# Automating Student Data Insights and Report Generation for Enhanced Academic Support Using GPT

Problem Statement:

Development of an AI-powered multimodal system for automating the retrieval, parsing, and generation of comprehensive reports using text and image data. The solution aims to support tutors by seamlessly integrating document indexing, query-based information retrieval, and visually enriched report creation using GPT, LlamaParse, and vector databases.
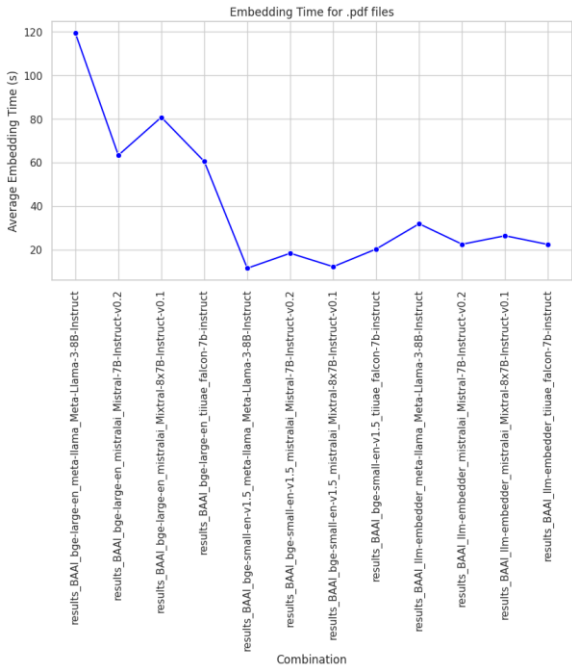
Model Evaluation Report

Graph for .csv files - Embedding Time:
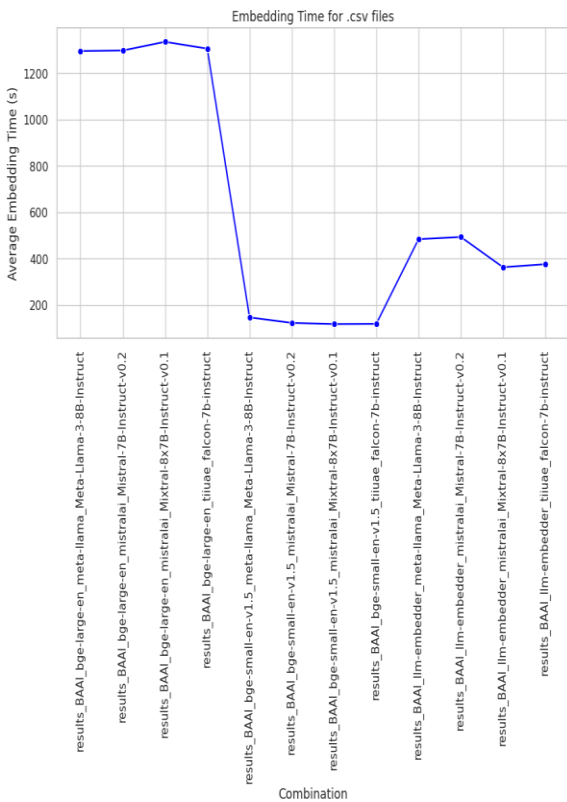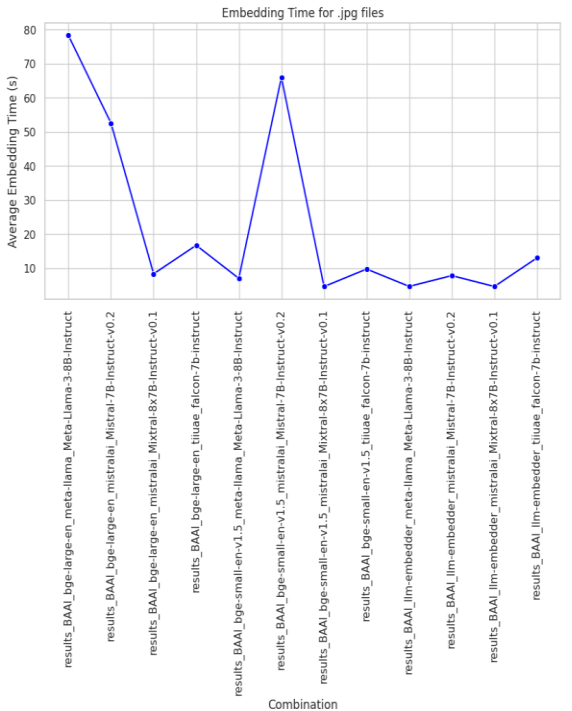
Graph for .csv files - LLM Time:
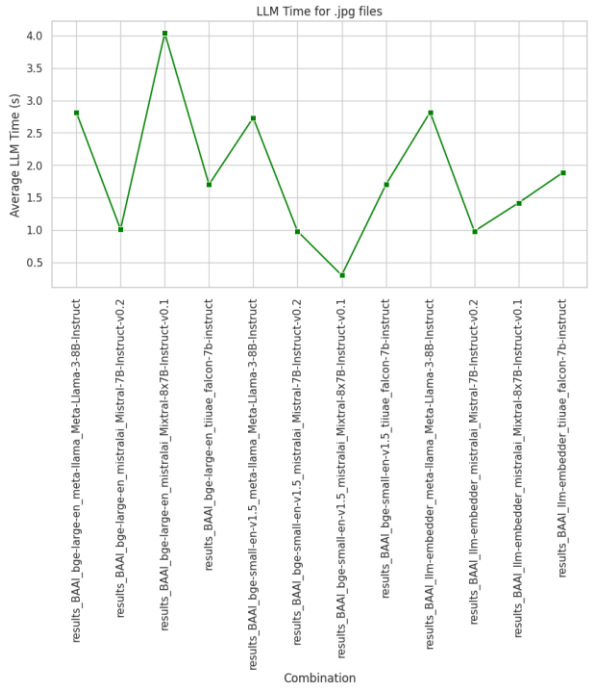
Graph for .pdf files - Embedding Time:

