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Technical Directorate of Information Technology Department

Govt. of Odisha

OCAC Training Centre

INTERNSHIP TRAINING PROGRAM

ARTIFICIAL INTELLIGENCE

Course Description:

This course provides a comprehensive introduction to the theory and applications of artificial intelligence (AI). Students will explore various AI techniques, including problem-solving, knowledge representation, machine learning, natural language processing, and robotics. Practical implementation and hands-on projects will be emphasized to develop proficiency in AI concepts and methodologies.

Duration – 160 Hrs.

Prerequisites:

- ❑ Basic programming knowledge (preferably in Python), Data Structure.
- ❑ Understanding of basic mathematics (linear algebra, calculus, probability, and statistics)

Course Objectives:

Upon completion of the course, students will be able to:

1. Understand the fundamental concepts and techniques of artificial intelligence.
2. Apply AI algorithms and methodologies to solve real-world problems.
3. Implement various AI techniques using programming languages such as Python.
4. Analyze and evaluate AI systems for performance and effectiveness.
5. Explore advanced topics in AI and its applications in different domains.

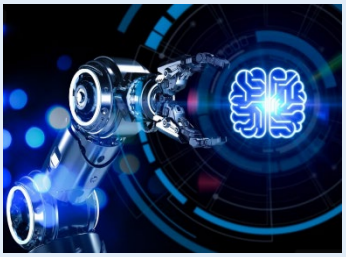
Topics Covered:

1. **Introduction to Artificial Intelligence**
   - ❑ Definition and history of artificial intelligence
   - ❑ AI applications and ethical considerations

2. **Problem-Solving and Search Algorithms**
   - ❑ Problem-solving methods
   - ❑ Search algorithms (e.g., uninformed search, informed search, heuristic search)
   - ❑ Constraint satisfaction problems

3. **Knowledge Representation and Reasoning**
   - ❑ Propositional and predicate logic
   - ❑ Semantic networks, frames, and ontologies
   - ❑ Rule-based systems and inference engines

4. **Machine Learning**
   - ❑ Introduction to machine learning
   - ❑ Supervised learning (classification, regression)
   - ❑ Unsupervised learning (clustering, dimensionality reduction)
   - ❑ Reinforcement learning

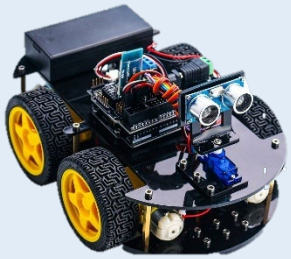


5. **Neural Networks and Deep Learning**
   - ❑ Basics of artificial neural networks
   - ❑ Deep learning architectures (e.g., convolutional neural networks, recurrent neural networks)
   - ❑ Training and optimization techniques

6. **Natural Language Processing (NLP)**
   - ❑ Text processing and tokenization
   - ❑ Language modeling and probabilistic methods
   - ❑ Named entity recognition, part-of-speech tagging, sentiment analysis

7. **Computer Vision**
   - ❑ Image processing techniques
   - ❑ Feature extraction and object detection
   - ❑ Image classification and segmentation

8. **Robotics and Autonomous Agents**
   - ❑ Introduction to robotics
   - ❑ Robot perception and control
   - ❑ Autonomous navigation and planning



9. **Fundamentals of Generative AI**
   - ❑ Prompt Engineering
   - ❑ ChatGPT
   - ❑ OpenAI API
   - ❑ Gemini

10. **AI Ethics and Societal Impact**
   - ❑ Ethical considerations in AI development and deployment
   - ❑ Bias and fairness in AI algorithms
   - ❑ Societal impact and policy implications

11. **Advanced Topics in AI**
   - ❑ Multi-agent systems
   - ❑ Knowledge graphs and reasoning
   - ❑ Cognitive architectures

Textbooks:

- ❑ "Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig
- ❑ "Deep Learning" by Ian Goodfellow, Yoshua Bengio, and Aaron Courville
- ❑ "Natural Language Processing with Python" by Steven Bird, Ewan Klein, and Edward Loper

Software and Tools:

- ❑ Python (Anaconda distribution recommended)
- ❑ Google Collab
- ❑ Jupyter Notebook
- ❑ NumPy, Pandas, Matplotlib, Seaborn
- ❑ Scikit-learn, TensorFlow, Keras
- ❑ NLTK, spaCy (for NLP)
- ❑ OpenCV (for computer vision)
- ❑ Robotics simulation environments (e.g., Gazebo, ROS)

Contact


OCAC Training Centre
Collaboration of OCAC & OKCL
(Get ahead of the competition with programming training from OCAC)
For More Details Please Call:
8144604010 / 8018039767
Odisha Computer Application Centre
(Designated Technical Directorate of Electronics & Information Technology Department, Government of Odisha)
Ground Floor, OCAC Tower, Acharya Vihar, Bhubaneswar