

# AI-Powered Document Processing with IBM Granite





# Introduction

## Problem Statement:

- Handling unstructured documents is time-consuming.
- Extracting meaningful insights from PDFs, images, and text requires automation.

## Solution Overview:

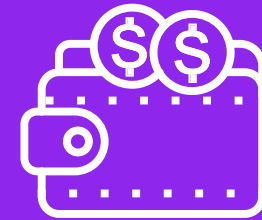
- AI-powered document processing using IBM Granite models for text embedding & language understanding.
- Integrated with Gradio for an interactive and user-friendly interface.



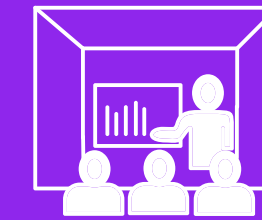
# Project Objectives



- **Automate document processing with AI-powered text extraction.**



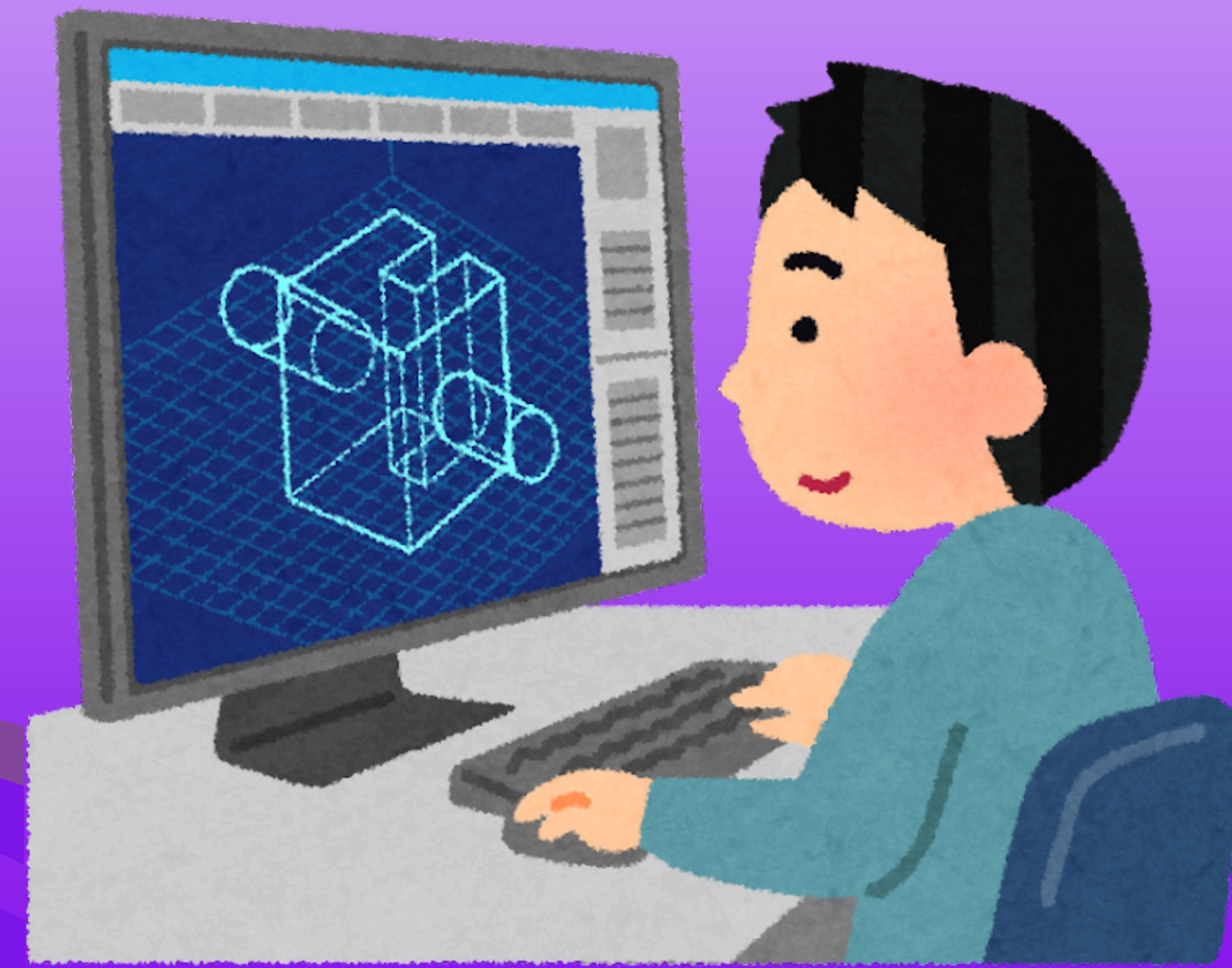
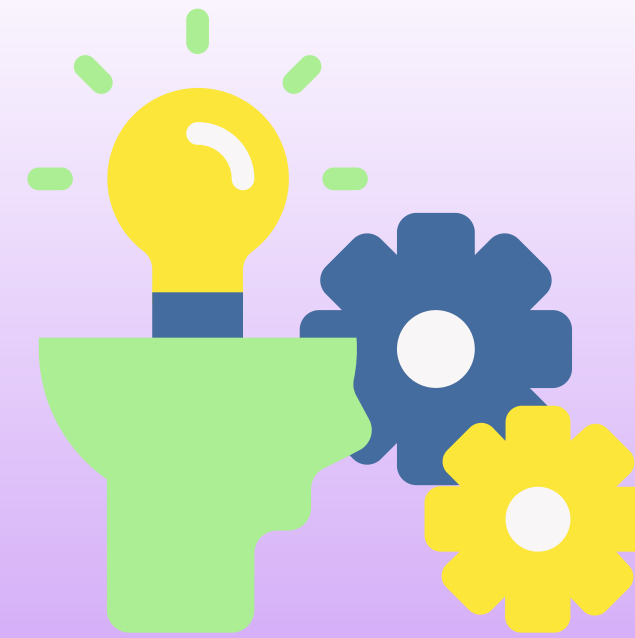
**Improve efficiency by using OCR and NLP models.**



