Final Exam Portfolio

Name: SM Tawhid

Course: ITAI 2376 - Deep Learning

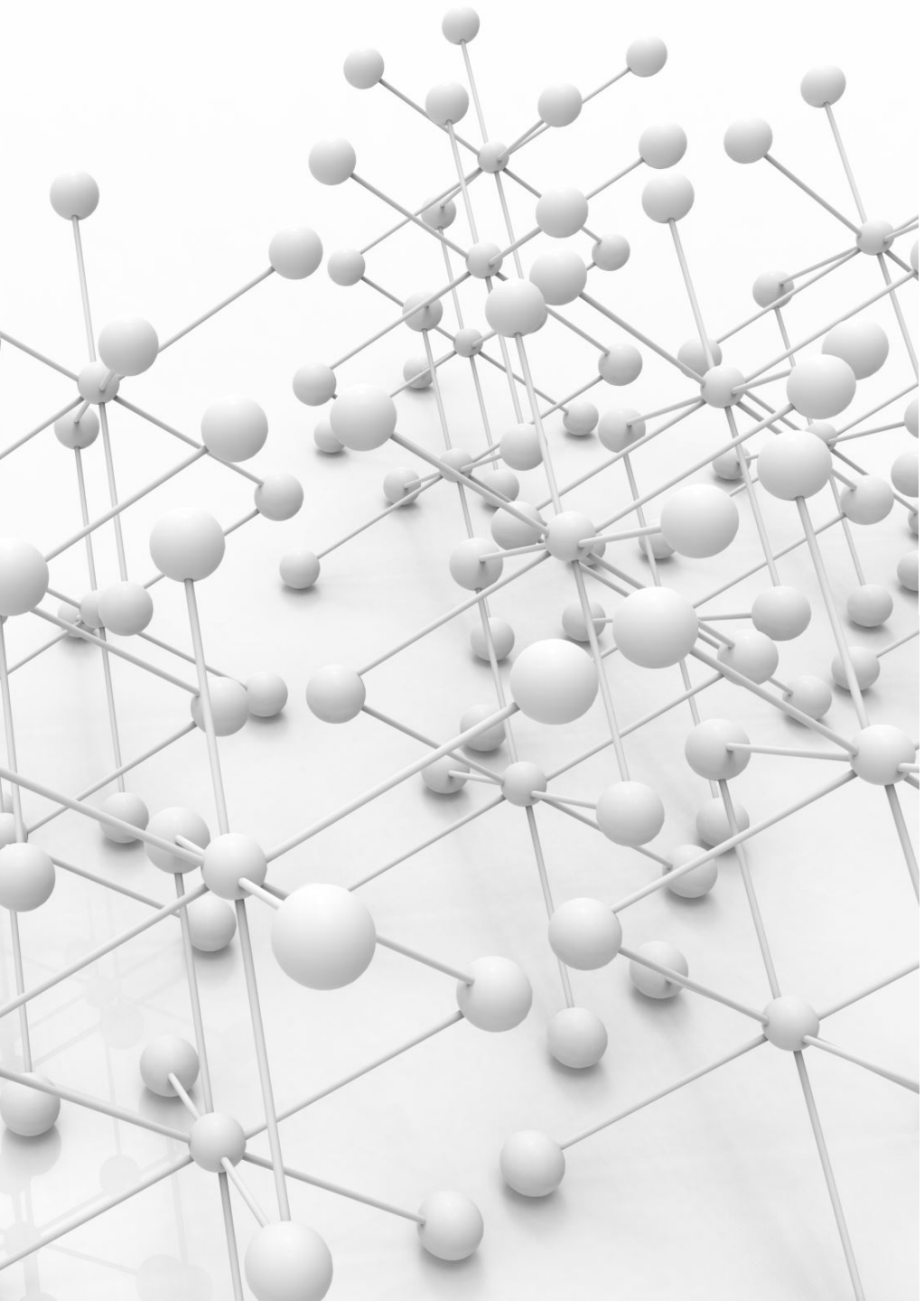
Portfolio Overview

This portfolio showcases the core assignments and projects completed in ITAI 2376. Each module focused on essential deep learning concepts, culminating in a hands-on final project.

