Artificial intelligence	Week (1)

Section Content:

- **Introduction to AI & Python Revision**

Artificial Intelligence Definition

- An intelligent entity created by humans.
- Capable of performing tasks intelligently without being explicitly instructed.
- Capable of thinking and acting rationally and humanely.

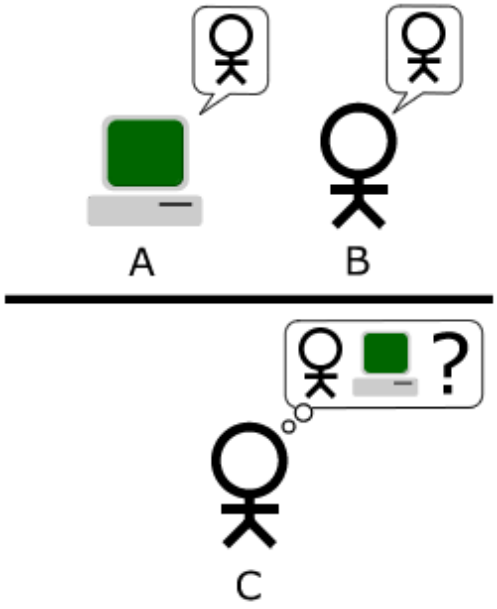
Rational➔ based on reason & logic.

Main goal➔ to emulate human mind & behavior

Test the human likeness of AI with these tests

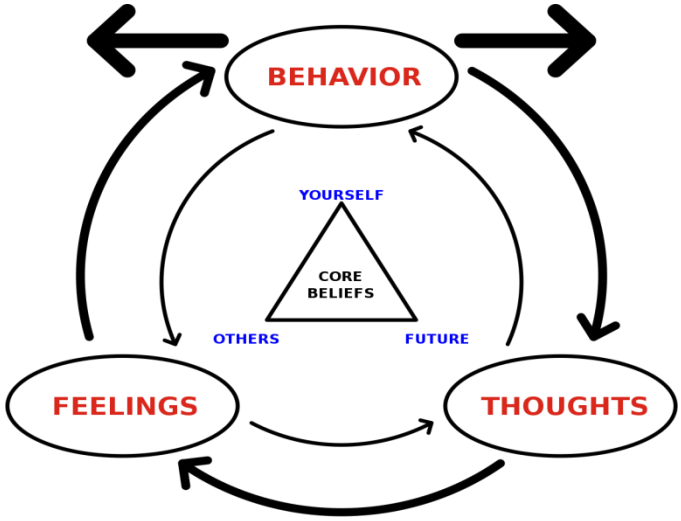
Turing test:

- Turing Test is that the Artificial Intelligence entity should be able to hold a conversation with a human.
- The human agent ideally should not able to conclude that they are talking to an AI.



The Cognitive Modeling Approach

- It tries to build an AI model-based on Human Cognition. To most important aspect of the human mind, there are 3 approaches:
  - Introspection: **observing our thoughts**, and building a model based on that
  - Psychological Experiments: conducting experiments on humans and **observing their behavior**
  - Brain Imaging: Using MRI to **observe how the brain functions in different scenarios** and replicating that through code.

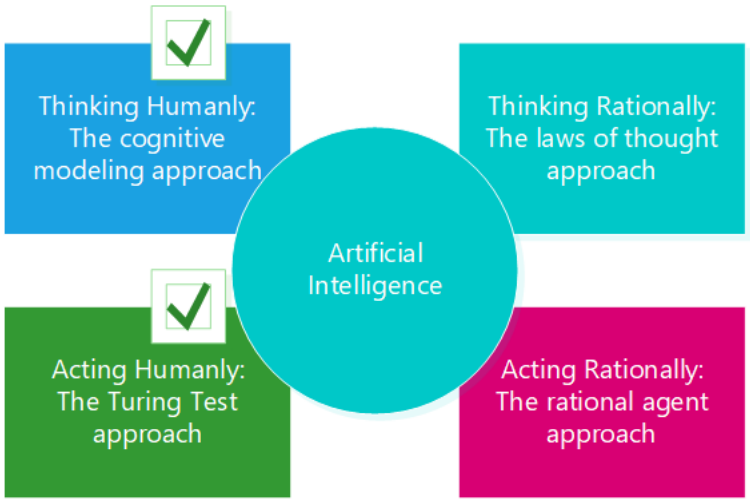


The Laws of Thought Approach

- The aim is to create AI that thinks and solves problems like humans do by following these logical rules.
- The issues with this approach, because solving a problem in principle and solving them in practice can be quite different.

The rational agent approach

- The rational agent approach tries to make the best possible choice in the current circumstances. It means that it's a much more dynamic and adaptable agent.



What is the Purpose of Artificial Intelligence?

- Improve their process efficiencies
- Automate resource-heavy tasks
- Make business predictions based on hard data rather than feelings.

Top Used Applications in Artificial Intelligence

- Google's AI-powered predictions (E.g.: Google Maps)
- Ride-sharing applications (E.g.: Uber, Lyft)
- AI Autopilot in Commercial Flights
- Spam filters on E-mails
- Plagiarism checkers and tools
- Facial Recognition
- Search recommendations
- Voice-to-text features
- Smart personal assistants (E.g.: Siri, Alexa)
- Fraud protection and prevention.

Python revision

Data Types & Operations

```
# Variables and Basic Data Types
x = 10          # Integer
y = 3.14        # Float
name = "Ahmed" # String
is_student = True # Boolean

# Operations
sum_val = x + y
mult = x * 2
div = x / y
mod = x % 3

print(f"Sum: {sum_val}, Multiplication: {mult}, Division: {div}, Modulus: {mod}")
```

Lists, Tuples & Dictionaries

```
# Lists
fruits = ["apple", "banana", "cherry"]
fruits.append("orange")  # Adding elements
print(fruits)

# Tuples (Immutable)
coordinates = (10, 20)
print(f"x: {coordinates[0]}, y: {coordinates[1]}")

# Dictionaries (Key-Value Pairs)
student = {
    "name": "Ahmed",
    "age": 21,
    "major": "AI"
}
print(student["name"])
student["grade"] = "A+"  # Adding a new key-value pair
print(student)
```

Control Structures

```
# If-Else Statement
age = 21
if age >= 18:
    print("Adult")
else:
    print("Minor")

# For Loop
for i in range(5):
    print(i)
# While Loop
count = 0
while count < 5:
    print(count)
    count += 1
# Looping over a list
for fruit in fruits:
    print(fruit)
```

Functions

```python
# Basic Function
def greet(name):
    return f"Hello, {name}!"

print(greet("Ahmed"))

# Function with Default Parameters
def power(base, exponent=2):
    return base ** exponent

print(power(3))  # Default square
print(power(2, 3))  # Cube
```

Classes & Objects

```python
# Defining a class
class Student:
    def __init__(self, name, age):
        self.name = name
        self.age = age

    def introduce(self):
        return f"My name is {self.name} and I am {self.age} years old."

# Creating objects
student1 = Student("Ahmed", 21)
print(student1.introduce())
```