**Enable interactive analysis through a web-based UI.**

# Technology Stack

- **Programming Language: Python**
- **Libraries & Frameworks:**
  - **Gradio** – UI for document processing
  - **Transformers** – IBM Granite models for NLP
    - Embedding Model: granite-embedding-278m-multilingual
    - Text Processing Model: granite-3.1-8b-instruct
  - **Tesseract OCR** – Image-to-text conversion
  - **pdfplumber** – PDF text extraction
  - **SQLite** – Storing processing history
  - **langchain**: Various langchain tools are utilized for processing
- **Hardware & Deployment:**
  - **Runs on a local machine or cloud.**
  - **Can be shared via a web interface.**



**Supports multiple file types –  
PDFs, images, and text files**

**OCR-enabled – Extracts text  
from scanned documents**

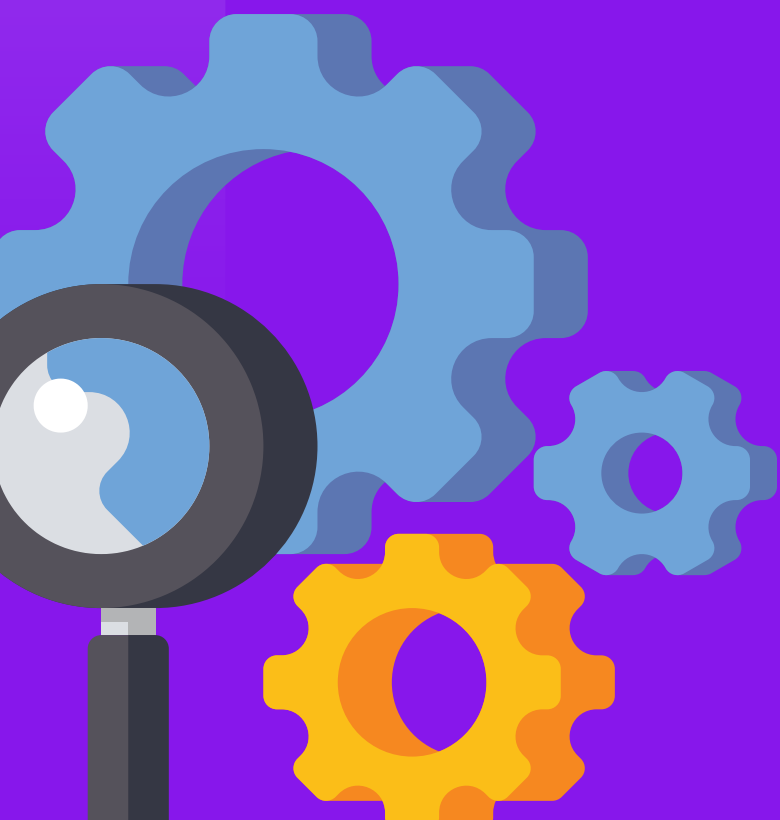
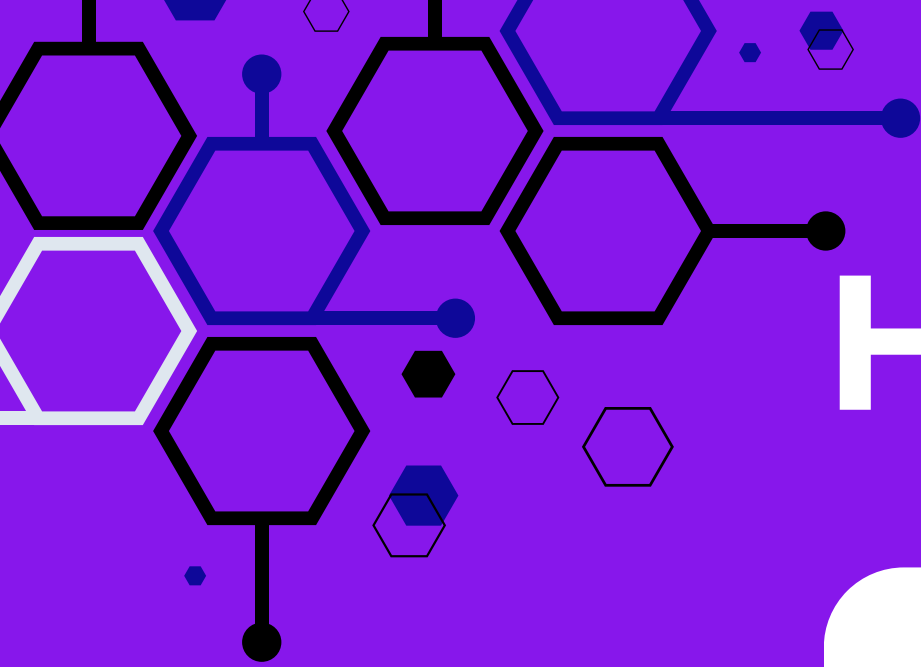
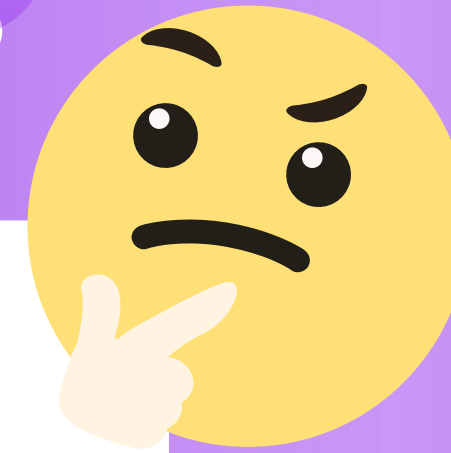


**AI-driven text processing –  
Uses IBM Granite models**

**Interactive UI with Gradio –  
Easy-to-use interface**

# How It Works

1. **Document Upload (PDF, Image, Text Files)**
2. **AI Extraction & Analysis (IBM Granite Models)**
3. **Automated Categorization & Summarization**
4. **Decision-Making Support (Approvals, Recommendations)**
5. **Integration with Business Systems**
6. **User Interaction via Dashboard & Chatbot**



# Key Benefits & Impact

- ✓ Reduces manual workload by 50-70%
- ✓ Accelerates decision-making with AI-driven insights
- ✓ Minimizes errors and ensures compliance
- ✓ Saves businesses time and operational costs
- ✓ Scalable and adaptable to multiple industries





# Result Expected



## Ideal Situation ( With better hardware)

- Faster processing of unstructured documents
- Improved efficiency in document classification and extraction
- Automated decision-making reducing manual workload
- Seamless integration with business workflows
- Faster inference times for document processing
- Higher throughput for handling multiple documents simultaneously
- More complex and deeper NLP analysis with better results



### AI-Powered Document Processing (Demo)

Upload Document

Business\_Whitepaper.pdf269.1 KB

Processing Instructions

Analyze the document and extract key insights.

Process Document

Analysis Results

Summary:

This document discusses the use of AI-powered smart document processing and decision-making using IBM Granite to enhance business workflows. It highlights the benefits of automation, integration, and scalability.