GitHub Repository

Module 2: Tools & Libraries

Explored TensorFlow, PyTorch, and Keras. Compared ease of use, performance, community support, and compatibility. PyTorch was found to be the most flexible for research-focused work.



Module 3: Neural Network Zoo

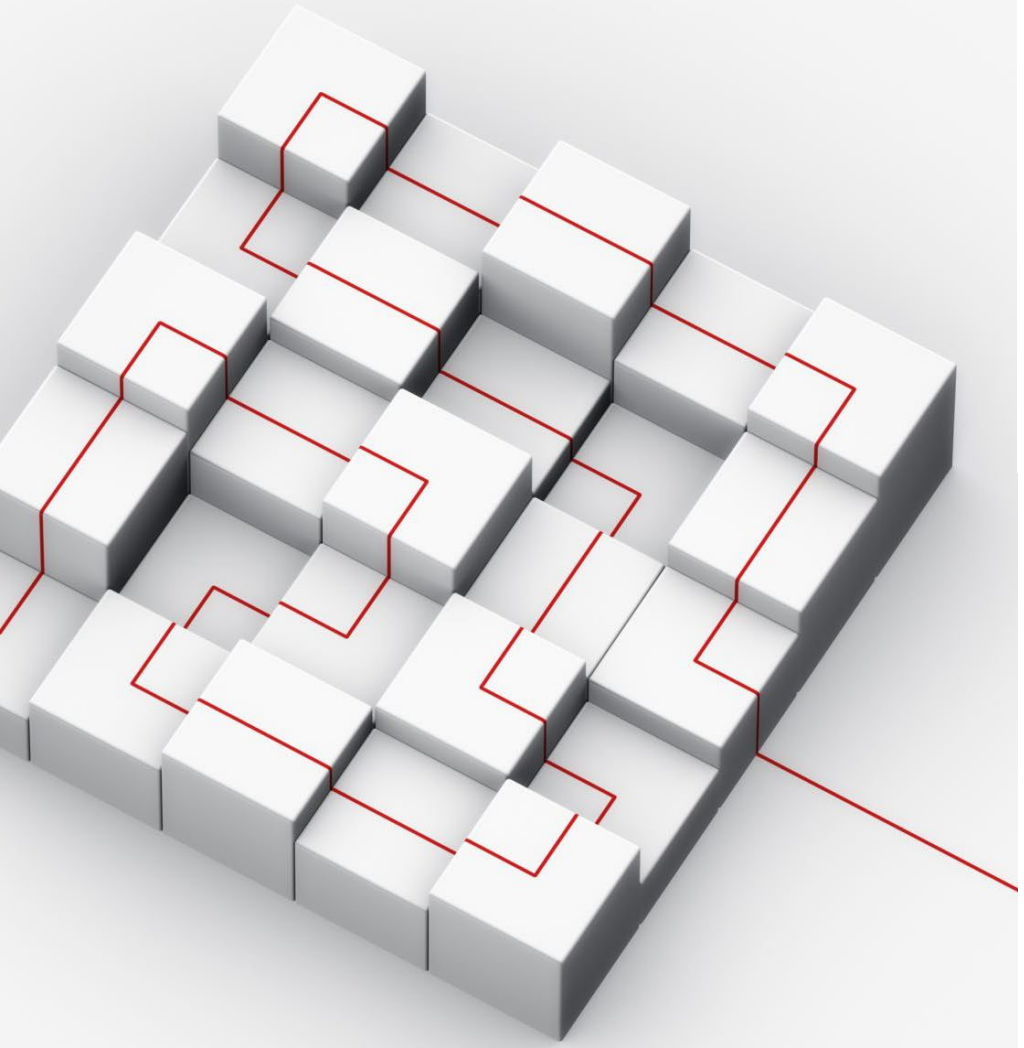
Created a visual 'zoo' of popular neural network architectures.

Each model was represented as a metaphorical animal, highlighting its unique structure and use case.

Module 4: Explaining CNNs Simply

Designed an educational breakdown of how CNNs work using everyday concepts.

Focused on filters, feature maps, and classification in an accessible way.



