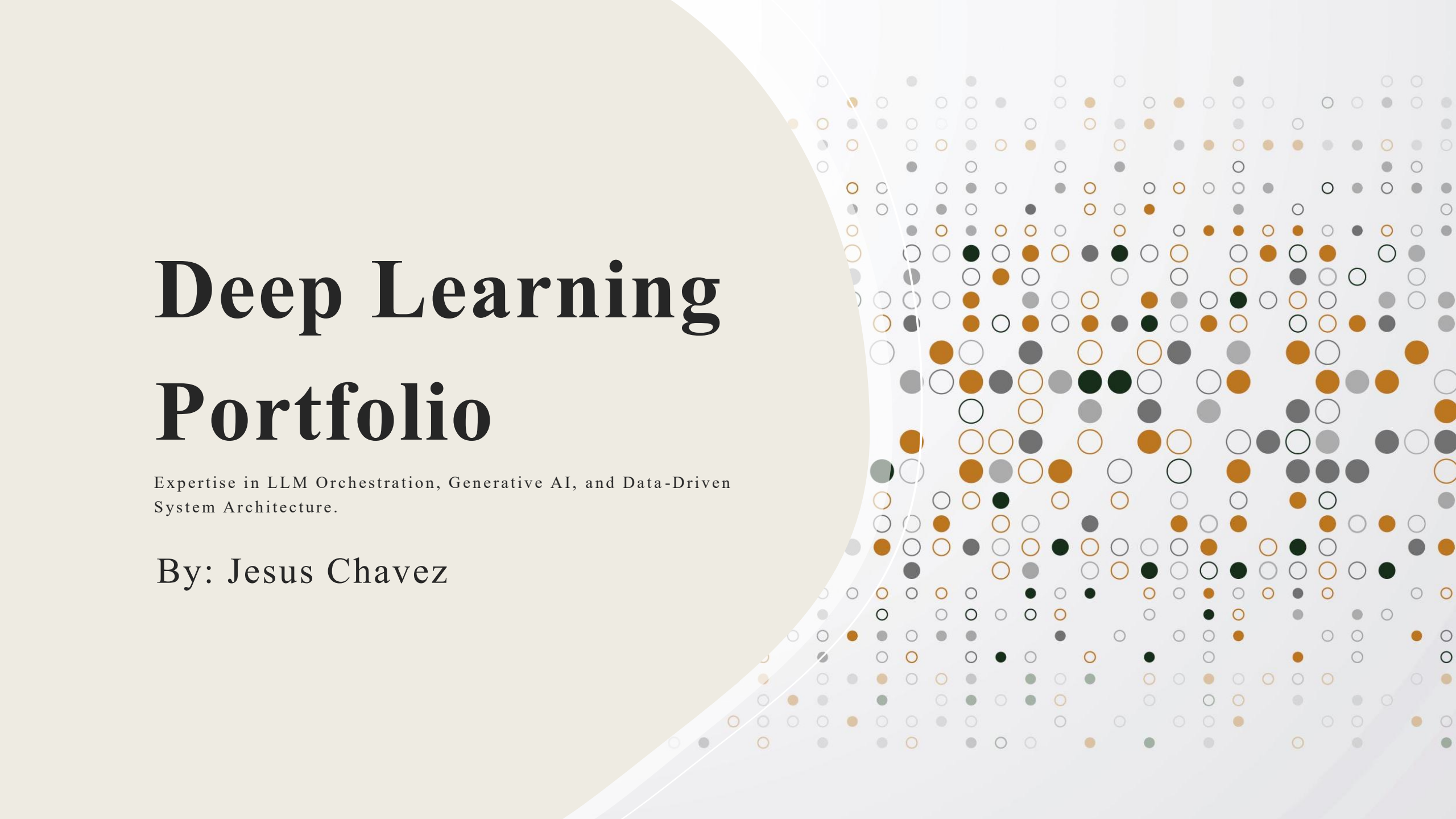
Deep Learning Portfolio

Expertise in LLM Orchestration, Generative AI, and Data-Driven System Architecture.

By: Jesus Chavez



Solving Real-World Problems with Advanced Models

A. Research Assistant Agent (Project 0)

Goal: Automate academic research, credibility scoring, and citation generation.

Key Skill: LLM Orchestration & Agent Design.

Takeaway: Designed a robust multi-component agent system with a reasoning loop, moving beyond simple prompt engineering.

B. Diffusion Model (Project 1)

Goal: Generate realistic, conditional images from noise (MNIST dataset).

Key Skill: State-of-the-Art Generative AI (DDPM, U-Net).

Takeaway: Successfully implemented the U-Net architecture with skip connections and used contemporary metrics like CLIP scores to evaluate and guide generation quality.

Foundational Mastery: Theory to Application

A. Optimization Theory (Concept 1)

Key Skill: Gradient Descent & Learning Rate Control.

Takeaway: Demonstrated a clear grasp of how models learn, understanding concepts like the "Mountain of Mistakes" (loss landscape) and the critical role of the learning rate.

B. CNN Classification (Project 3)

Key Skill: CNN Architecture & Regularization.

Takeaway: Built a functional CNN for MNIST, mastered techniques like **Max Pooling** for efficiency, and implemented **Dropout** for robust overfitting prevention. **(Used Google Colab)**

Conclusion & Next Steps

Key Achievements Summary

1. **Generative Modeling** (Diffusion & U-Net).
2. **Agent & LLM Systems** (Research Assistant).
3. **Core CV & Optimization** (CNNs, VGG16, Gradient Descent).

Portfolio Link:
https://github.com/J-xololt/Jesus-Chavez-AI-Portfolio

Next Goal: To apply these skills to solve real-world industry problems in Corporate Knowledge Management.