National College of Ireland

Configuration Manual

MSc Research Project
MSc in Data Analytics

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School of Computing
National College of Ireland

Supervisor: Abdul Qayum

National College of Ireland

MSc Project Submission Sheet

School of Computing

Student Name:	Addanki Mahesh Kumar
Student ID:	x22240047
Programme:	MSc in Data Analytics **Year:** 2024-2025
Module:	Research Project
Supervisor:	Abdul Qayum
Submission Due Date:	15 Sept 2025
Project Title:	Multi-LLM Ensemble Architecture for Cross-Modal Document Understanding: A RAG-based Approach

Word Count: 170 **Page Count:** 07

I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.
ALL internet material must be referenced in the bibliography section. Students are required to use the Referencing Standard specified in the report template. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action.

Signature: Addanki Mahesh Kumar

Date: 15 Sept 2025

PLEASE READ THE FOLLOWING INSTRUCTIONS AND CHECKLIST

Attach a completed copy of this sheet to each project (including multiple copies)	□
Attach a Moodle submission receipt of the online project submission, to each project (including multiple copies).	□
You must ensure that you retain a HARD COPY of the project, both for your own reference and in case a project is lost or mislaid. It is not sufficient to keep a copy on computer.	□

Assignments that are submitted to the Programme Coordinator Office must be placed into the assignment box located outside the office.

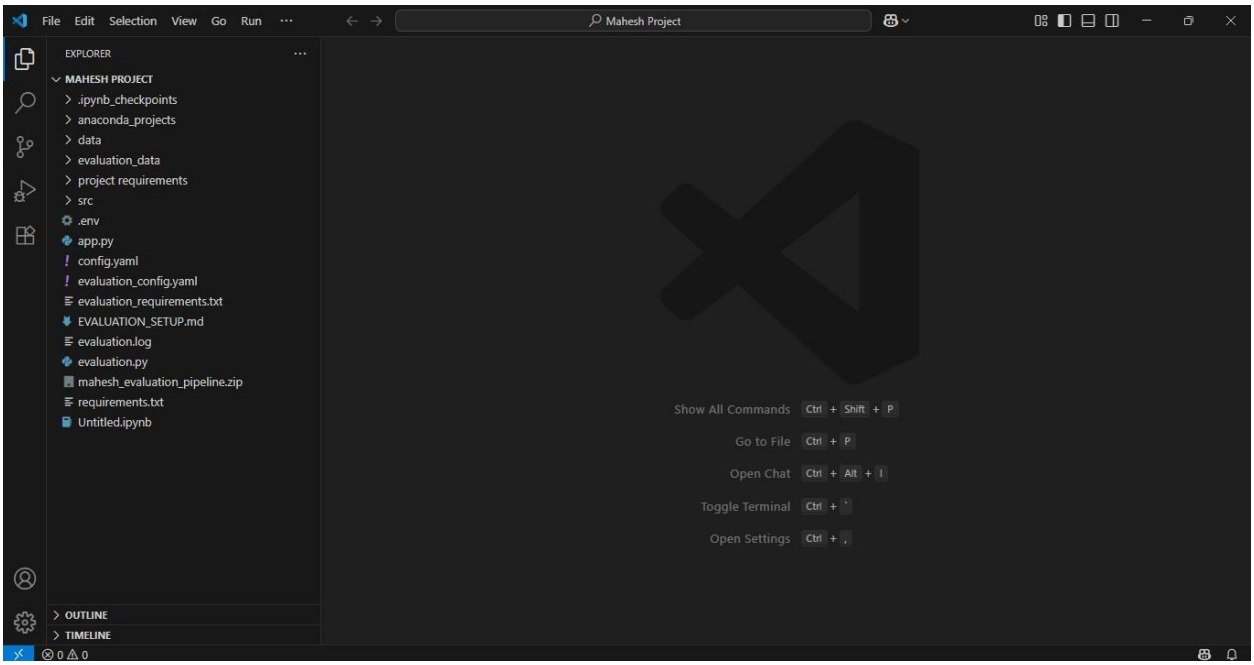
Office Use Only	
Signature:	
Date:	
Penalty Applied (if applicable):	