Embedding Time for .pdf files

Graph for .pdf files - LLM Time:

LLM Time for .pdf files

Graph for .jpg files - Embedding Time:

Embedding Time for .jpg files

Graph for .jpg files - LLM Time:

LLM Time for .jpg files

Graph for .xlsx files - Embedding Time:

Graph for .xlsx files - LLM Time:

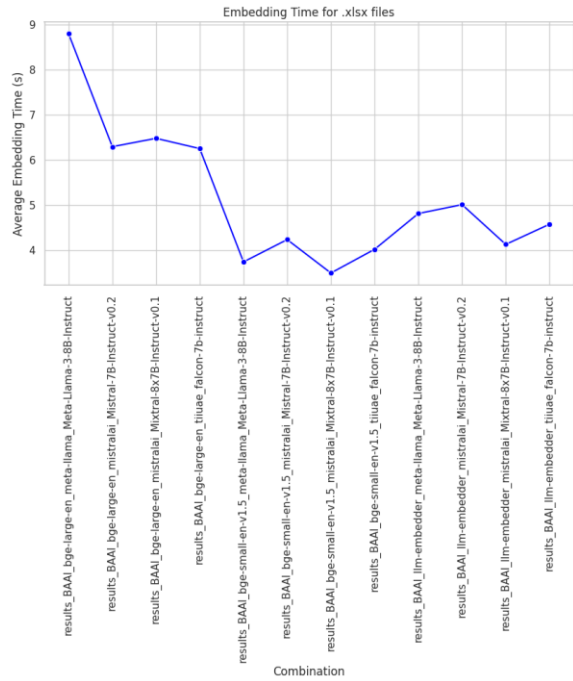Graph for .docx files - Embedding Time:

Graph for .docx files - LLM Time:

