Natural Language Processing (NLP)

Zetlan Technologies

e-Learning Course

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COURSE MODULES

Module 1: Introduction to NLP

- What is NLP?
- Applications of NLP (Machine Translatn, Sentiment Analysis, etc.)
- NLP Challenges (Ambiguity, Sarcasm, Polysemy, etc.)
- Overview of NLP Tools & Libraries (NLTK, spaCy, Hugging Face)

Module 2: Text Preprocessing & Tokenization

- Text Cleaning (Lowercasg, Stopword Removal, Punctuatn Handlng)
- Tokenization (Word & Sentence Tokenization)
- Stemming vs. Lemmatization
- Part-of-Speech (POS) Tagging
- Named Entity Recognition (NER)

Module 3: Feature Engineering for NLP

- Bag of Words (BoW)
- Term Frequency-Inverse Document Frequency (TF-IDF)
- Word Embeddings (Word2Vec, GloVe, FastText)
- Contextual Word Embeddings (ELMo, BERT, GPT)

Module 4: Text Classification & Sentiment Analysis

- Supervised Learning for NLP
- Naïve Bayes for Text Classification
- Logistic Regression, SVMs, and Neural Networks for NLP
- Sentiment Analysis with NLP
- Using Pretrained Sentiment Models

Module 5: Sequence Modeling & Language Models

- Recurrent Neural Networks (RNNs) for NLP
- Long Short-Term Memory (LSTMs) & Gated Recurrent Units (GRUs)
- Transformer Models for NLP (Attention Mechanism, Self-Attention)
- BERT, GPT, and Transformer-based Models

Module 6: Machine Translation & Text Generation

- Rule-Based vs. Statistical vs. Neural Machine Translation (NMT)
- Seq2Seq Models with Attention
- Text Generation with Transformers
- Fine-tuning GPT for Text Generation

Module 7: Named Entity Recognitn (NER) & Info Extraction

- Rule-Based vs. ML-Based NER
- SpaCy & Hugging Face Transformers for NER
- Relation Extraction
- Summarization Techniques (Extractive vs. Abstractive)

Module 8: Question Answering & Conversational AI

- Understanding QA Systems (Closed vs. Open-Domain QA)
- BERT for Question Answering
- Building Chatbots using NLP
- Dialogflow, Rasa, and OpenAI's GPT for Chatbots

Module 9: Ethics & Bias in NLP

- Bias in NLP Models
- Explainability & Interpretability in NLP
- Fairness in AI and NLP

Module 10: Advanced NLP & Research Trends

- Zero-shot & Few-shot Learning in NLP
- Multimodal NLP (Text + Image Processing)
- Large Language Models (GPT-4, PaLM, LLaMA)
- Future of NLP & Industry Trends