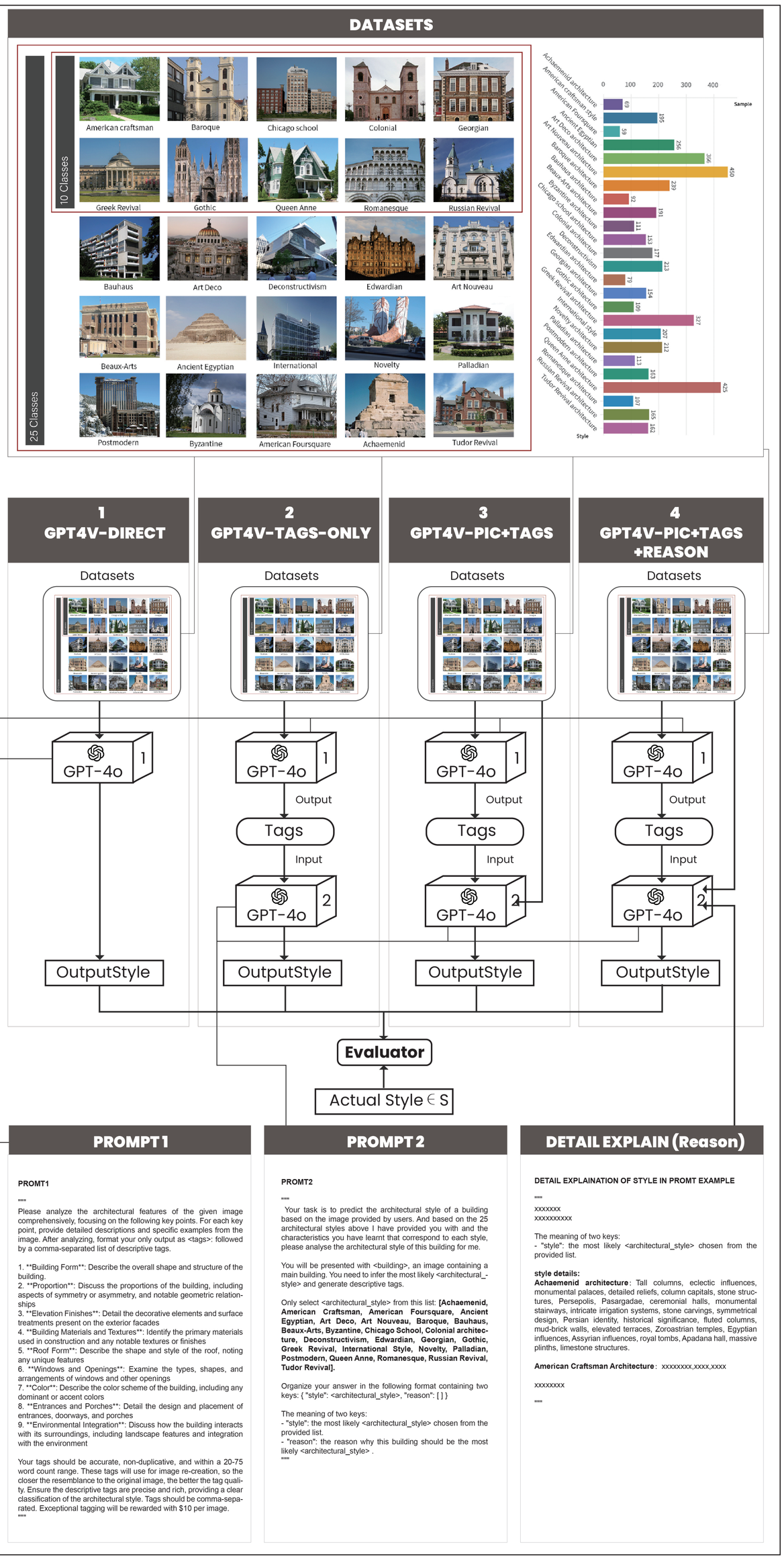
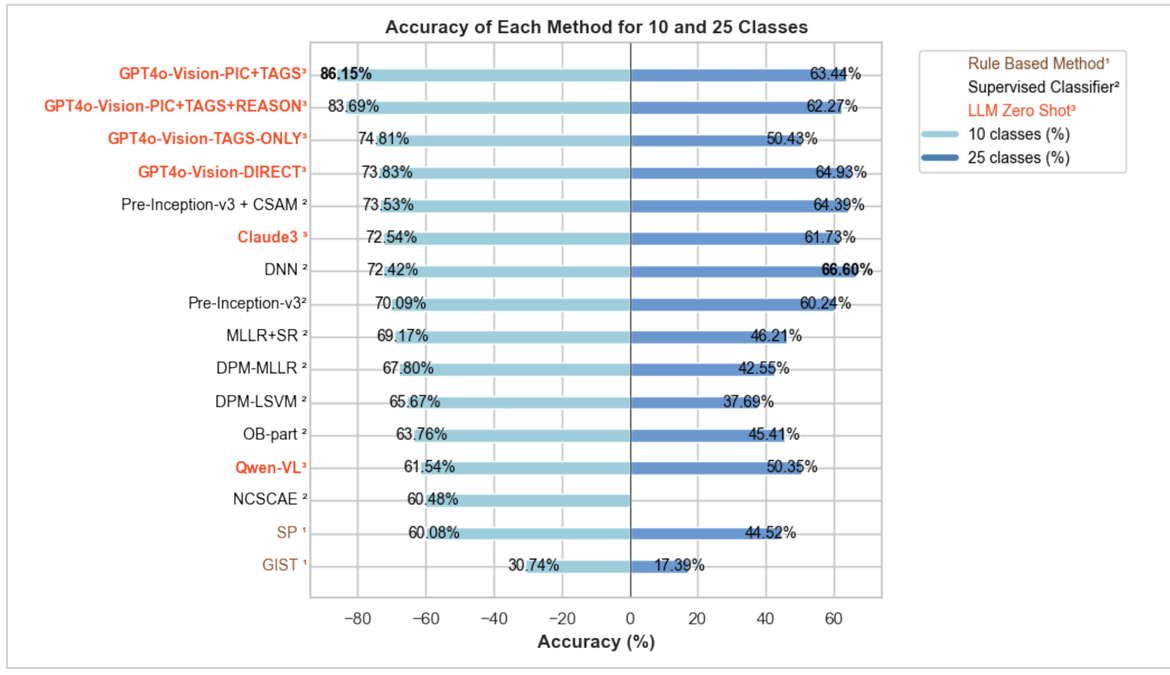
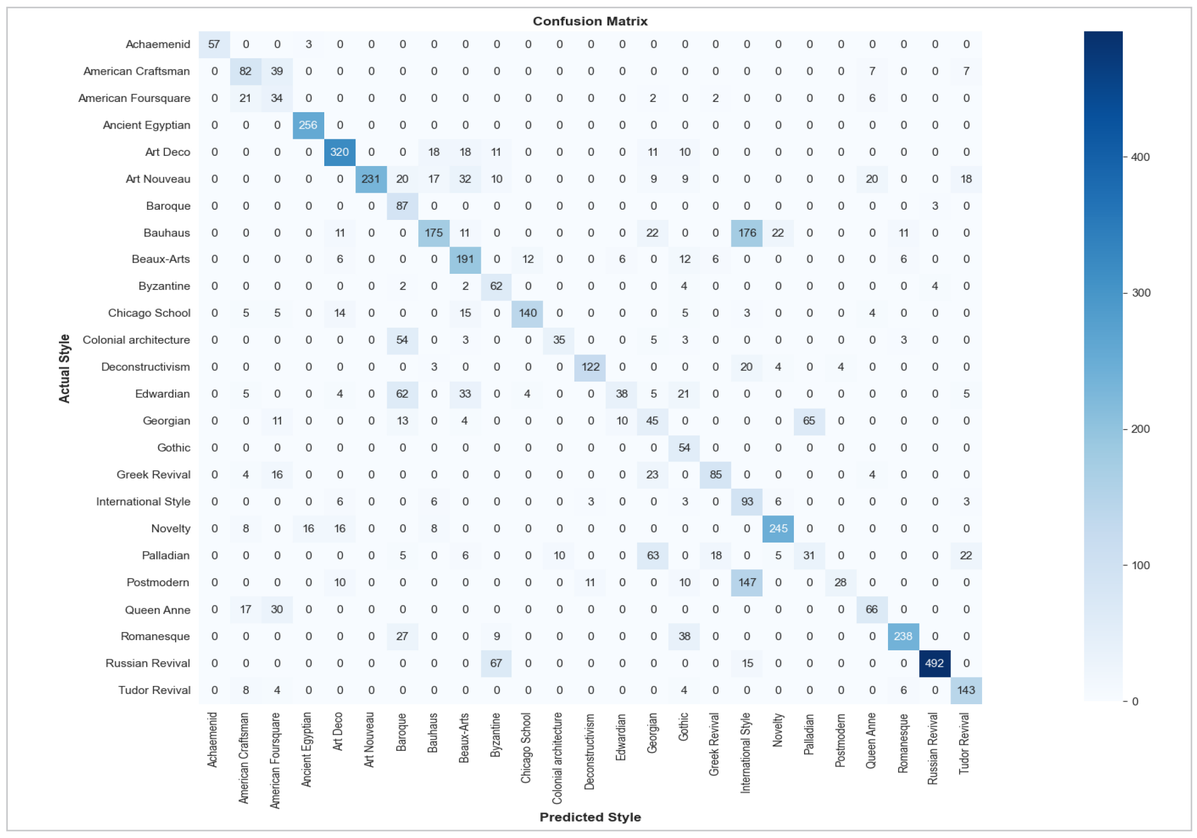


