



Deep Learning Portfolio

Alhassane Samassekou

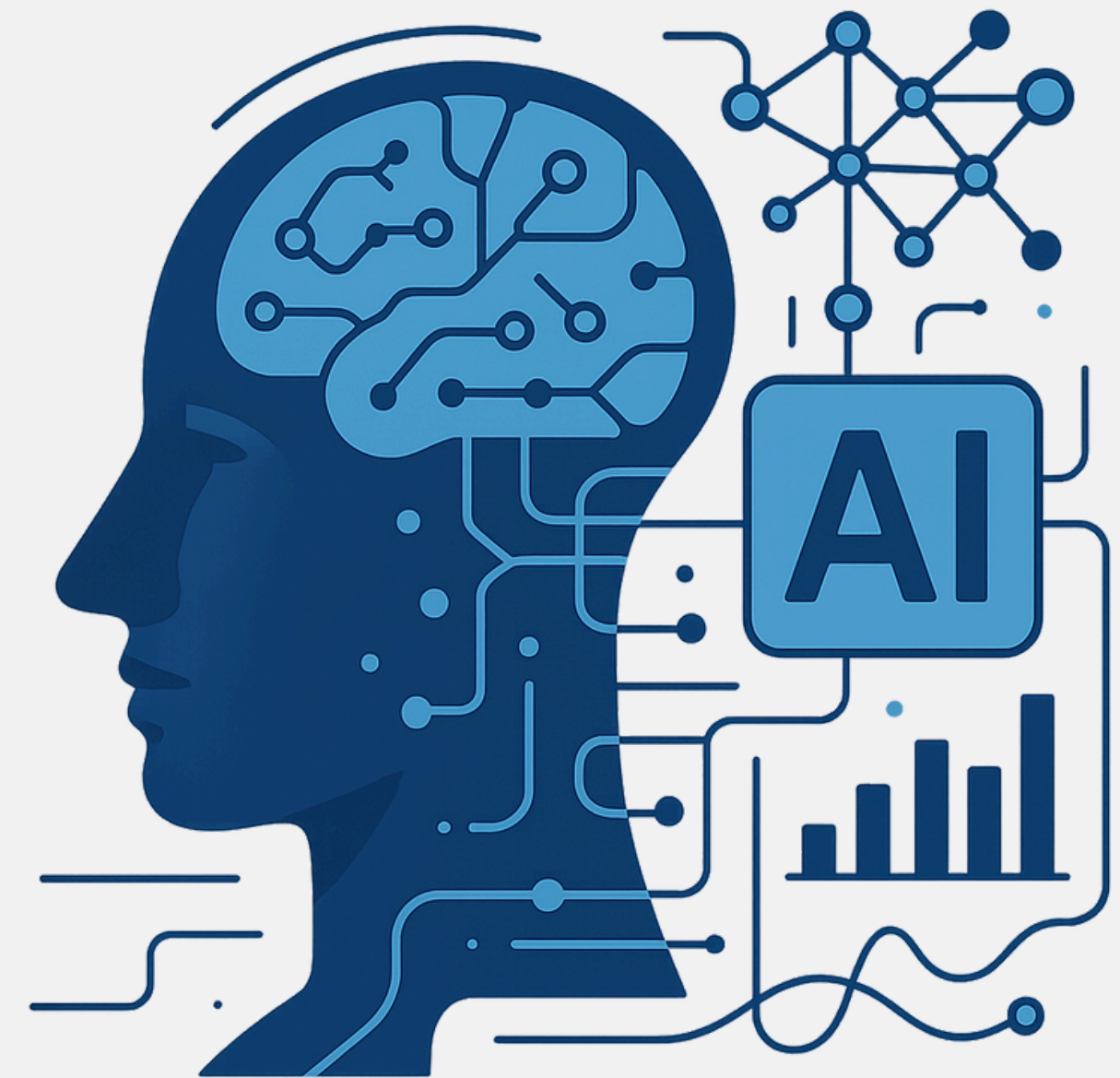
Final Exam Portfolio – ITAI 2376

Alhassane Samassekou

ITAI 2376 – Deep Learning



I'm an AI student with a strong focus on practical deep learning tools and methods. In this course, I applied CNNs, RNNs, transformers, and generative models to real-world problems using PyTorch, Hugging Face, and Azure AI.