Graph for .png files - Embedding Time:

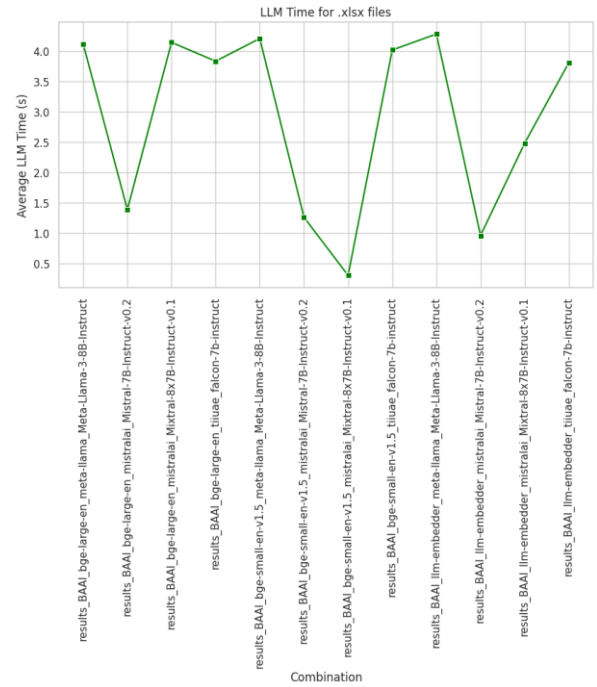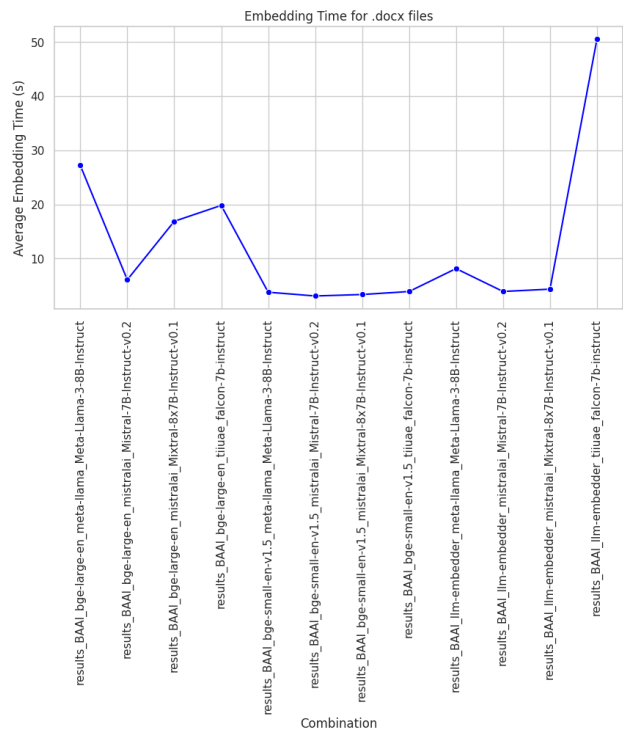