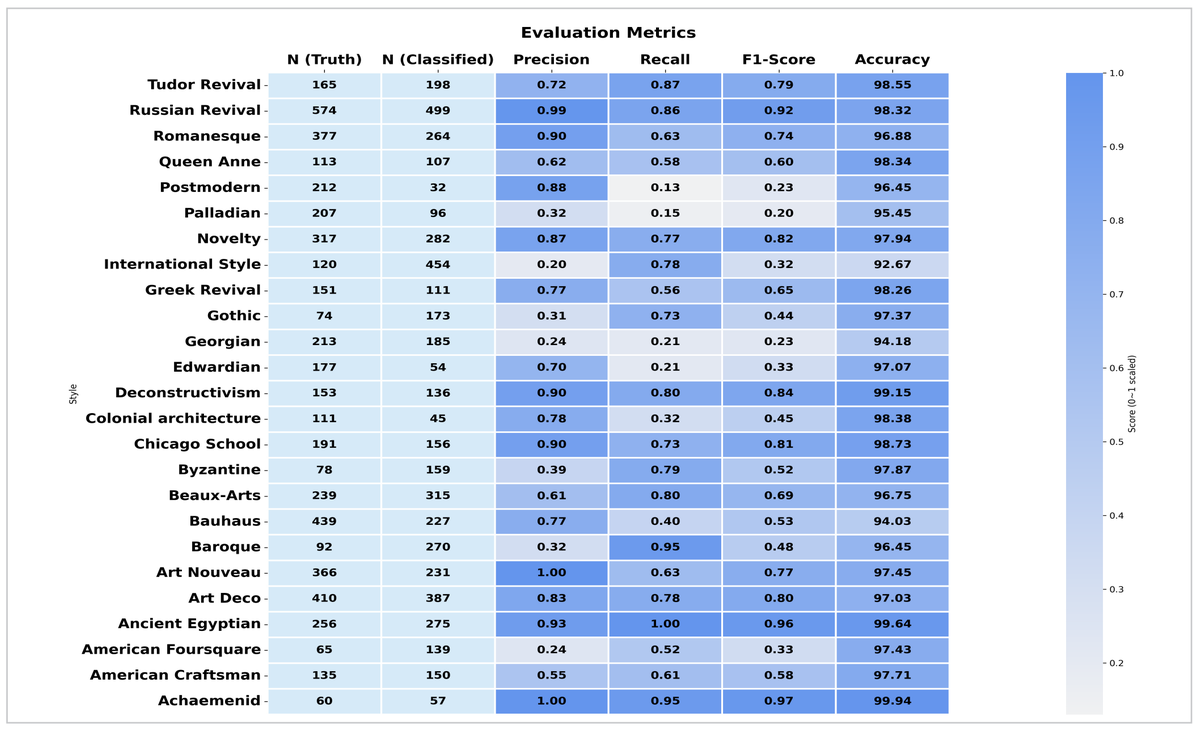
1 Framework for zero-shot architectural style classification based on GPT-4o



