MetaOr

2024

AI COURSES CATALOG

- Artificial Intelligence Fundamentals
- Machine Learning Basics
- Deep Learning Basics
- Artificial Intelligence for Inertial Navigation
- Real-Time Deep Learning Deployment
- Deep Learning Tools for Time Series
- AI for Cyber Fundamentals

ARTIFICIAL INTELLIGENCE

Invest in AI education to enhance your company's efficiency, competitiveness, and adaptability in the digital age.

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DR. BARAK OR

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MetaOr offers tailored corporate training programs covering AI and related fields, comprehensive research and intellectual property support, and end-to-end AI deployment solutions. Partner with us to elevate your organization's AI capabilities and drive innovation.

Dr. Barak Or is a well-versed professional in the field of Artificial Intelligence and data fusion.

- Lecturer, Researcher, and Entrepreneur
- Ph.D. in Machine Learning for Sensor Fusion -University of Haifa (2022)
- Published over 20 Patents and Scientific Articles
- Former Expert at Qualcomm (DSP & ML Algorithms)
- Winner of Gemunder prize for developing game theory and optimal control method for unique navigation system
- M.Sc. and B.Sc. in Aerospace Engineering - Technion (2018, 2016)
- B.A. in Economics and Management - Technion (2016, Cum Laude)
- Recipient of Prizes and Research Grants from Israel Innovation Authority, Israel MoD, and More
- Nominated for "Graduate Achievements" by Technion (2021)
- Founder & CEO of AI & Navigation StartUp Company

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AI COURSES

2024 CATALOG

- In-Person Classes for a Traditional Classroom Experience or Online Classes for Flexibility and Convenience
- Full Access to Lecture Notes and Resources
- Interactive Quizzes and Assignments
- Hands-On Projects to Apply Your Knowledge

Real-life Case Studies	Tools for Deployment in Your Team	State-of-the-Art Approaches

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Artificial Intelligence Fundamentals

FOR DIRECTORS & PROJECT MANAGERS

-NO PRIOR KNOWLEDGE IS REQUIRED-

- Trends in AI: ChatGPT, DALL-E, Midjourney
- Challenges in AI project
- How to decide if your problem needs AI at all?
- Understanding foundation: AI, ML, DL, data science, Cloud, GPU, and more
- Supervised learning vs. unsupervised learning
- Classification and regression tasks
- From data collection to fully deployed real-time AI models
- Build your won AI model or use an exist one? The Transfer Learning approach
- How to evaluate the AI model?
- Big data vs. small data
- Cloud environment

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Machine Learning Basics

For SW and Algorithm Engineers

-PYTHON KNOWLEDGE IS REQUIRED-

- Overview of machine learning, its importance, and real-world applications, including ChatGPT4, DALL·E 2, etc.
- Introduction to Python programming for machine learning.
- Overview of Python libraries like NumPy, pandas, and Matplotlib.
- Understanding supervised learning and its applications.
- Key concepts: labeled data, regression, classification, and Example algorithms: Linear Regression, Logistic Regression, Decision Trees.
- Exploring unsupervised learning and its applications.
- Key concepts: clustering, dimensionality reduction.
- Example algorithms: K-Means Clustering, Hierarchical Clustering, PCA (Principal Component Analysis).
- Introduction to reinforcement learning and its unique approach. Key concepts: agents, environments, rewards.
- Basics of neural networks and their architecture. Introduction to deep learning. Overview of popular neural network models.
- Implementing machine learning algorithms in Python. Case studies and project ideas for hands-on experience.

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Deep Learning Basics

FOR SW AND ALGORITHMS ENGINEERS

-ML KNOWLEDGE IS REQUIRED-

- Overview of deep learning applications in various fields.
- Convolutional Neural Networks (CNNs) and their applications in image recognition, classification, and generation.
- Deep dive into backpropagation and how neural networks learn.
- Detailed study of various layers in neural networks: Convolutional, Pooling, Dropout, Batch Normalization, and more.
- How different layers function and contribute to a neural network's learning capability.
- Overview of optimization algorithms (e.g., Gradient Descent, Adam).
- Introduction to cloud computing platforms like Google Colab.
- Setting up and running deep learning models in cloud environments.
- Exploring various deep neural network architectures like ResNet, Inception, and Transformer models.
- Comparative analysis of different architectures and their use cases.
- Exploring RNNs and their applications in sequence data analysis.
- Understanding autoencoders for data compression and feature extraction.
- Hands-on projects incorporating the concepts learned.