My work emphasizes both model performance and responsible AI practices, with hands-on experience in architecture design, training optimization, and API deployment.



Capstone & Core Projects

The course challenged me to go beyond tutorials and apply deep learning to complex, real-world use cases. These projects helped sharpen my problem-solving and model-building skills across different types of architectures and domains.

Hugging Face vs. GPT-4		
	 Hugging Face	 GPT-4
Developer	Hugging Face	OpenAI
Open-Source	Yes	No
Release Date	Oct. 2022	Mar. 2023

01.

AI Research Assistant

A custom agent that performs web research using SerpAPI, ranks results with TF-IDF, and outputs summaries with citations and downloadable PDFs—no LLMs required.

02.

U-Net Based Diffusion Model

Implemented a 3-level U-Net for class-conditional image generation. Trained on CIFAR-10 with timestep + class embeddings. Evaluated using CLIP similarity.

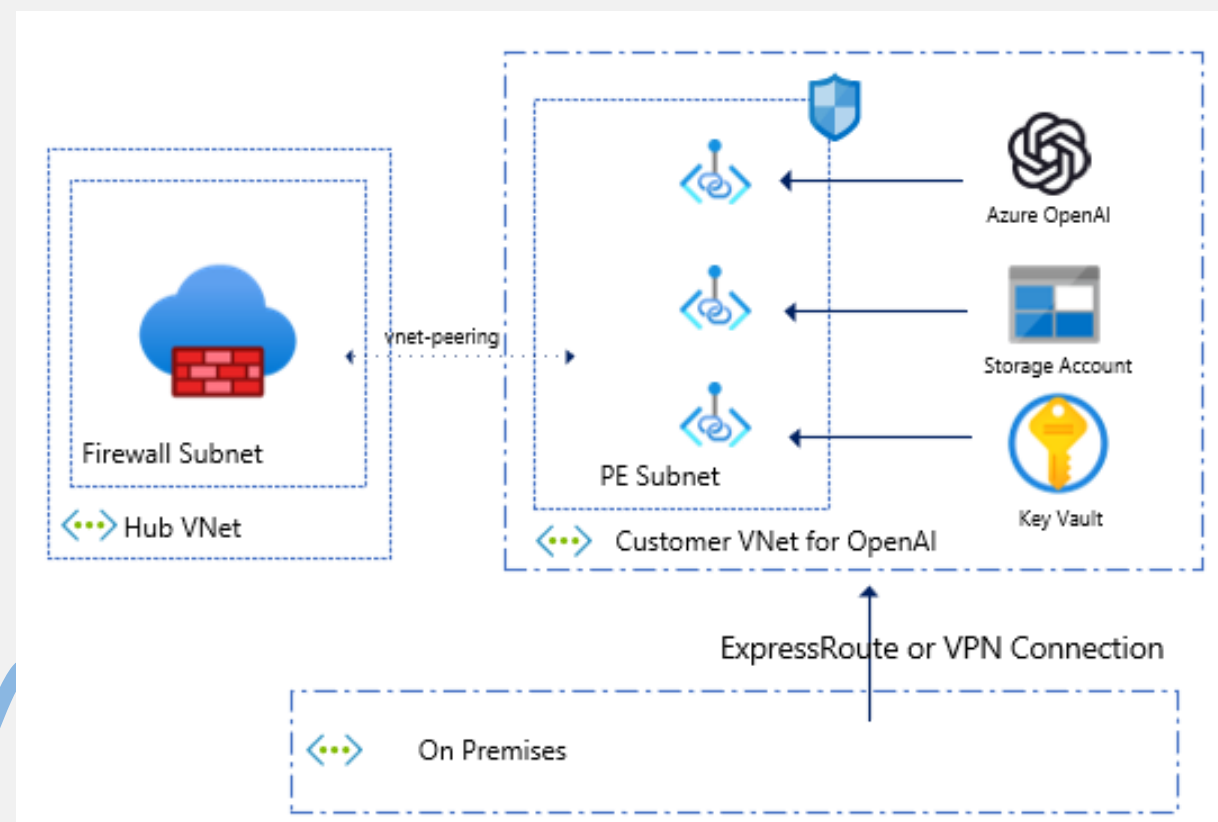
03.

