

Deep Learners: Learning Tools for Transcribed Lecture Audio

Lecture Transcription, Keyword Highlighting & Quiz Generation

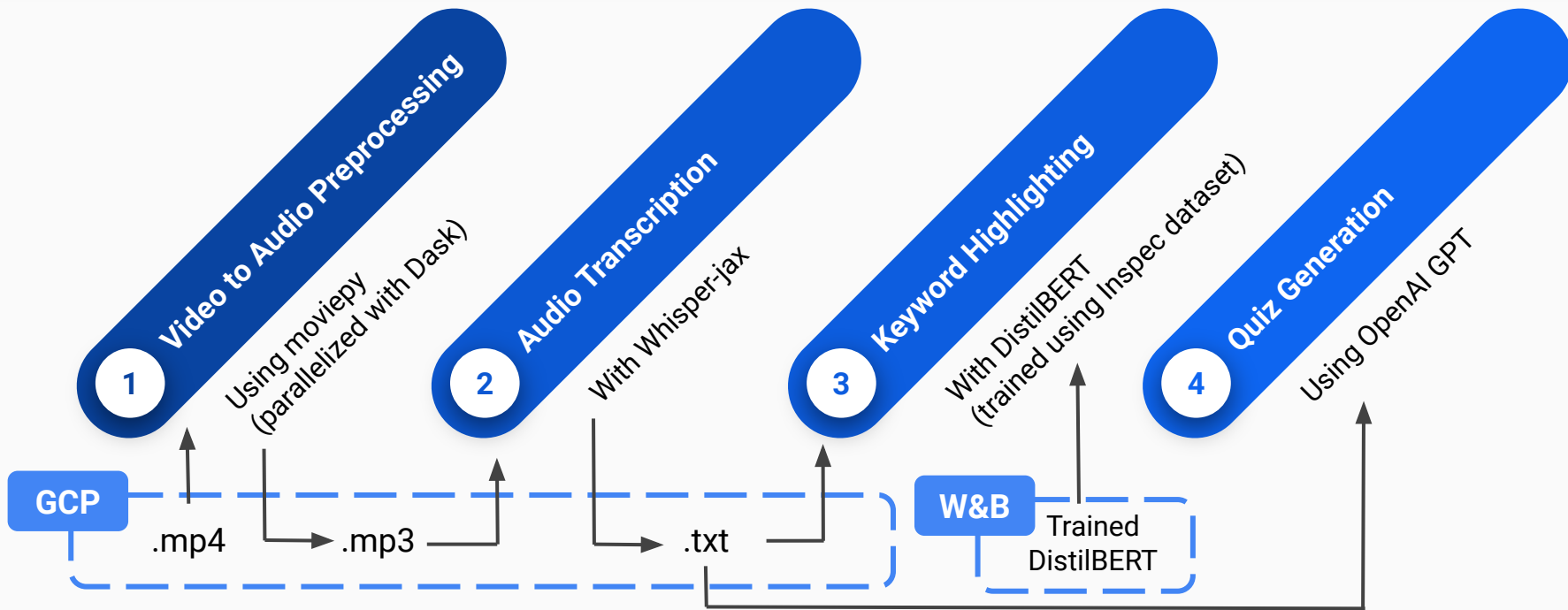
Pavlos' Perceptron Pals (Ben, Caleb, Chase, Cyrus, Warren)

Background and Motivation

Problem: Lecture transcripts – long blocks of unstructured text – are non-interactive and daunting to students in their current form.

Solution: Application to transcribe a lecture recording using speech recognition and to help a student understand the content of the lesson, using tools such as keyword highlighting and quiz generation.

