MUTHAYAMMAL POLYTECHNIC COLLEGE

Rasipuram - 637 408, Namakkal District, Tamilnadu

DESIGNING YOUR FUTURE

MUTHAYAMMAL EDUCATIONAL TRUST

40 Years OF ACADEMIC EXCELLENCE

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Topic: Artificial Intelligence and Data Science Using Python

Introduction to Artificial Intelligence

- Artificial Intelligence (AI) is a branch of computer science that makes machines perform tasks that usually require human intelligence.
- AI systems can learn from information, recognize patterns, solve problems and support decision-making.
- The main goal of AI is to build systems that can perform tasks in a smart and useful way.
- Examples include voice assistants, recommendation systems, face recognition and chatbots.

Types and Branches of AI

- Narrow AI: designed to perform a specific task, such as translation or voice recognition.
- General AI: a theoretical form of AI that would be able to perform a wide range of intellectual tasks.
- Machine Learning (ML): enables computers to learn patterns from data without being programmed for every situation.
- Deep Learning (DL): uses multi-layer neural networks for tasks such as image and speech recognition.
- Other important areas include Natural Language Processing, Computer Vision and Robotics.

Machine Learning and Applications of AI

- Machine Learning uses examples and data to train a model to make predictions or decisions.
- Supervised learning uses labelled examples; unsupervised learning finds patterns in unlabelled data.
- AI is used in healthcare for image analysis, in banking for fraud detection and in education for personalized learning.
- It is also used in transport, agriculture, customer support and online shopping.
- Responsible AI should be fair, safe, transparent and respectful of privacy.

Developing a Simple AI Project

- Identify the problem that the AI system should solve.
- Collect relevant and reliable data for the problem.
- Clean and prepare the data by removing errors and handling missing values.
- Choose an appropriate algorithm and train the model using the prepared data.
- Test the model, evaluate its performance and improve it when necessary.
- Present the results clearly and use the system responsibly.

Introduction to Data Science Using Python

- Data Science is the process of collecting, organizing, analysing and interpreting data to discover useful information.
- It combines statistics, programming, data analysis and subject knowledge.
- Python is widely used because it has simple syntax and many libraries for working with data.
- A typical data science workflow includes data collection, cleaning, analysis, visualization and communication.
- Data Science helps organizations make evidence-based decisions.

Python Basics: Data Types and Operators

- Variables are used to store values. Python does not require a separate type declaration.
- Common data types include int (whole numbers), float (decimal numbers), str (text) and bool (True or False).
- Arithmetic operators: +, -, *, /, //, %, **.
- Comparison operators: ==, !=, >, <, >= and <=. Logical operators include and, or and not.
- Example: age = 18; mark = 85.5; name = 'Vignesh'; passed = True.

Python Data Structures and Decision Making

- List: stores an ordered, changeable collection. Example: marks = [75, 80, 90].
- Tuple: stores an ordered collection that cannot be changed. Example: point = (10, 20).
- Set: stores unique values. Example: numbers = {1, 2, 3}.
- Dictionary: stores key-value pairs. Example: student = {'name': 'Vignesh', 'mark': 85}.
- if, elif and else statements allow a program to choose actions based on conditions.
- Loops such as for and while repeat a set of instructions.

Python Libraries and Conclusion

- NumPy supports numerical calculations and working with arrays.
- Pandas helps organize and analyse data using Series and DataFrames.
- Matplotlib is used to create charts and graphs for understanding data.
- These libraries help convert raw data into meaningful information.
- AI and Data Science are useful fields, and Python provides tools to build practical solutions.
- Learning the basics of AI, Python and data analysis is a strong starting point for future projects.

Thank You!