

CS 561 Artificial Intelligence

Lecture # 1

Rashmi Dutta Baruah

Dept. of Computer Science & Engineering

IIT Guwahati

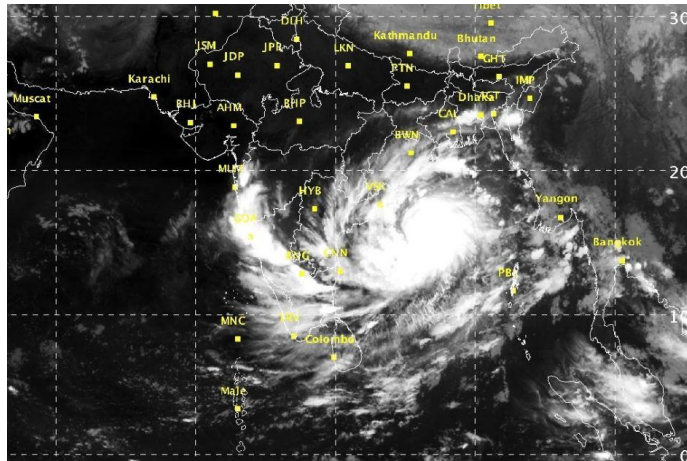
Introduction

- How AI impacts life today and how it could change future?



Early Warning: Saving Lives in India

(source: United Nations Development Program (UNDP) in India : www.in.udp.org)



(Image source: India Meteorological Department, www.imd.gov.in)

- The 2004 tsunami took the lives of about **10,000 people** in India and wrecked towns and villages in several coastal states.
- Following the tsunami, the Government of India took major steps to build early warning systems.
- The Indian Meteorological Department has developed systems for issuing accurate warnings and generating real-time weather reports that are provided to disaster management agencies and emergency support service responders.
- In 2013 cyclone Phailin only **38 people** and in October 2014 Cyclone Hudhud **46 people** were reported killed.

- Robots for boring or dangerous tasks
 - **Robotic vacuum cleaners** : cleans according to schedule, able to maneuver around obstacles like stairs, furniture and even pets.
 - **PackBot** from iRobot is used for handling hazardous tasks like bomb disposal, surveillance and reconnaissance.



iRobot Roomba Vacuum Cleaning Robot
(sold over two million)



iRobot PackBot
(over 2000 deployed in Iraq and Afghanistan)

- **Planning and scheduling softwares:** AI based planning and scheduling softwares are used in Hospitals for Staff scheduling and many other complex scheduling tasks.
- Aurora Intelligent Planning & Scheduling System from Stottler Henke is used by Boeing company in assembly schedule for production of aircrafts.



Image source: School of Medicine, Wright State University
med.wright.edu



Image source: Stottler Henke www.stottlerhenke.com

Introduction

- AI based marketing: behavioural targeting, targeted advertising



Google start 'real world' target-based advertising based on mobile phone GPS and mobile history.

Source: www.newsbiscuit.com

Thank god ! Finally
I got to talk to a real
person.



online dating, driverless cars, robot
journalists....AI everywhere

Introduction



sources: <https://www.pinterest.com/jaymzcardi/camouflaged-animal-kingdom/>
<http://www.awayweglobe.com/the-latest/2014/11/19/funny-observations-india>

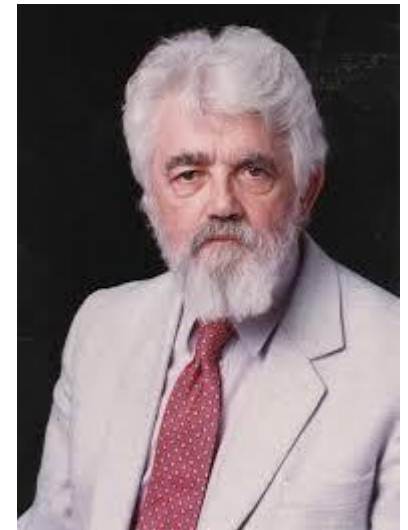
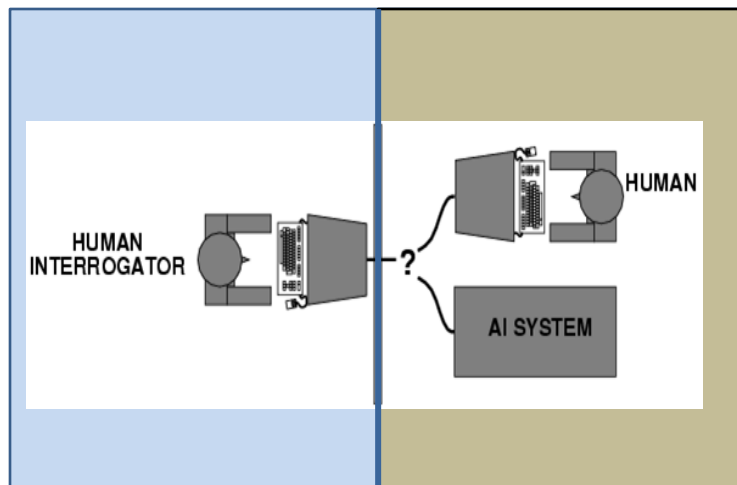
Commonsense, Vision, Interaction , . . . , which we perform without any conscious thought are most difficult to emulate.

