

AI Engineering & EduSense AI Project Roadmap

Core Concepts for EduSense AI Project

1. Document Understanding

- Text extraction (PDF, DOC, Images)
- OCR with Tesseract, PyMuPDF

2. NLP Fundamentals

- Named Entity Recognition (NER)
- Keyphrase Extraction
- Sentence Embeddings (SBERT)
- Chunking and Preprocessing

3. Custom Model Building

- Concept Extraction Model
- Question Generation Model (T5, BART)
- Model fine-tuning and evaluation

4. LLM Integration and RAG

- Embeddings + Vector Stores (FAISS)
- LangChain for chaining logic
- LLM prompt engineering

5. Visualization

- Mind map creation using networkx, d3.js
- Concept graph building

6. Voice Interaction

- Speech-to-text: Whisper
- Text-to-speech: gTTS, pyttsx3

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7. Learning Analytics

- User progress tracking
- Knowledge gap analysis
- Recommendation systems

Core Skills for AI Engineering

1. Math & Theory

- Linear Algebra, Probability, Calculus

2. Machine Learning

- Supervised & Unsupervised learning
- Model evaluation, hyperparameter tuning

3. Deep Learning & NLP

- Neural Networks, Transformers
- Attention Mechanism, Sequence Models

4. Tooling & Frameworks

- PyTorch, TensorFlow, Hugging Face
- scikit-learn, LangChain, OpenAI APIs

5. Deployment & MLOps

- FastAPI, Docker, GitHub CI/CD
- Experiment tracking

6. Data Engineering

- ETL pipelines, preprocessing, augmentation

7. Application Building

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- LLM agents, RAG pipelines
- UI/UX using React, Tailwind