Hugging Face vs GPT-4 API

Conducted a critical comparison of these two transformer tools. Explored trade-offs in control, fine-tuning, API cost, and data handling.

Labs Tools in Action

The labs were essential in translating theoretical concepts into practice, reinforcing my confidence in working with deep learning frameworks like PyTorch and Hugging Face. Each lab challenged me to understand what drives model behavior and how to tune it effectively.



01.

PyTorch Core:

Gained a strong foundation in PyTorch by working extensively with tensors, matrix operations, automatic differentiation, and training logic. Built custom training loops, implemented loss functions, and experimented with optimization algorithms.

02.

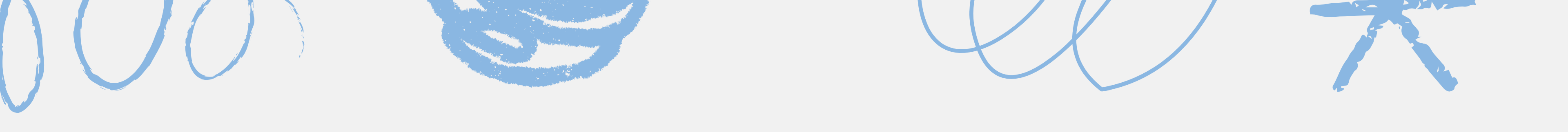
RNN + GloVe:

Developed a recurrent neural network using LSTM layers to classify text sentiment. Preprocessed data with Bag-of-Words and GloVe embeddings to improve semantic understanding, and evaluated model accuracy and learning stability across multiple epochs.

03.

Azure GPT-4 Deployment:

Used Azure AI Foundry to deploy GPT-4 via managed APIs. Explored prompt chaining, grounding inputs with external sources, and implementing safety filters to ensure outputs were contextually appropriate and ethically sound. Reflected on real-world deployment challenges including latency, moderation, and cost.



Where These Skills Apply

01

Academic Research Assistants

My capstone can help automate literature reviews, generate citations, and prepare summaries for busy researchers or students.

02

Healthcare Diagnostics

CNN and diffusion models can enhance X-ray clarity, detect abnormalities, or denoise medical images—supporting radiologists.

03

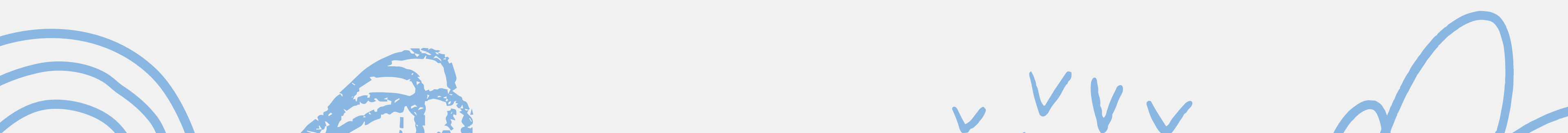
Sentiment & Trend Detection

RNN/BERT classifiers can interpret product reviews or social media data to guide marketing, UX, and brand monitoring.

04

Generative AI Systems

The U-Net diffusion model sets a foundation for guided generation, AI art, and custom image synthesis tools.



Resources

Articles Studied:

“Diffusion Models Beat GANs” – Foundation for my class-conditional generator
“BERT: Pre-training of Deep Bidirectional Transformers” – Core NLP understanding

Videos Watched:

Azure AI Foundry – GPT deployment, grounding, and system design

Links Referenced:

huggingface.co, platform.openai.com

Use Cases Explored:

Research automation, X-ray analysis, opinion mining, generative art

Let's Connect

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 - Email: alhassane.samassekou@gmail.com
 - LinkedIn: [linkedin.com/in/asamassekou](https://www.linkedin.com/in/asamassekou)
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- Key Tools: PyTorch, Transformers, Gradio, Azure AI, CLIP, U-Net, SerpAPI
 - Skills: Deep Learning, NLP, Computer Vision, Prompt Engineering, Responsible AI