Let's look back...



Alan Turing (1912-1954) proposed **Turing Test** (1950) in his paper *Computing Machinery and Intelligence*.

John McCarthy (1927-2011) one of the founders of the AI discipline, **coined the term Artificial Intelligence** in 1956. Also developed LISP programming language.



Artificial Intelligence

- Artificial Intelligence covers a HUGE variety of SUB-FIELDS.

Logic
Knowledge
representation and
reasoning

Planning

Machine
Learning

Game Playing
board games:
chess and
checkers

Natural Language
Processing
Machine
Translation

Computer Vision

Robotics

What is Artificial Intelligence?

- Views of AI fall into four category:

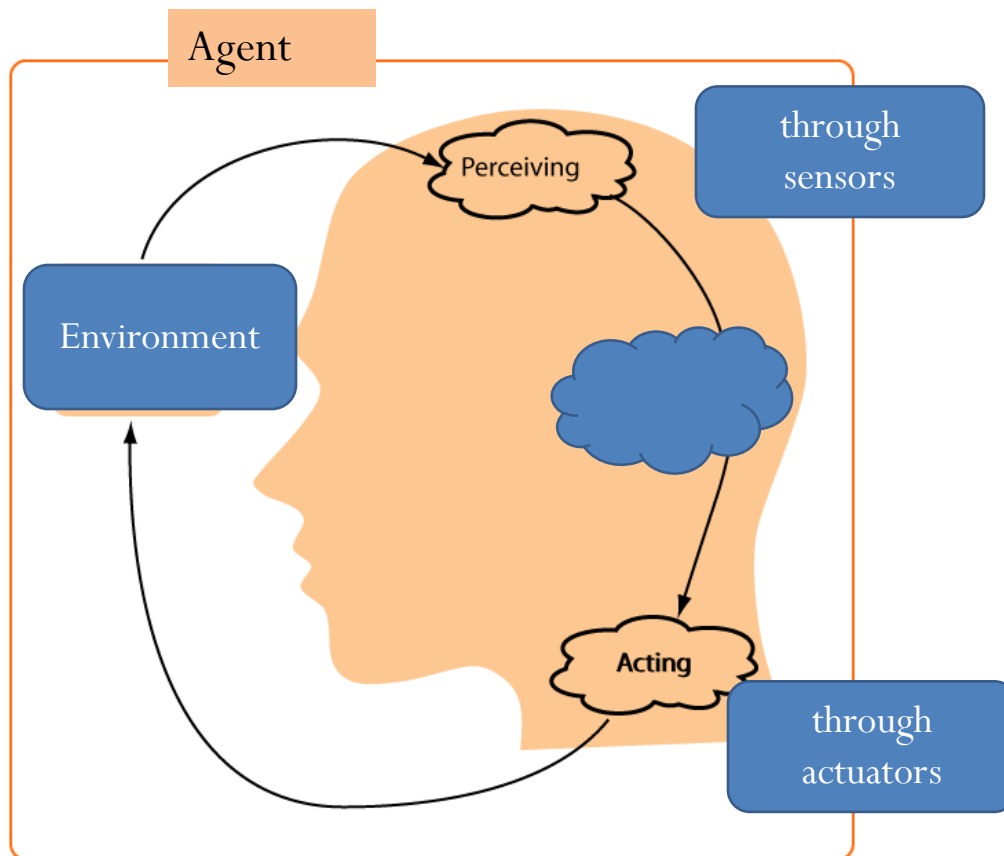
Thinking Humanly	Thinking Rationally
Acting Humanly	Acting Rationally

- **Acting rationally: The rational agent Approach**
 - Rational behavior: doing the right thing
 - The right thing: that which is expected to maximize goal achievement, given the available information.
 - Doesn't necessarily involve thinking – e.g., reflex actions
 - However, thinking is one of the ways of achieving rationality.

.

Rational Agents

- An **agent** is an entity that perceives and acts.



Rational Agents

- A **rational** agent is one that does the right thing.
- Right thing
 - considering the outcome of agent behaviour on the environment (environment states not agent states).
 - If the outcome is desirable then the agent has performed well.
 - Desirability in terms of performance measure.
- Design performance measures according to what is desired in the environment, rather than according to how one thinks the agent should behave.
- This course focuses on designing rational agents: general principles and its components.

- Do you think the following systems are instances of Artificial Intelligence?
 - Supermarket bar code scanners
 - Web search engines
 - Voice- activated telephone menus
 - Washing Machines

Course Information

Book: **Artificial Intelligence : A Modern Approach**

S. Russell and P. Norvig, 3rd Edition, Pearson

Grading Components

- **Mid Sem (20%)**
- **End Sem (30%)**
- **Quiz (15%)**
- **Assignment (25%)**
- **Class Participation (10%)**