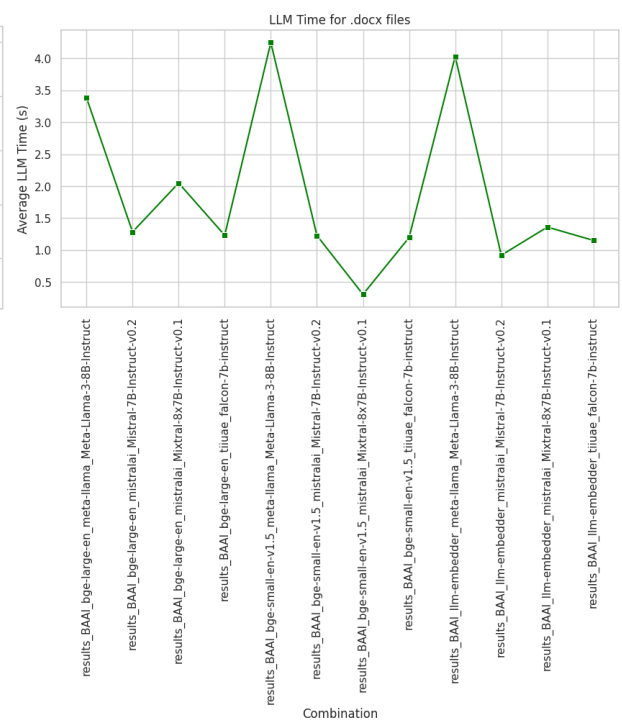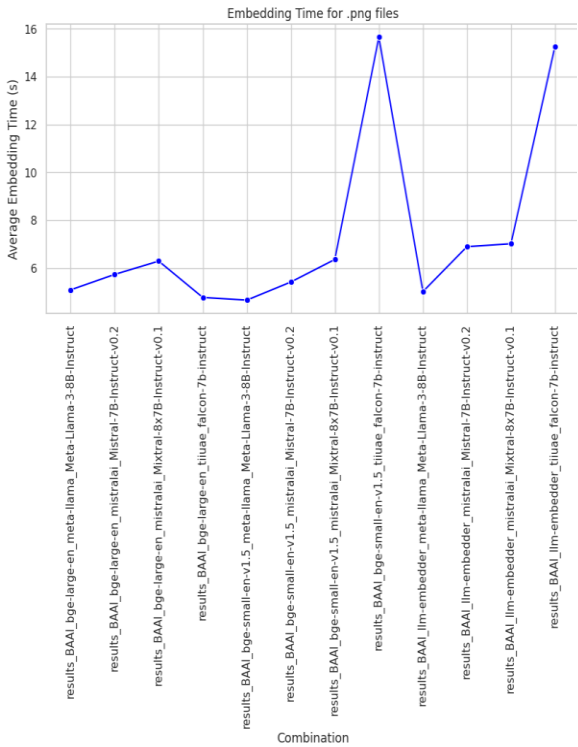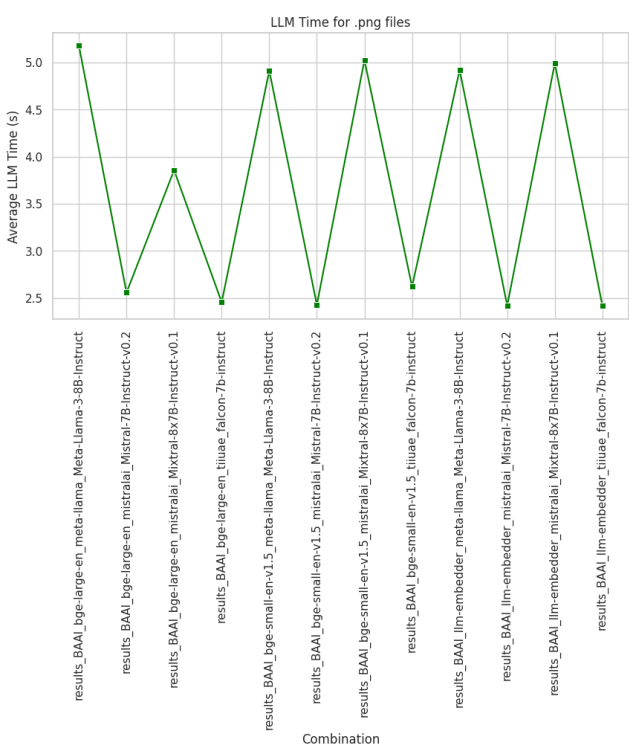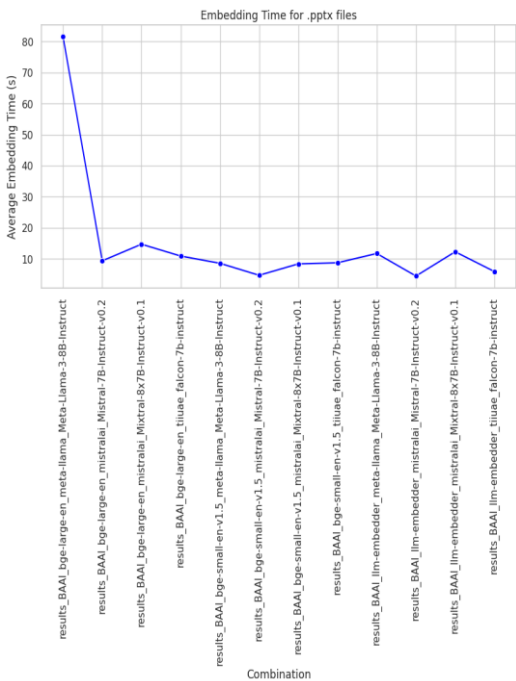