Scope and opportunities in the areas of

Artificial Intelligence - NLP

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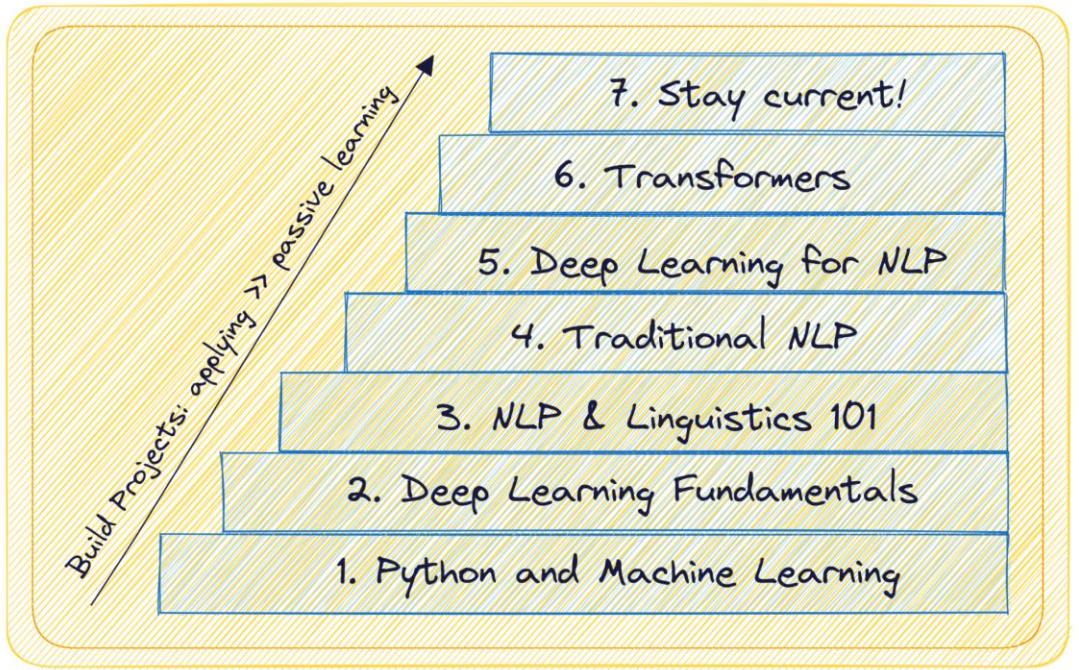
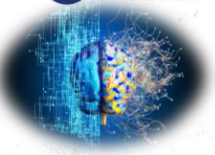
- Step 1: Python and ML fundamentals
- Step 2: Deep learning fundamentals
- Step 3: NLP essential linguistics concepts
- Step 4: Traditional NLP techniques
- Step 5: Deep learning for NLP
- Step 6: NLP with transformers
- Step 7: Build projects, keep learning, and stay current!



Source : https://www.kdnuggets.com/

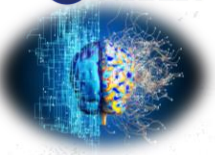
Step 1: Python and Machine Learning

- Python programming
- Proficiency with libraries like NumPy and Pandas
- Machine Learning basics (from data preprocessing and exploration to evaluation and selection)
- Familiarity with both supervised and unsupervised learning paradigms
- Libraries like Scikit-Learn for ML in Python
  - Projects like:
    - House price prediction
    - Loan default prediction



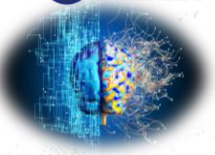
Step 2: Deep Learning Fundamentals

- Neural networks and their architecture
- Activation functions, loss functions, and optimizers
- Backpropagation and gradient descent
- Frameworks like TensorFlow and PyTorch
  - Basics of PyTorch and TensorFlow:
    - PyTorch for Deep Learning
    - TensorFlow 2.0 Complete Course
  - Projects like
    - Handwritten digit recognition
    - Image classification on CIFAR-10 or a similar dataset



Step 3: NLP 101 and Essential Linguistics Concepts

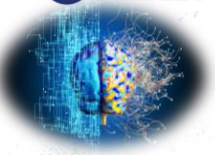
- Introduction to NLP and its applications
- Tokenization, stemming, and lemmatization
- Part-of-speech tagging and named entity recognition
- Basic linguistics concepts like syntax, semantics, and dependency parsing
- Natural language Processing with Python



Step 4: Traditional NLP Techniques

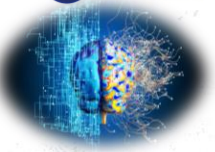
- Bag of Words (BoW) and TF-IDF representation
- N-grams and text classification
- Sentiment analysis, topic modeling, and text summarization
- Hidden Markov Models (HMMs) for POS tagging

  - Tutorials :Complete Natural Language Processing Tutorial with Python.
  - Projects like
    - Spam classifier
    - Topic modeling on a news feed or similar dataset



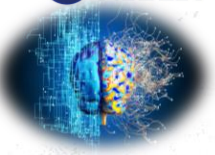
Step 5: Deep Learning for NLP

- Start with word embeddings, such as Word2Vec and GloVe, which represent words as dense vectors and capture semantic relationships.
- Then delve into sequence models such as Recurrent Neural Networks (RNNs) for handling sequential data.
- Understand Long Short-Term Memory (LSTM) and Gated Recurrent Units (GRU), known for their ability to capture long-term dependencies in text data.
- Explore sequence-to-sequence models for tasks such as machine translation.



Step 5: Deep Learning for NLP

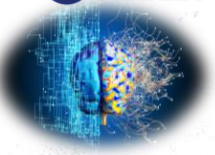
- Word embeddings (Word2Vec, GloVe)
- RNNs
- LSTM and GRUs
- Sequence-to-sequence models
- Natural Language Processing with Deep Learning is an excellent resource.
- A couple of project ideas:
- Language translation app
- Question answering on custom corpus



Step 6: NLP with Transformers

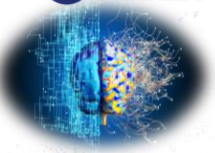
The advent of **Transformers** has revolutionized NLP. Understand the **attention mechanism**, a key component of Transformers that enables models to focus on relevant parts of the input. Learn about the Transformer architecture and the various applications.

- Attention mechanism and its significance
- Introduction to Transformer architecture
- Applications of Transformers
- Leveraging pre-trained language models; fine-tuning pre-trained models for specific NLP tasks



Step 6: NLP with Transformers

- The most comprehensive resource to learn NLP with Transformers is the Transformers course by HuggingFace team .
- Interesting projects can include:
  - Customer chatbot/virtual assistant
  - Emotion detection in text



Step 7: Build Projects, Keep Learning, and Stay Current

- In a rapidly advancing field like natural language processing (or any field in general), you can only keep learning and hack your way through more challenging projects.
- It's essential to work on projects, as they provide practical experience and reinforce your understanding of the concepts. Additionally, staying engaged with the NLP research community through blogs, research papers, and online communities will help you keep up with the advances in NLP.
- ChatGPT from OpenAI hit the market in late 2022 and GPT-4 released in early 2023. At the same time (we've seen and still are seeing) there are releases of scores of open-source large language models, LLM-powered coding assistants, novel and resource-efficient fine-tuning techniques, and much more.

Step 7: Build Projects, Keep Learning, and Stay Current

- If you're looking to up your LLM game, here's a two-part compilation two part compilation of helpful resources:
  - Top Free Courses on Large Language Models
  - More Free Courses on Large Language Models
- You can also explore frameworks like Langchain and LlamaIndex to build useful and interesting LLM-powered applications.