Lab-01: Introduction to Artificial intelligence and Python

1.1 Objectives:

- An introduction to Artificial intelligence and Python programming language

Since the invention of computers or machines, their capability to perform various tasks has experienced an exponential growth. Humans have developed the power of computer systems in terms of their diverse working domains, their increasing speed, and reducing size with respect to time.
A branch of Computer Science named Artificial Intelligence pursues creating the computers or machines as intelligent as human beings.

1.2 Basic Concept of Artificial Intelligence (AI)

According to the father of Artificial Intelligence, John McCarthy, it is "The science and engineering of making intelligent machines, especially intelligent computer programs".
Artificial Intelligence is a way of making a computer, a computer-controlled robot, or a software think intelligently, in the similar manner the intelligent humans think. AI is accomplished by studying how human brain thinks and how humans learn, decide, and work while trying to solve a problem, and then using the outcomes of this study as a basis of developing intelligent software and systems.
While exploiting the power of the computer systems, the curiosity of human, lead him to wonder, "Can a machine think and behave like humans do?"

Thus, the development of AI started with the intention of creating similar intelligence in machines that we find and regard high in humans.

1.3 The Necessity of Learning AI

As we know that AI pursues creating the machines as intelligent as human beings. There are numerous reasons for us to study AI. The reasons are as follows:

1.3.1 AI can learn through data

In our daily life, we deal with huge amount of data and human brain cannot keep track of so much data. That is why we need to automate the things. For doing automation, we need to study AI because it can learn from data and can do the repetitive tasks with accuracy and without tiredness.

1.3.2 AI can teach itself

It is very necessary that a system should teach itself because the data itself keeps changing and the knowledge which is derived from such data must be updated constantly. We can use AI to fulfill this purpose because an AI enabled system can teach itself.

1.3.3 AI can respond in real time

Artificial intelligence with the help of neural networks can analyze the data more deeply. Due to this capability, AI can think and respond to the situations which are based on the conditions in real time.

1.3.4 AI achieves accuracy

With the help of deep neural networks, AI can achieve tremendous accuracy. AI helps in the field of medicine to diagnose diseases such as cancer from the MRIs of patients.

1.3.5 AI can organize data to get most out of it

The data is an intellectual property for the systems which are using self-learning algorithms. We need AI to index and organize the data in a way that it always gives the best results.

1.4 Why Python for AI

Artificial intelligence is considered to be the trending technology of the future. Already there are a number of applications made on it. Due to this, many companies and researchers are taking interest in it. But the main question that arises here is that in which programming language can these AI applications be developed? There are various programming languages like Lisp, Prolog, C++, Java and Python, which can be used for developing applications of AI. Among them, Python programming language gains a huge popularity and the reasons are as follows:

- Simple syntax & less coding

Python involves very less coding and simple syntax among other programming languages which can be used for developing AI applications. Due to this feature, the testing can be easier and we can focus more on programming.

- Inbuilt libraries for AI projects

A major advantage for using Python for AI is that it comes with inbuilt libraries. Python has libraries for almost all kinds of AI projects. For example, NumPy, SciPy, matplotlib, nltk, SimpleAI are some the important inbuilt libraries of Python.

- Open source: Python is an open source programming language. This makes it widely popular in the community.

- Can be used for broad range of programming: Python can be used for a broad range of programming tasks like small shell script to enterprise web applications. This is another reason Python is suitable for AI projects.
- Easy-to-learn – Python has few keywords, simple structure, and a clearly defined syntax. This allows the student to pick up the language quickly.
- Easy-to-read – Python code is more clearly defined and visible to the eyes.
- Easy-to-maintain – Python's source code is fairly easy-to-maintain.
- A broad standard library – Python's bulk of the library is very portable and cross-platform compatible on UNIX, Windows, and Macintosh.

1.5 Python, PyCharm and Anaconda Installation:

1.5.1 Download python interpreter

https://www.python.org/ **(Latest version** Python 3.x.x)

1.5.2 Pycharm

https://www.guru99.com/how-to-install-python.html

1.5.3 Anaconda

https://docs.anaconda.com/anaconda/install/windows/