Midterm Project: Diffusion Model

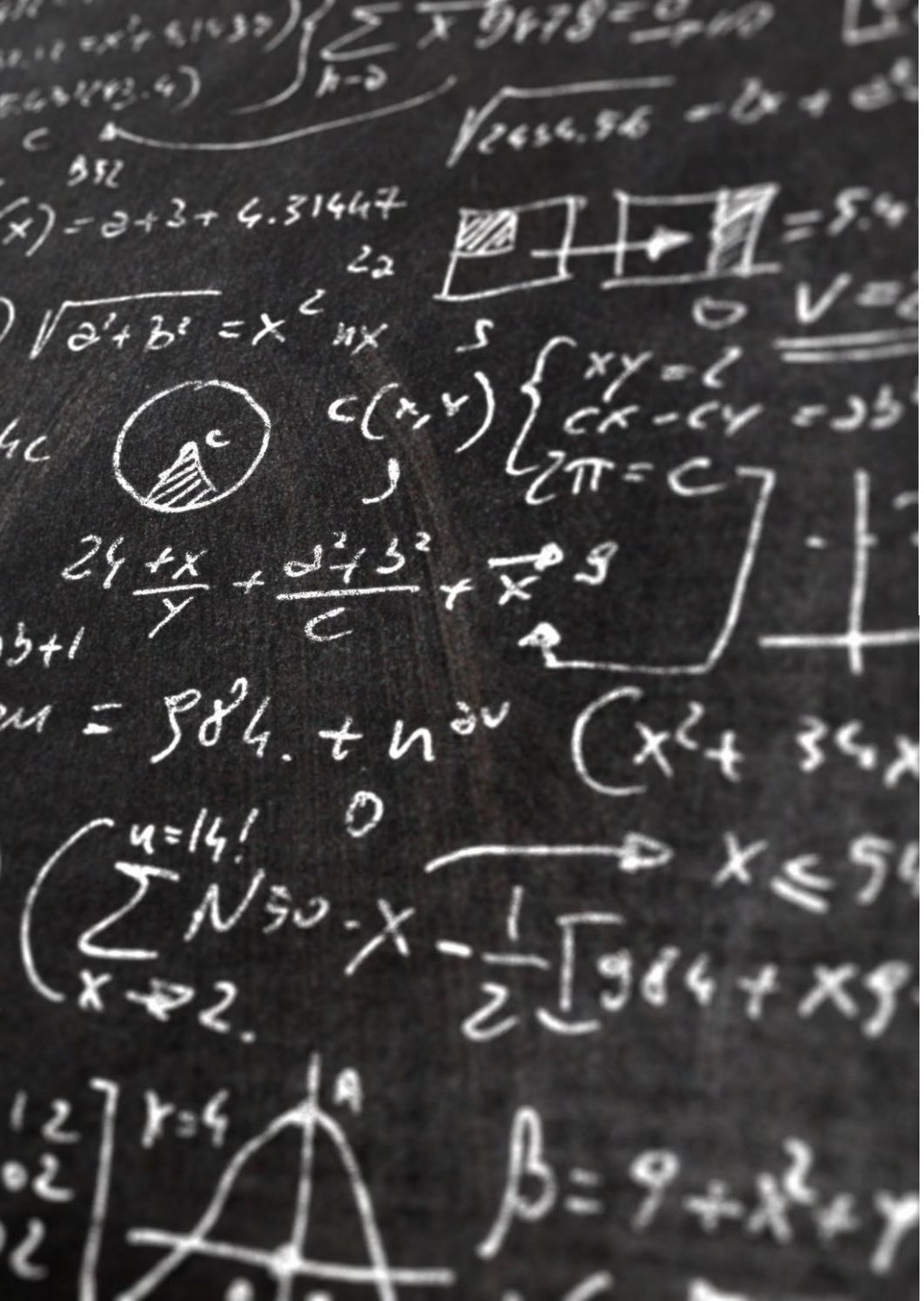
Implemented a diffusion-based generative model for MNIST digits.

Trained a U-Net architecture to learn the reverse denoising process and generate high-quality images.

Module 5: Analyzing 'Arrival'

Used NLP techniques to analyze themes from the movie 'Arrival'.

Applied tokenization, embeddings, and basic RNN understanding to evaluate language and meaning.



