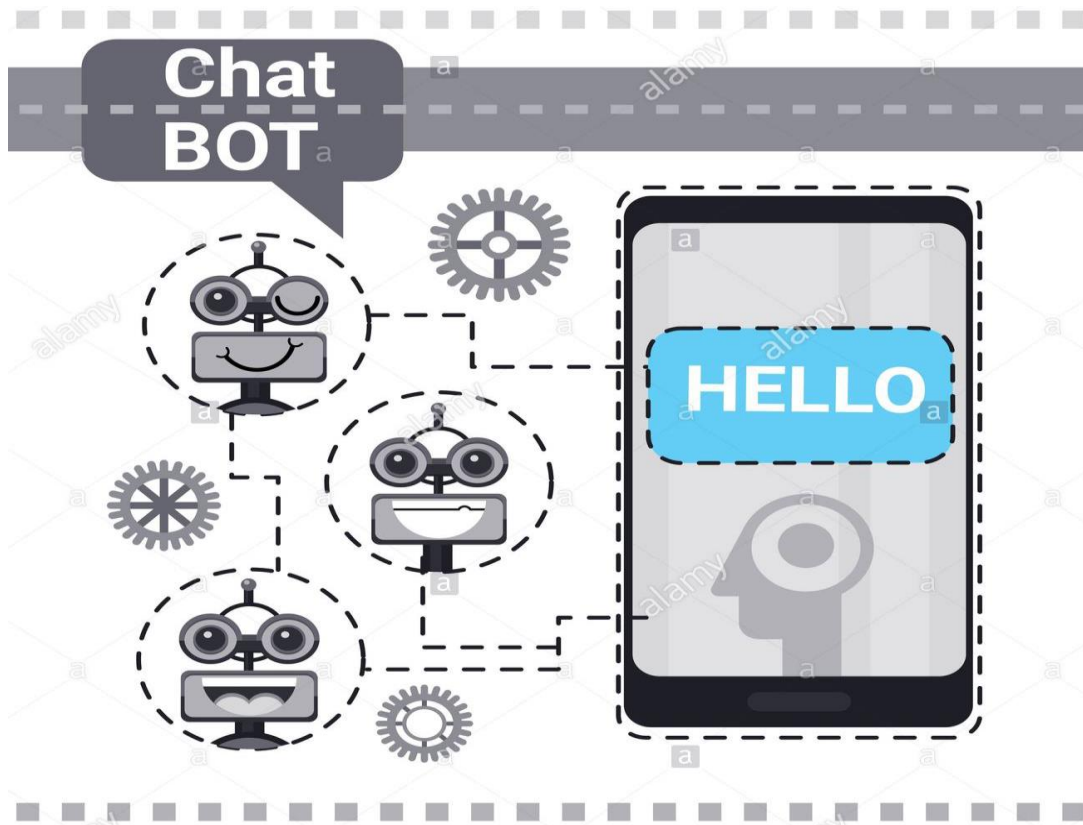
ACHIEVEMENTS

- In 1996 Greatest Chess Player of All Time Garry Kasparov from Russia face IBM's Deep Blue and Garry managed to beat Deep Blue but Next year Deep Blue Won.

- In 1998 Undisputed champion of Rapid Chess Vishwanathan Anand faced off against Robel-10 and Robel-10 Win.

- In 2002 Worlds Highest Ranker Player Vladimir Kramnic faced off Deep Fritz (Super comp.) Vladimir Draw match but

ACHIEVEMENTS

- DARPA Grand challenge -123 miles through the desert in the year 2004 & 2005
- DARPA Urban challenge – autonomous driving in traffic in the year 2007
- DARPA Robotics Challenge Finals test state-of-the-art robots' ability to perform tasks related to disaster response

DRAWBACKS

- Limited Ability

- Slow Real Time Response

- Can't Handle Emergency Situation

- Difficult code

- High Cost

WE WERE ALSO BEEN WARN SOME OF SCIENTISTS AND EXPERTS

Hawking , Musk , Wozniak And More······

CONCLUSION

Finally, as the technology Improves, there will be new ways to use robots with

A.I which will bring new hopes and new potential

HISTORY

HISTORY

THANK YOU
FOR
YOUR ATTENTION

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