Overview

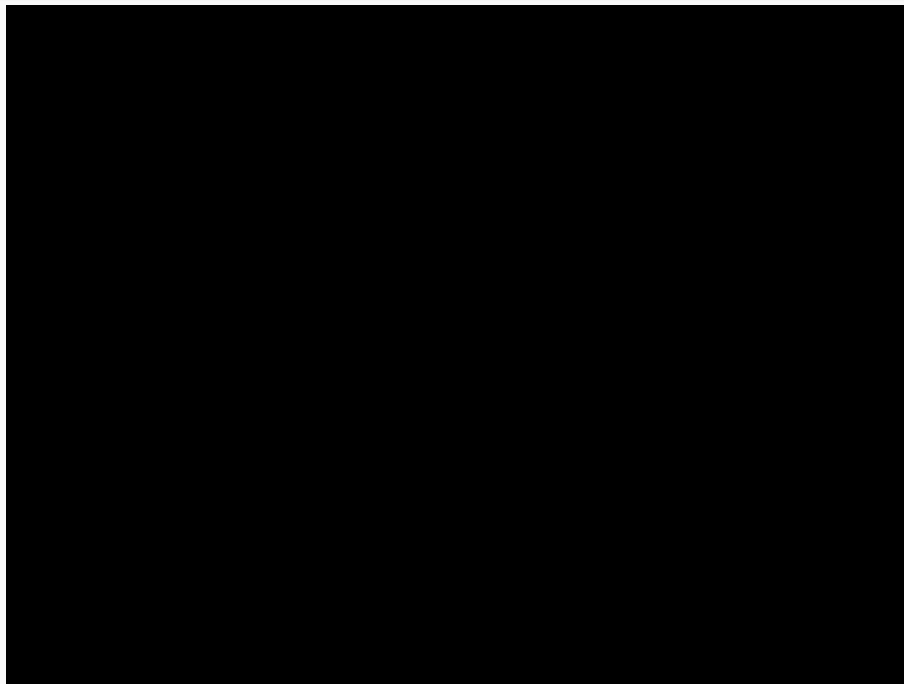


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Video to Audio Preprocessing

MP4 to MP3

★ Dask



Whisper-jax

“I'm going to talk about introduction to denoising Diffusion Models. How we train a Diffusion Model, latent Diffusion Models, conditional image generation, guided Diffusion Models, and some examples, including Wally at the end.”

- Pavlos Protopapas



DistilBERT

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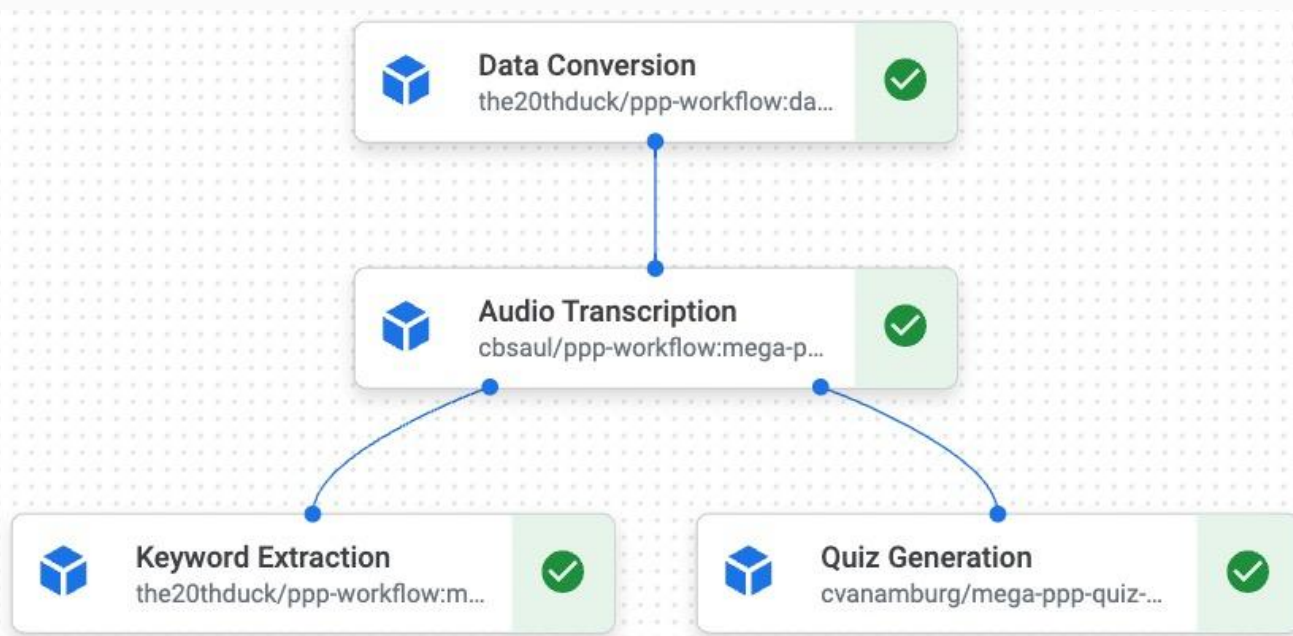


OpenAI GPT

1. Diffusion models are a class of machine learning models that are known for their ability to:
 - a) Generate high-quality samples from simple data distributions
 - b) Generate high-quality samples from complex data distributions
 - c) Generate low-quality samples from complex data distributions
 - d) Generate low-quality samples from simple data distributions
2. What random process do diffusion models simulate?
 - a) Diffraction
 - b) Denoising
 - c) Imagination
 - d) Integration
3. How do diffusion models transform random noise samples to resemble the target data distribution?
 - a) By removing noise from the samples
 - b) By adding noise to the samples
 - c) By gradually morphing the noise into the samples
 - d) By abruptly changing the noise into the samples
4. Diffusion models leverage a sequence of _____ probabilities to guide the diffusion process.
 - a) Transformation
 - b) Transition
 - c) Transmission
 - d) Translocation
5. One of the primary advantages of diffusion models is their ability to generate samples without the need for explicit:
 - a) Data augmentation
 - b) Feature extraction
 - c) Likelihood computation
 - d) Gradient descent
6. What are some domains where diffusion models have been applied?
 - a) Medical research and pharmaceuticals
 - b) Image synthesis and audio generation
 - c) Cryptocurrency mining and blockchain technology
 - d) Robotics and automation