Configuration Manual

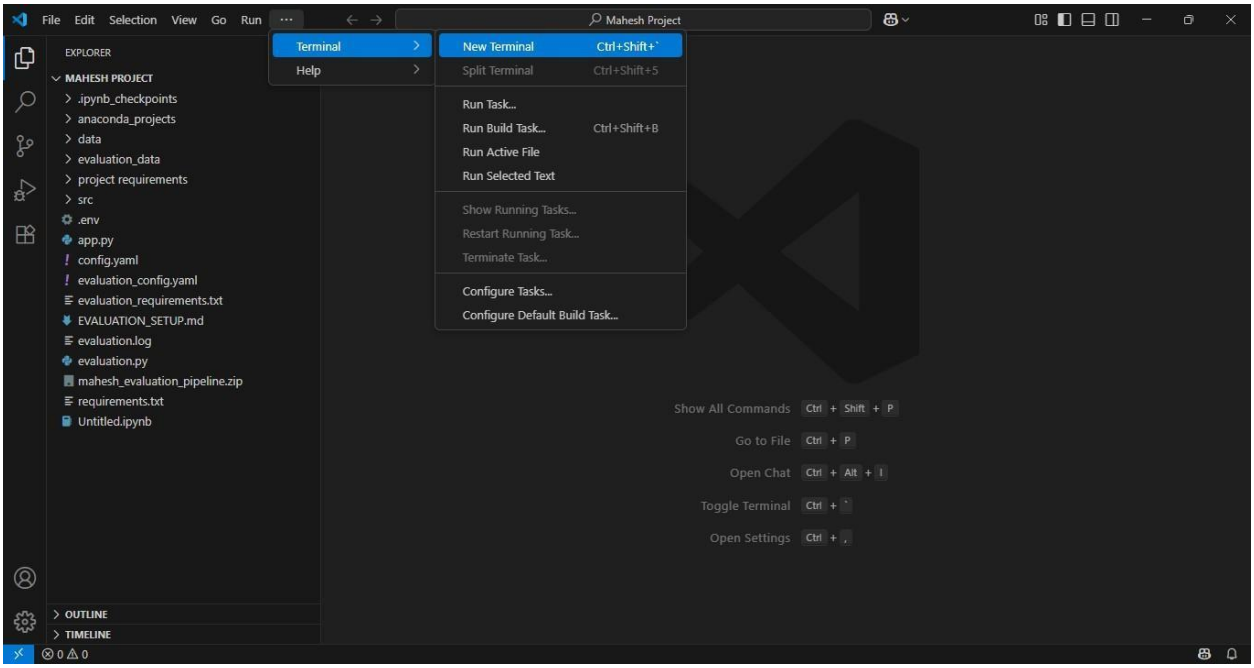
Addanki Mahesh Kumar

Student ID:x22240047

1. Unzip the code and open in VS code

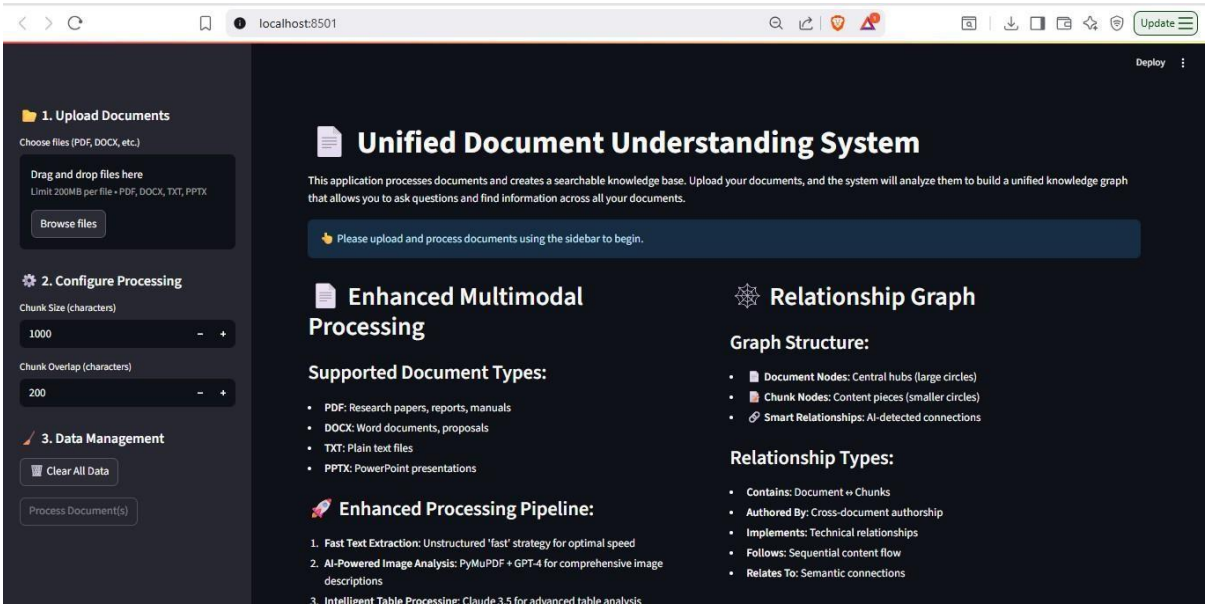


2. Open new terminal as follows

