Natural Language Processing

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Expectations

- Gain comprehensive NLP knowledge.

- Develop skills in data labelling and model training.

- Enhance research and writing abilities.

Plan of Action

Timeline:

- **Week 1**: Introduction to NLP

    - Watch CS224N Lectures 1-4: Introduction, Word Vectors, Neural Networks Basics.

    - Study tokenization, POS tagging, and named entity recognition (NER).

    - Resources: CS224N, "Speech and Language Processing" by Jurafsky and Martin.

- **Week 2**: Deep Dive into Word Vectors and Neural Networks

    - Watch CS224N Lectures 5-8: Advanced Word Vectors, Introduction to Neural Networks for NLP.

    - Explore detailed aspects of word embeddings and start neural network implementations.

    - Resources: CS224N, "Natural Language Processing with Python" by Bird et al.

- **Week 3**: Neural Networks and Sequence Models

    - Watch CS224N Lectures 9-12: Neural Networks for NLP (Continued), Sequence Models and RNNs.

    - Study RNNs, LSTMs, and GRUs for handling sequences.

    - Implement basic sequence models using TensorFlow or PyTorch.

    - Resources: CS224N, "Deep Learning" by Goodfellow et al.

- **Week 4**: Introduction to Attention Mechanisms
  - Watch CS224N Lectures 13 & 14: Introduction to Attention Mechanisms.
  - Read "Attention is All You Need" by Vaswani et al.
  - Understand the theoretical foundations of attention and begin simple implementations.
  - Resources: CS224N, Vaswani et al.

- **Week 5**: Transformers and Advanced Sequence Modelling
  - Watch CS224N Lectures 15-18: Transformers, Advanced Models.
  - Deep dive into the architecture and applications of Transformer models.
  - Start implementing Transformer models for NLP tasks.
  - Resources: CS224N, Hugging Face tutorials.

- **Week 6**: Pre-trained Models and Fine-tuning
  - Watch CS224N Lectures 19-22: Pre-trained Models like BERT and GPT, Fine-tuning Techniques.
  - Study the design, usage, and fine-tuning of models like BERT and GPT-3.
  - Implement fine-tuning on specific datasets.
  - Resources: CS224N.

- **Week 7**: Advanced NLP Applications
  - Watch CS224N Lectures 23 & 24: Advanced Applications, Machine Translation, and Summarization.
  - Implement NLP models for tasks like translation and summarization.
  - Explore recent advancements and case studies.
  - Resources: CS224N, recent NLP research papers and Medium articles.

- **Week 8**: Real-world NLP Systems and Project Development
  - Watch CS224N Lectures 25 & 26: Question Answering Systems and Advanced Topic Reviews.

  - Resources: CS224N

References:

- "Speech and Language Processing" by Daniel Jurafsky and James H. Martin.

- "Natural Language Processing with Python" by Steven Bird, Ewan Klein, and Edward Loper.

- "Deep Learning" by Ian Goodfellow, Yoshua Bengio, and Aaron Courville.

- CS224N Lecture Series on YouTube.

- Hugging Face tutorials and Vaswani et al. paper.