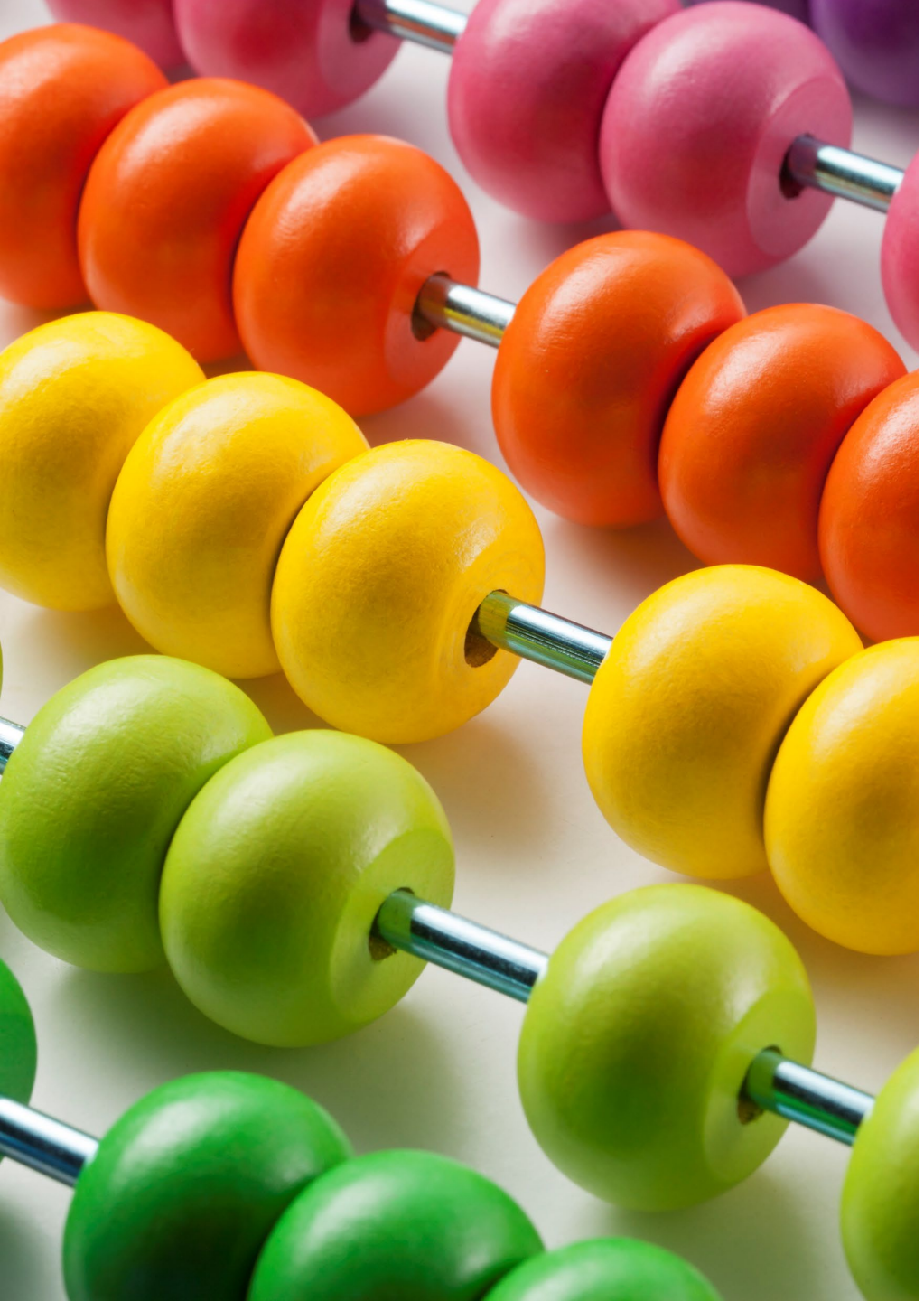
Final Project: AI Math Tutor Agent

Built a simple rule-based NLP agent that solves algebra equations and quizzes users.

Agent interprets input, performs symbolic math, and provides immediate feedback.

GitHub Portfolio Submission

Created a GitHub Repository and organized all modules by filename and order.



Final Reflections

This course strengthened understanding of deep learning and AI fundamentals. The hands-on projects, especially the diffusion model and AI agent, provided real-world experience. Future goals include exploring LLMs and applying AI to education.