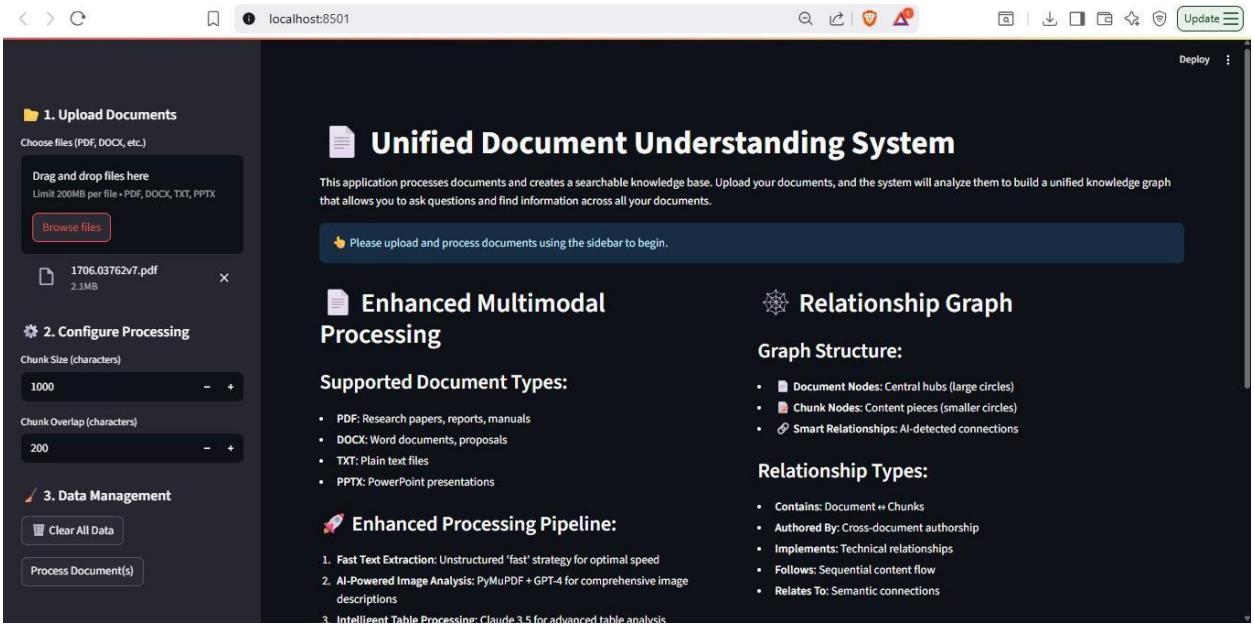


3. Run the following commands in the new terminal
    a. conda activate –name my_project python=3.10 -y
    b. pip install -r requirements.txt
    c. streamlit run app.py