2 Accuracy of each method for 10 and 25 classes



3 Confusion Matrix



4 Evaluation Matrix

Zero-Shot Architectural Style Classification with Large Language Models

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In architectural research, accurate classification of architec tural styles is crucial for integrating historical and contemporary design elements as well as for educational purposes. This paper presents a novel application of existing Large Language Models (LLMs), including the GPT-4o model from OpenAI, for architectural style classification tasks. LLMs are language neural networks with billions of parameters trained on extensive datasets. GPT-4o, a state-of-the-art LLM, demonstrates significant potential for achieving Zero-Shot classification capabilities, comparable to specifically trained supervised classifiers on many tasks.

We explore the model's Zero-Shot ability to identify and classify architectural styles without prior specialized training on architectural images. Various prompt engineering approaches were experimented with to augment the model's prior knowledge about architecture, thereby increasing classifi cation accuracy. Experimental results indicate that GPT-4o can achieve classification accuracy comparable to, and even exceeding, traditional con volutional neural network (CNN) models without any training.

This study not only highlights the flexibility and potential of large pre-trained models for architectural style classification but also proposes a new paradigm for resource-efficient and high-accuracy architectural analysis.

CAAD FUTURES HONG KONG 2025
CATALYTIC INTERFACES
The University of Hong Kong
July 2 — 4, 2025