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Artificial Intelligence for Inertial Navigation

FOR ALGORITHMS ENGINEERS

-ML KNOWLEDGE IS REQUIRED-

- Error-state Extended Kalman Filter for INS/GNSS
- CV/CA dynamic models with parameters learning
- Supervised learning for time series (RNN, LSTM, CNN)
- Boosting INS/GNSS with parameters learning
- Dynamic quantities learning from low-cost sensors
- Speed learning using for ground vehicle to boost INS performance
- Distance learning for pedestriain and comparison with the classical Weinberg model
- Hybrid models combining deep learning and INS with hedging mechanism
- Human and dog activity recognition (classification on IMU signal)

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Real-Time Deep Learning Deployment

FOR ALGORITHMS AND SW ENGINEERS

-ML KNOWLEDGE IS REQUIRED-

- Overview of real-time systems and deep learning
- Trade-offs between accuracy and complexity (i.e. number of parameters)
- Understanding how model complexity affects performance and computational demands
- Strategies for model simplification and optimization (pruning or quantization techniques)
- Exploring architectures designed for efficiency (e.g., SqueezeNet)
- Importance of preprocessing in real-time systems
- Case studies: 1D signals and images processing
- Deployment issues and challenges: scalability, latency, and reliability considerations
- Running trained models on edge devices: hardware constraints: processing power, memory, etc.
- Battery consumption and power efficiency: techniques for power-efficient computing. Case studies: mobile devices and their motion sensors
- Converting deep learning models to C code (e.g., TensorFlow Lite)

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Deep Learning Tools for Time Series

FOR ALGORITHMS AND SW ENGINEERS

-ML KNOWLEDGE IS REQUIRED-

- Basics of time series data, characteristics and challenges of analysis
- Overview of deep learning in the context of time series and frameworks (Keras, TensorFlow, TFT, SKtime, NeuralProphet, etc.)
- Introduction to basic architecture to deal with time series: LSTM (Long Short-Term Memory) and GRU (Gated Recurrent Units), Temporal Convolutionsal Networks (TCN), WaveNet.
- Feature engineering specific to time series data
- Windowing techniques for sequence data (non-stationary signals)
- Models for time series forecasting (stock price prediction)
- Anomaly Detection in Time Series using autoencoders (practical applications in fraud detection, system health monitoring, etc.)
- Multivariate Time Series Analysis
- Techniques and challenges in real-time data processing
- Hybrid models combining traditional statistical methods with deep learning (Kalman Filter and Deep Learning).
- Advanced topics: Attention mechanisms, transformers, graph neural networks, and more

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Artificial Intelligence for Cyber Fundamentals

FOR DIRECTORS & PROJECT MANAGERS
-NO PRIOR KNOWLEDGE IS REQUIRED-

- Introduction to Terminologies: AI, ML, DL, UL, SP, RL, data science, Cloud, GPU, and more. Classification vs. regression tasks, data processing, feature engineering, train, test, validation sets, .
- AI in threat detection and incident response (IR): the use of AI in detecting cyber threats, exploring the Blue and Red sides in cybersecurity: defensive (Blue) and offensive (Red) strategies.
- ML-based Spam Filter (detctor)
- Generative AI in cybersecurity (voice synthesis usecase)
- Large Language Models (LLM) in cybersecurity: potential uses and risks, analyzing various LLM engines and learning how to effectively utilize them, LLM from an attacker's perspective.
- Textual CPI analysis for threat and vulnerability identification
- ChatGPT: Prompt engineering in cybersecurity, creating basic Python malware code
- Intro to cloud environment including vulnerabilities and risks
- Employing unsupervised learning to analyze and learn from user behavior patterns in cybersecurity contexts.

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