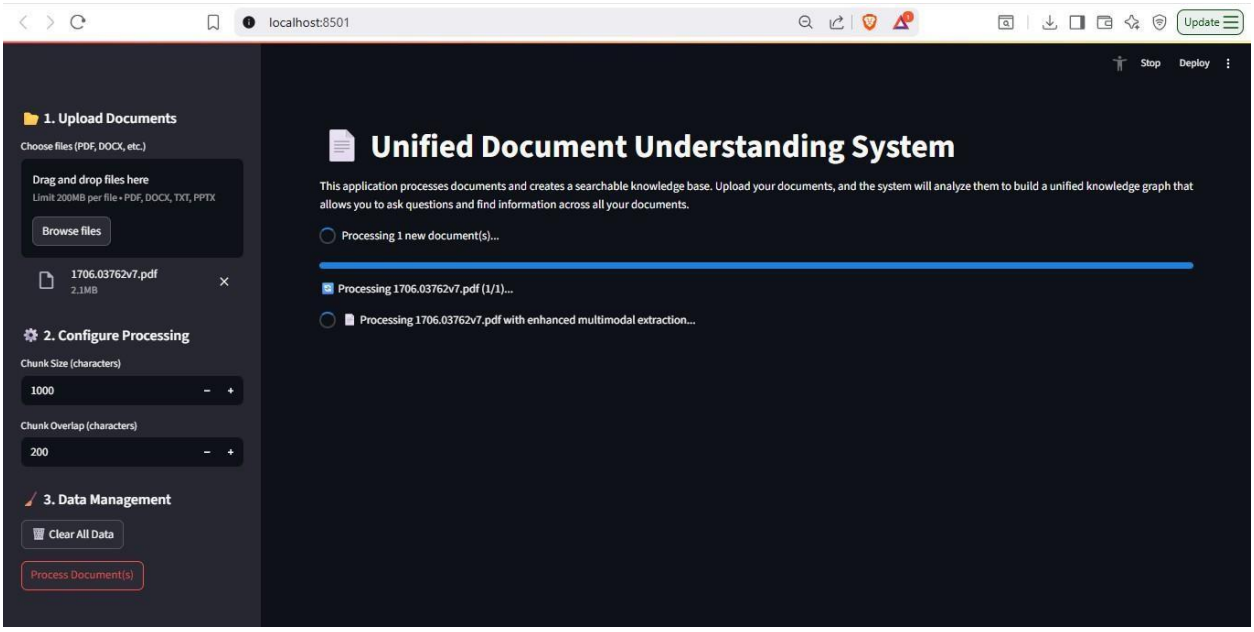
4. Then you can see an UI like this

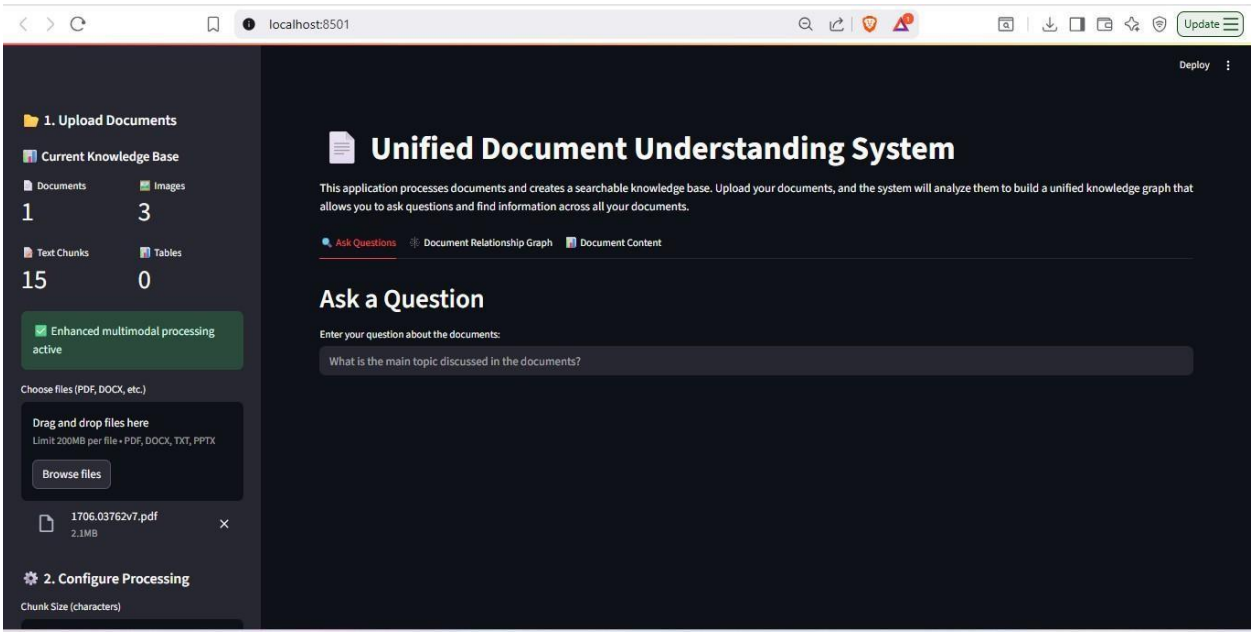


5. Click on Browse files and upload document as follows