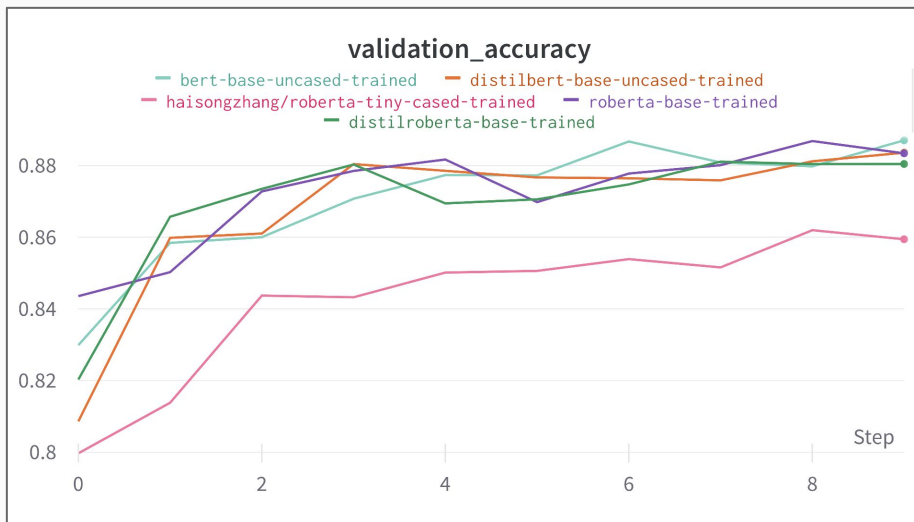
Pipeline

- ★ DVC
- ★ Vertex AI (Kubeflow)



Training with Inspec

- ★ TF Data
- ★ W&B
- ★ Multi-GPU/
Serverless
- ★ Distillation

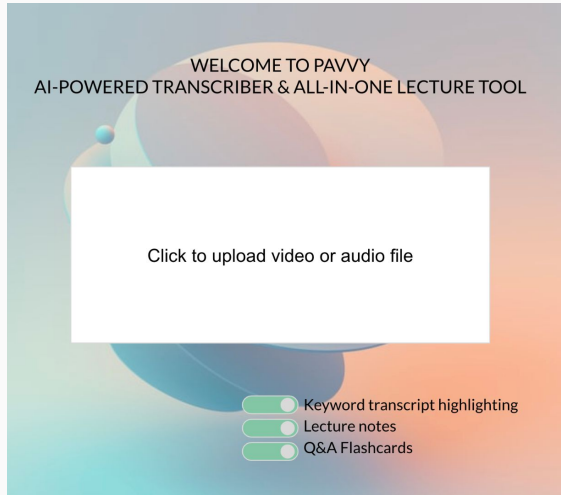


Model	# Parameters	Training Time (s)	Validation accuracy (%)
bert	110M	333.3	88.7
distilbert	66M	200.0	88.4
roberta	125M	327.6	88.3
distilroberta	82M	205.5	88.0
roberta-tiny	28M	132.0	85.9

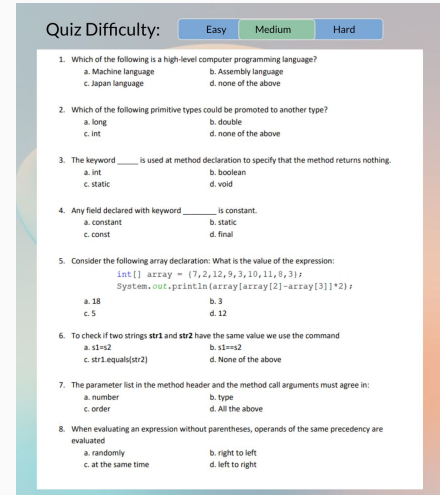
Next Steps

1. Generate quizzes with varying levels of difficulty
2. Design application architecture and UI
3. Build out front-end and API integration
4. Set up CI/CD pipeline as part of deployment strategy
5. Optimize performance at scale with Kubernetes
6. Implement an automated deployment solution using Ansible
7. Present and document!

End Goal



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Thank you!