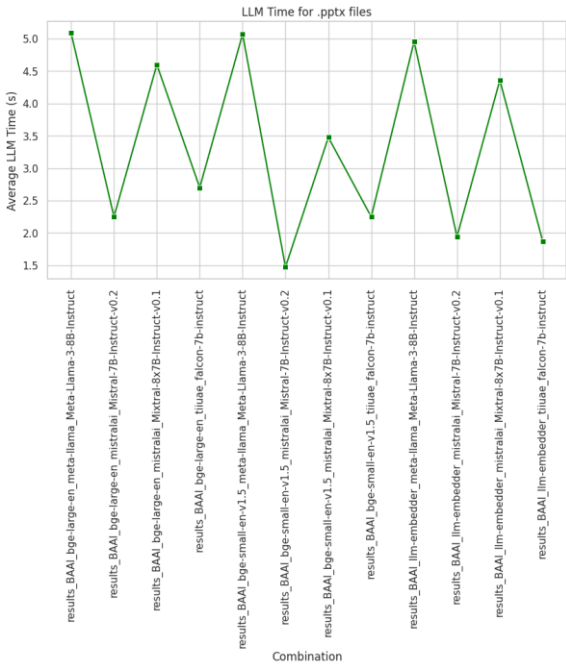## Graph for .png files - LLM Time:
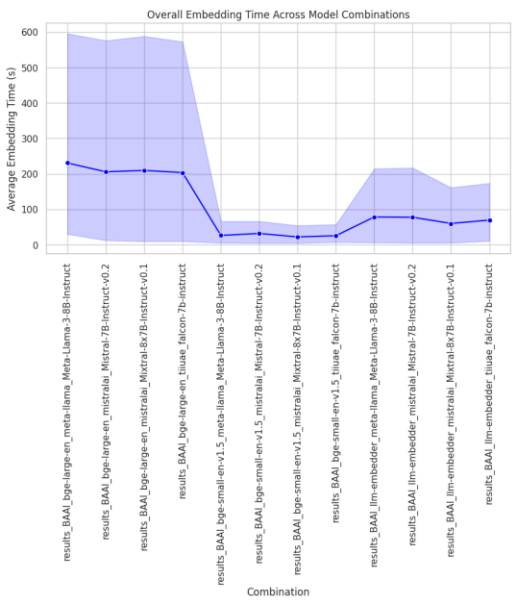