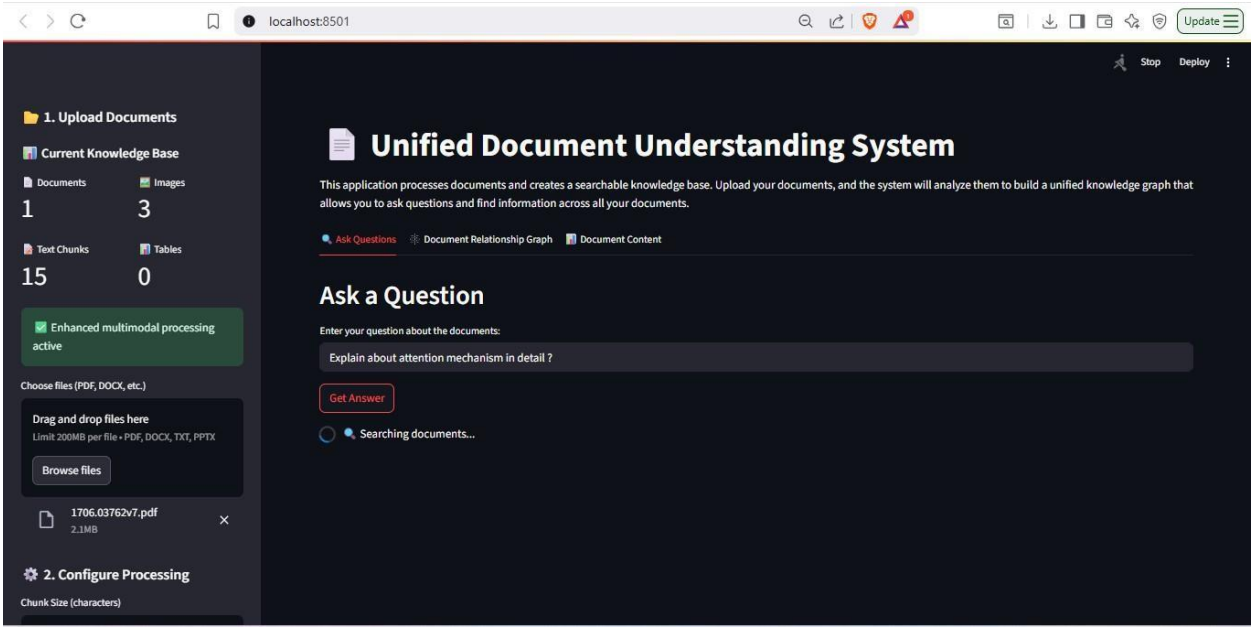


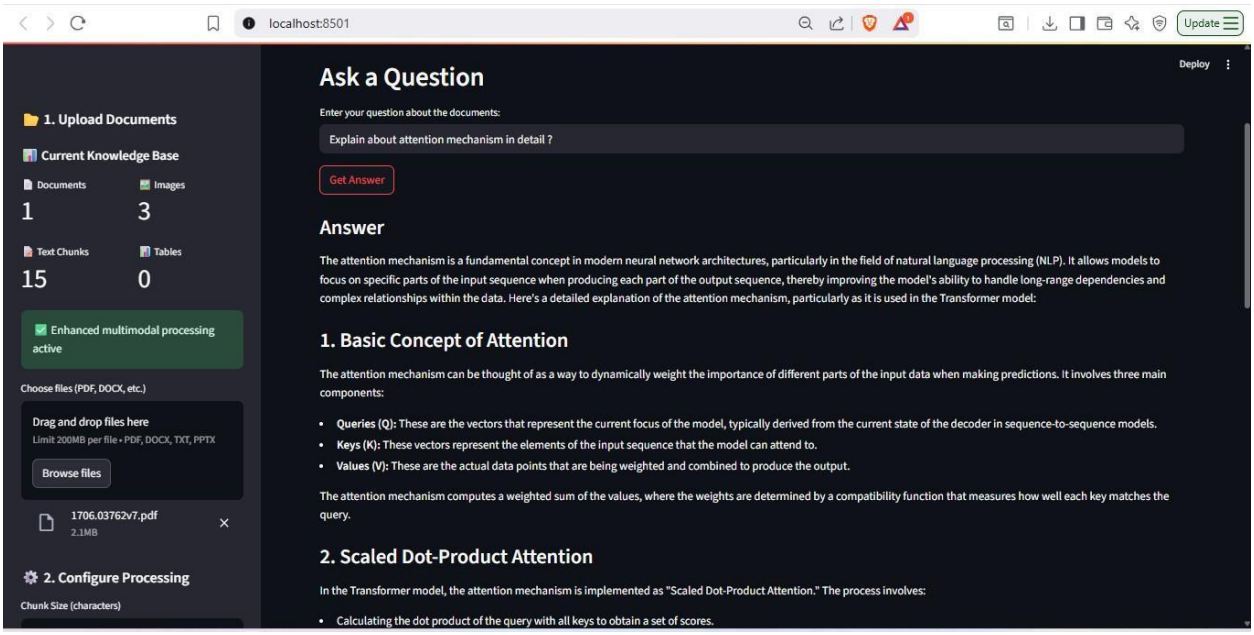
6. Click on process documents, then you can see the below screen



