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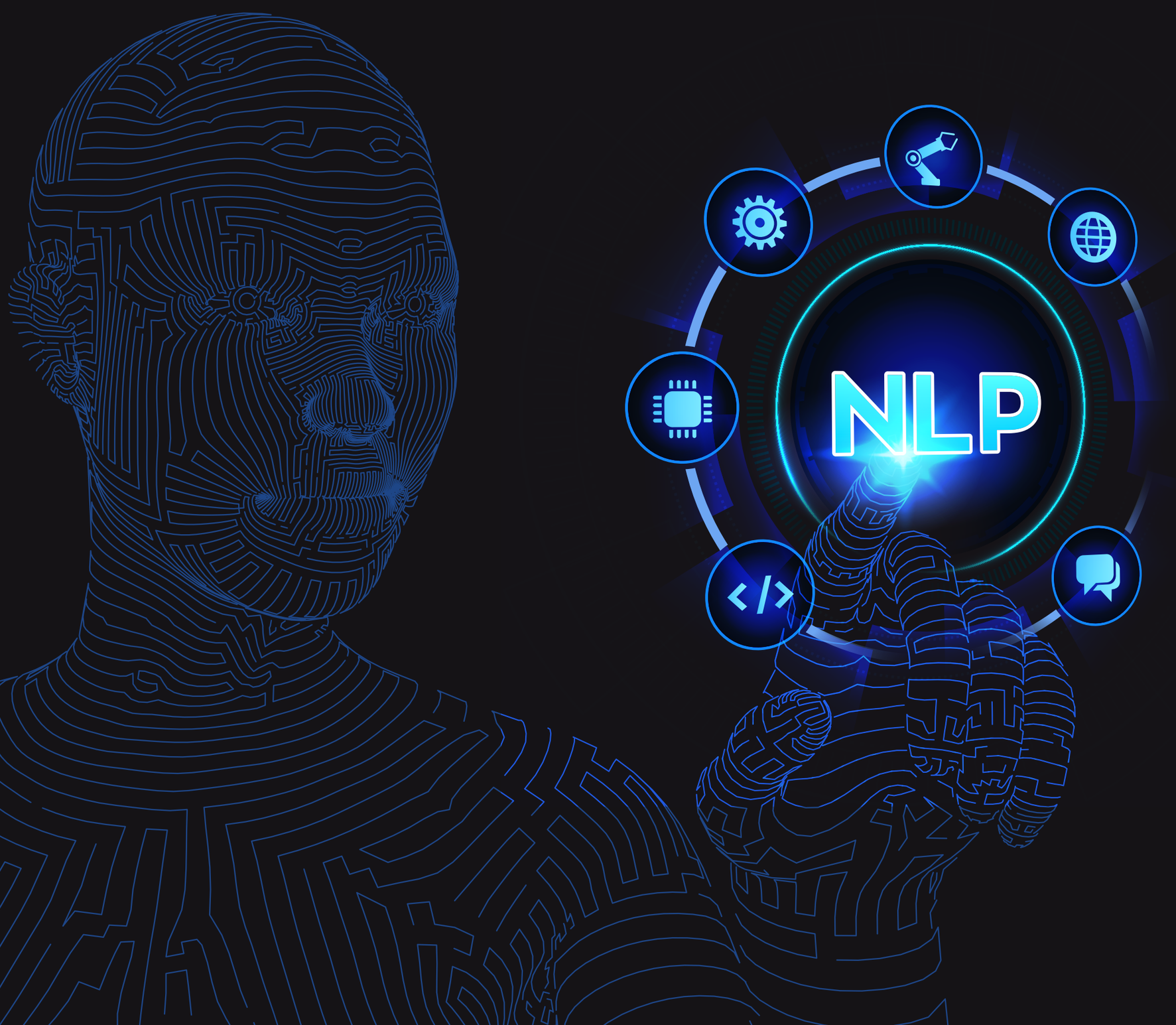
MASTER NATURAL LANGUAGE PROCESSING

2024



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Learning NLP in 2024 offers the chance to be at the forefront of this technological revolution. It equips you with the tools to train, fine-tune, and implement LLMs, ensuring you're prepared for a future where these models will likely dominate the tech landscape. Therefore, diving into NLP is both a strategic career move and a thrilling intellectual journey, allowing you to contribute to and shape the future of how humans and machines communicate and collaborate.

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PRE-REQUISITES:

- **Python:** Gain proficiency in Python, the primary programming language used in NLP.

- **Basic ML Algorithms:**
  - Linear Regression
  - Logistic Regression
  - KNN
  - Decision Tree
  - Random Forest
  - Naive Bayes
  - Support Vector Machine

- **Basic Deep Learning Concepts:** Learn the fundamentals of neural networks.

- **Mathematics:** Solidify your understanding of statistics and probability.

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MONTH-1

Getting Started with Textual Data

Text Preprocessing:

- Tokenization
- Text Cleaning
- Stopword removal
- Stemming and Lemmatization

Word Embeddings: Understand word representation techniques like

- Word2Vec
- TF-IDF
- One-Hot Encoding

Projects:

- Sentiment Analysis
- Fake News Detection

Research Papers: Read foundational papers on TF-IDF and Word2Vec.

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MONTH-2

Traditional NLP Approaches

Deep Learning NLP Frameworks: Get to grips with PyTorch and TensorFlow.

NLP Concepts: Dive into

- Convolutional Neural Networks (CNNs)
- Recurrent Neural Networks (RNNs)
- Long Short-Term Memory Networks (LSTMs)
- Gated Recurrent Units (GRUs)
- Encoder-Decoder Architecture

Projects: Start with text summarization and machine translation projects.

Research Papers: Study CNNs, RNNs, LSTM, GRU, and Encoder-Decoder architecture.

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MONTH-3

Entering into the NEW ERA of NLP

Attention Mechanisms: Study the "Attention Is All You Need" paper and understand the Transformer model.

Familiarize yourself with transformer-based models like BERT, Roberta, Distill Bert, T5, and so on..

Transfer Learning: Learn how to apply pre-trained models to new problems like sentiment analysis, machine translation, summarization, etc.

Projects:

- Next Word Prediction

Research Papers: Read about the “Attention Is All You Need” research paper.

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MONTH-4

Getting Started with LLMs

LLMs Introduction: Learn about different types of Large Language Models (LLMs) and their uses.

Foundation Models: Get acquainted with GPT - 3, Llama 2, Falcon 180B, Mistral 7B and so on.

Prompt Engineering: Understand how to prompt LLMs to get desired outputs effectively.

Learn about RAG(Retrieval Augmented Generation system)

Projects: Building LLM applications using RAG

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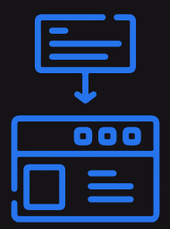
MONTH-5

Finetuning LLMs



Fine-tuning LLMs: Learn about Fine-tuning foundation models like Llama 2

Learn about Fine-tuning techniques

- Adapter based learning
  - PEFT
  - Lora - Qlora
- Full Model fine-tuning
- Prompt based Fine-tuning
  - One Shot Learning
  - Few Shot Learning

Projects:

- Fine-tune a model for a specific NLP task.

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MONTH-6

Building LLMs from Scratch

Building LLMs: Learn about building LLMs from scratch, considering the latest models and techniques.

Projects: Construct your own LLM, inspired by models like Llama 2.