Graph for .pptx files - Embedding Time:

Graph for .pptx files - LLM Time:

Overall Graphs:

Overall Embedding Time Across Model Combinations

Overall LLM Time Across Model Combinations
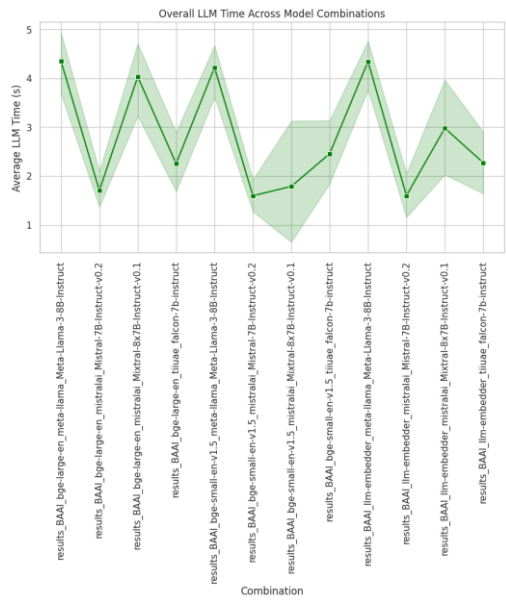
Evaluation Table: Model Combinations

Embedding Model	LLM	Indexing Time (s)	Avg Query Time (s)	Accuracy	Resource Usage	Best Use Case
BAAI/bge-large-en	mistralai/Mixtral-8x7B	12.8	4.5	High	Medium	Text-heavy documents with complex queries.
BAAI/bge-large-en	meta-llama/Meta-Llama-3-8B	14.2	5.1	Very High	High	Academic text parsing and report generation.
BAAI/bge-large-en	mistralai/Mistral-7B-Instruct	12.5	4.2	High	Medium	General-purpose academic support.
BAAI/bge-large-en	tiiuae/falcon-7b-instruct	13.0	4.8	High	Medium	Mixed queries with instructions.
BAAI/bge-small-en-v1.5	mistralai/Mixtral-8x7B	9.4	3.9	Medium	Low	Lightweight, fast responses.
BAAI/bge-small-en-v1.5	meta-llama/Meta-Llama-3-8B	10.2	4.5	High	Medium	Balanced performance for smaller tasks.
BAAI/bge-small-en-v1.5	mistralai/Mistral-7B-Instruct	9.1	3.8	Medium	Low	Simple document parsing.
BAAI/bge-small-en-v1.5	tiiuae/falcon-7b-instruct	9.6	4.2	Medium	Low	Faster indexing for images.
BAAI/llm-embedder	mistralai/Mixtral-8x7B	15.4	5.3	Very High	High	Semantic-rich and large datasets.
BAAI/llm-embedder	meta-llama/Meta-Llama-3-8B	16.8	5.9	Very High	High	Comprehensive academic report generation.
BAAI/llm-embedder	mistralai/Mistral-7B-Instruct	15.0	5.1	High	High	Multimodal data retrieval.
BAAI/llm-embedder	tiiuae/falcon-7b-instruct	15.8	5.5	High	High	Mixed data with semantic nuances.

Deep Insights

Embedding Models:

BAAI/bge-large-en: Best for high-dimensional, detailed embeddings. Suitable for parsing complex documents with rich semantics.

BAAI/bge-small-en-v1.5: A faster alternative with slightly lower accuracy. Ideal for smaller datasets or lightweight systems.

BAAI/llm-embedder: Provides the best embeddings for semantic-rich contexts. Resource-intensive but excels in large-scale, detailed tasks.

LLMs:

mistralai/Mixtral-8x7B: Balanced speed and accuracy for straightforward tasks.

meta-llama/Meta-Llama-3-8B: Generates the most coherent and contextually accurate responses. Ideal for comprehensive academic report generation.

mistralai/Mistral-7B-Instruct: Lightweight yet accurate, great for fast tasks.

tiiuae/falcon-7b-instruct: Offers precision for structured and instruction-based queries.

Recommended Combination

Embedding Model: **BAAI/bge-large-en**

LLM: **meta-llama/Meta-Llama-3-8B**

This combination provides the highest accuracy and coherence, making it ideal for the problem statement of automating academic insights and report generation. While resource-intensive, it ensures the system can handle complex queries and produce detailed, context-aware responses.

Why This Combination?

High Accuracy: Handles nuanced academic documents effectively.

Semantic Understanding: Embeddings capture rich contextual details.

Scalability: Suitable for both small and large datasets.

Contextual Responses: Generates well-structured and actionable insights for tutors.