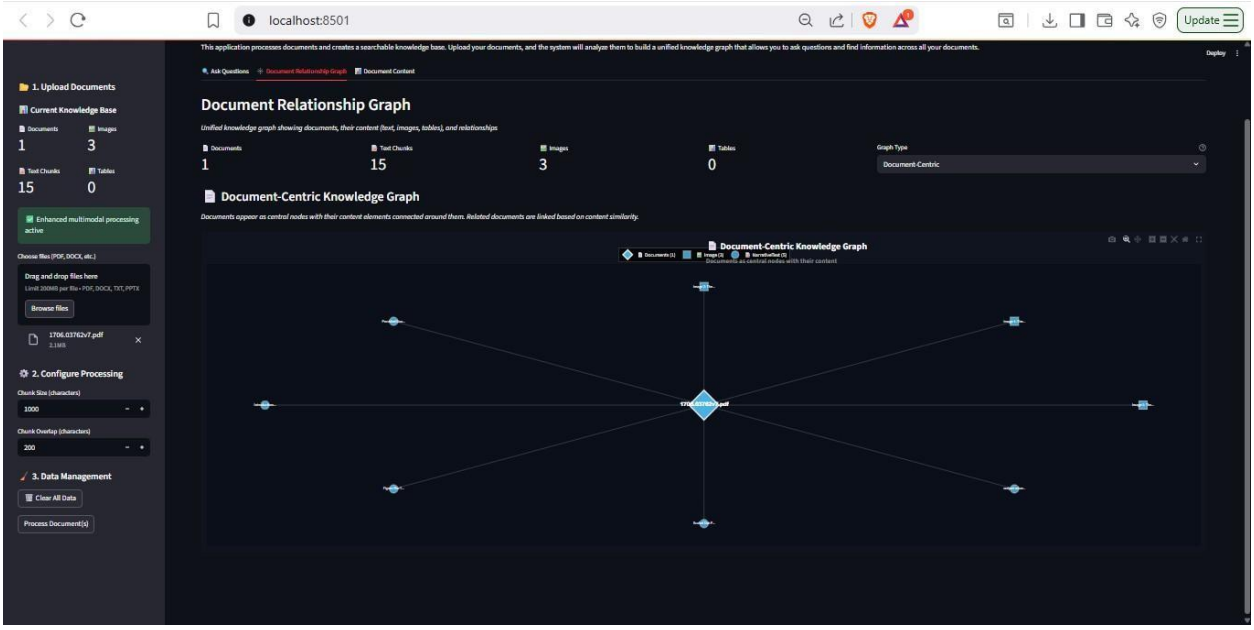


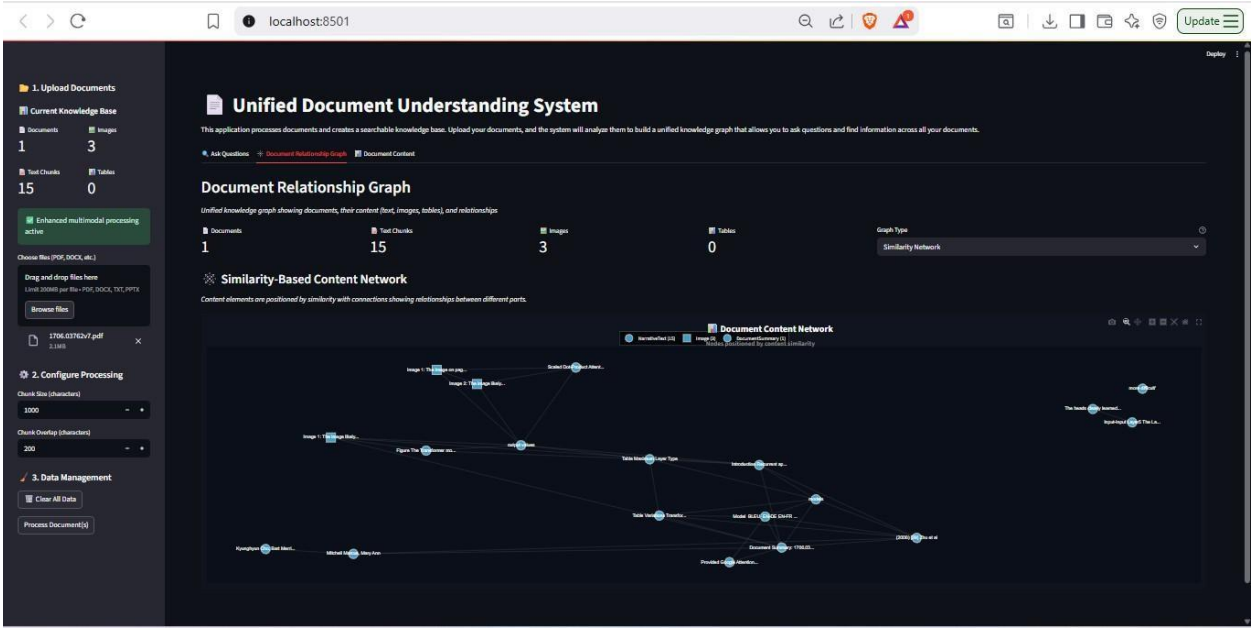
7. Enter question and click on get answer button

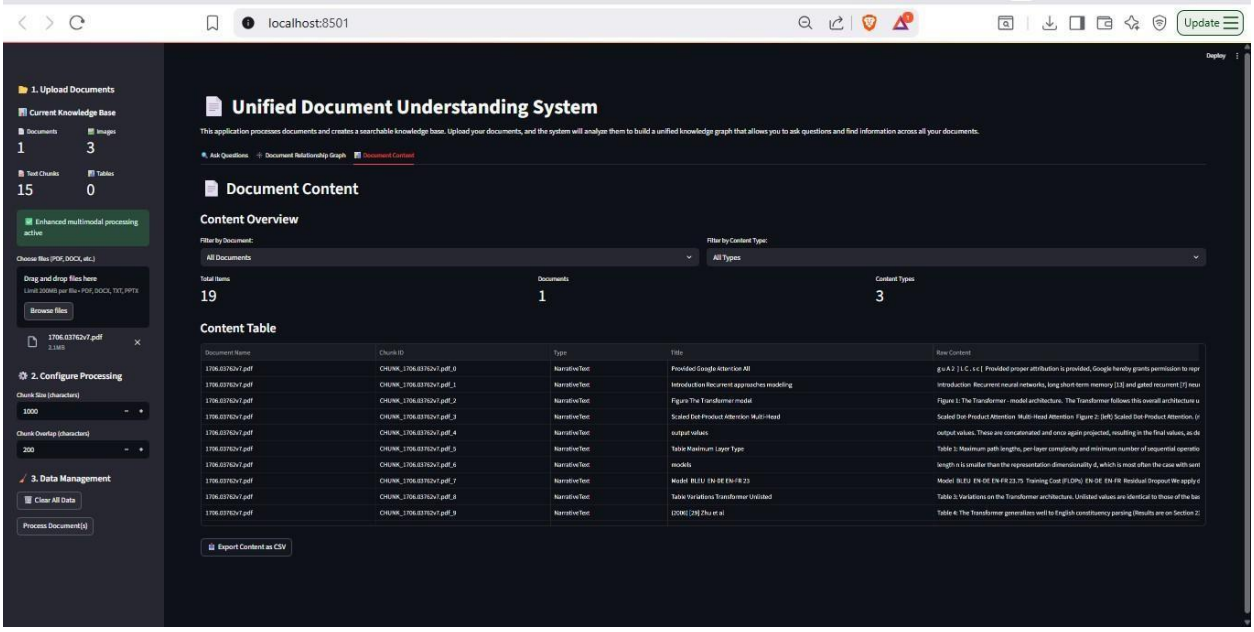




8. Explore multiple section of the app




localhost:8501
Update
Deploy
1. Upload Documents
Current Knowledge Base
Documents
1
Images
3
Text Chunks
15
Tables
0
Enhanced multimodal processing active
Choose files (PDF, DOCX, etc.)
Drag and drop files here
Limit 200MB per file • PDF, DOCX, TXT, PPTX
Browse files
1706.03762v7.pdf
2.1MB
2. Configure Processing
Chunk Size (characters)
1000
Chunk Overlap (characters)
200
3. Data Management
Clear All Data
Process Document(s)
Unified Document Understanding System
This application processes documents and creates a searchable knowledge base. Upload your documents, and the system will analyze them to build a unified knowledge graph that allows you to ask questions and find information across all your documents.
Ask Questions
Document Relationship Graph
Document Content
Document Relationship Graph
Unified knowledge graph showing documents, their content (text, images, tables), and relationships
Documents
1
Text Chunks
15
Images
3
Tables
0
Graph Type
Similarity Network
Similarity-Based Content Network
Content elements are positioned by similarity with connections showing relationships between different parts.
Document Content Network
Nodes positioned by content similarity


localhost:8501
Update
Deploy
1. Upload Documents
Current Knowledge Base
Documents
1
Images
3
Text Chunks
15
Tables
0
Enhanced multimodal processing active
Choose files (PDF, DOCX, etc.)
Drag and drop files here
Limit 200MB per file • PDF, DOCX, TXT, PPTX
Browse files
1706.03762v7.pdf
2.1MB
2. Configure Processing
Chunk Size (characters)
1000
Chunk Overlap (characters)
200
3. Data Management
Clear All Data
Process Document(s)
Unified Document Understanding System
This application processes documents and creates a searchable knowledge base. Upload your documents, and the system will analyze them to build a unified knowledge graph that allows you to ask questions and find information across all your documents.
Ask Questions
Document Relationship Graph
Document Content
Document Content
Content Overview
Filter by Document:
All Documents
Filter by Content Type:
All Types
Total Items
19
Documents
1
Content Types
3
Content Table
Document Name
Chunk ID
Type
Title
Raw Content
1706.03762v7.pdf
CHUNK_1706.03762v7.pdf_0
NarrativeText
Provided Google Attention All
g u A 2] L C . s c [Provided proper attribution is provided, Google hereby grants permission to repr
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CHUNK_1706.03762v7.pdf_1
NarrativeText
Introduction Recurrent approaches modeling
Introduction Recurrent neural networks, long short-term memory [13] and gated recurrent [7] neu
1706.03762v7.pdf
CHUNK_1706.03762v7.pdf_2
NarrativeText
Figure The Transformer model
Figure 1: The Transformer - model architecture. The Transformer follows this overall architecture u
1706.03762v7.pdf
CHUNK_1706.03762v7.pdf_3
NarrativeText
Scaled Dot-Product Attention Multi-Head
Scaled Dot-Product Attention Multi-Head Attention Figure 2: (left) Scaled Dot-Product Attention. (r
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CHUNK_1706.03762v7.pdf_4
NarrativeText
output values
output values. These are concatenated and once again projected, resulting in the final values, as de
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CHUNK_1706.03762v7.pdf_5
NarrativeText
Table Maximum Layer Type
Table 1: Maximum path lengths, per-layer complexity and minimum number of sequential operatio
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CHUNK_1706.03762v7.pdf_6
NarrativeText
models
length n is smaller than the representation dimensionality d, which is most often the case with sent
1706.03762v7.pdf
CHUNK_1706.03762v7.pdf_7
NarrativeText
Model BLEU EN-DE EN-FR 23
Model BLEU EN-DE EN-FR 23.75 Training Cost (FLOPs) EN-DE EN-FR Residual Dropout We apply d
1706.03762v7.pdf
CHUNK_1706.03762v7.pdf_8
NarrativeText
Table Variations Transformer Unlisted
Table 3: Variations on the Transformer architecture. Unlisted values are identical to those of the bas
1706.03762v7.pdf
CHUNK_1706.03762v7.pdf_9
NarrativeText
[2006] [28] Zhu et al
Table 4: The Transformer generalizes well to English constituency parsing (Results are on Section 2
Export Content as CSV

References

Gao, Y., Xiong, Y., Gao, X., Jia, K., Pan, J., Bi, Y., Dai, Y., Sun, J., & Wang, H. (2023). Retrieval-Augmented Generation for Large Language Models: A survey. arXiv (Cornell University). https://doi.org/10.48550/arxiv.2312.10997

He, H., Ye, M., Zhang, J., Cai, X., Liu, J., Du, B., & Tao, D. (2025, May 19). Reasoning-OCR: Can Large Multimodal Models Solve Complex Logical Reasoning Problems from OCR Cues? arXiv.org. https://arxiv.org/abs/2505.12766