Key Insights:

- AI-powered tools like IBM Granite can extract key insights from unstructured documents with over 90% accuracy.
- Automated document categorization reduces manual effort by up to 70%, enabling faster processing of business workflows.
- AI-driven decision-making improves contract validation and invoice matching accuracy by 40%, reducing errors and delays.
- Seamless integration with ERP and CRM systems ensures smooth data flow and eliminates silos.
- Businesses can save up to 60% in operational costs by automating repetitive document processing tasks.

Recommendations:

- Implement IBM Granite NLP models for accurate extraction and summarization of key details.
- Use AI-driven decision-making to automate contract validation and invoice matching.
- Integrate the AI solution with ERP and CRM systems for seamless data flow.

Document History

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Extracted Content

Extracted Text:

This whitepaper explores the use of AI-powered smart document processing and decision-making using IBM Granite to enhance business workflows. It covers automation, integration, and scalability, providing actionable insights for enterprises.

Metadata:

- Author: IBM Solutions Team
- Date: 2025-03-15
- Document Type: Business Whitepaper
- Pages: 20

Processed Data

Summary:

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Use via API • Built with Gradio • Settings

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# Result Obtained

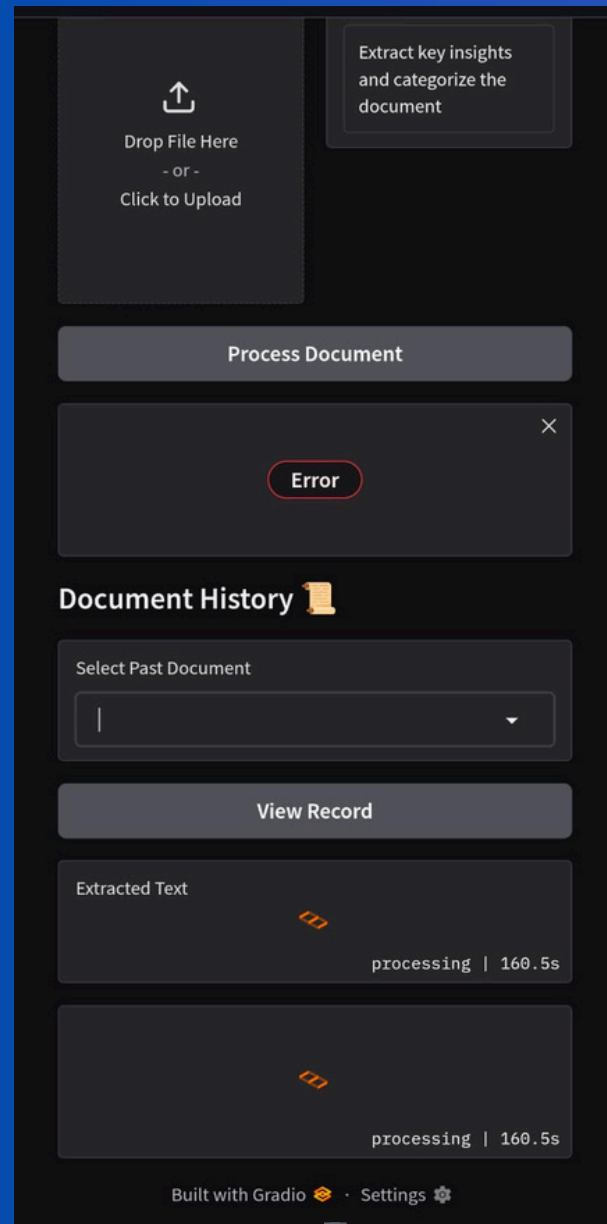


## Real World Scenario (Inferior hardware)

- Due to hardware limitations, the processing time was significantly high.
- The system failed to deliver results within the stipulated time.
- Some large documents were not fully processed due to resource constraints.

## Challenges Faced:

- Running locally required 32GB RAM, which was unavailable.
- Attempts to deploy on IBM Cloud were hindered by strict access restrictions.
- Team members were not added to the same resource group, preventing collaboration.
- Low availability of computational resources impacted efficiency.
- Default agent in IBM WatsonX was not functioning correctly.
- Estimated processing time was excessively high, making real-time use impractical.
- Cloud execution costs were prohibitive, with \$68 per hour on IBM WatsonX, making long-running tasks unfeasible.





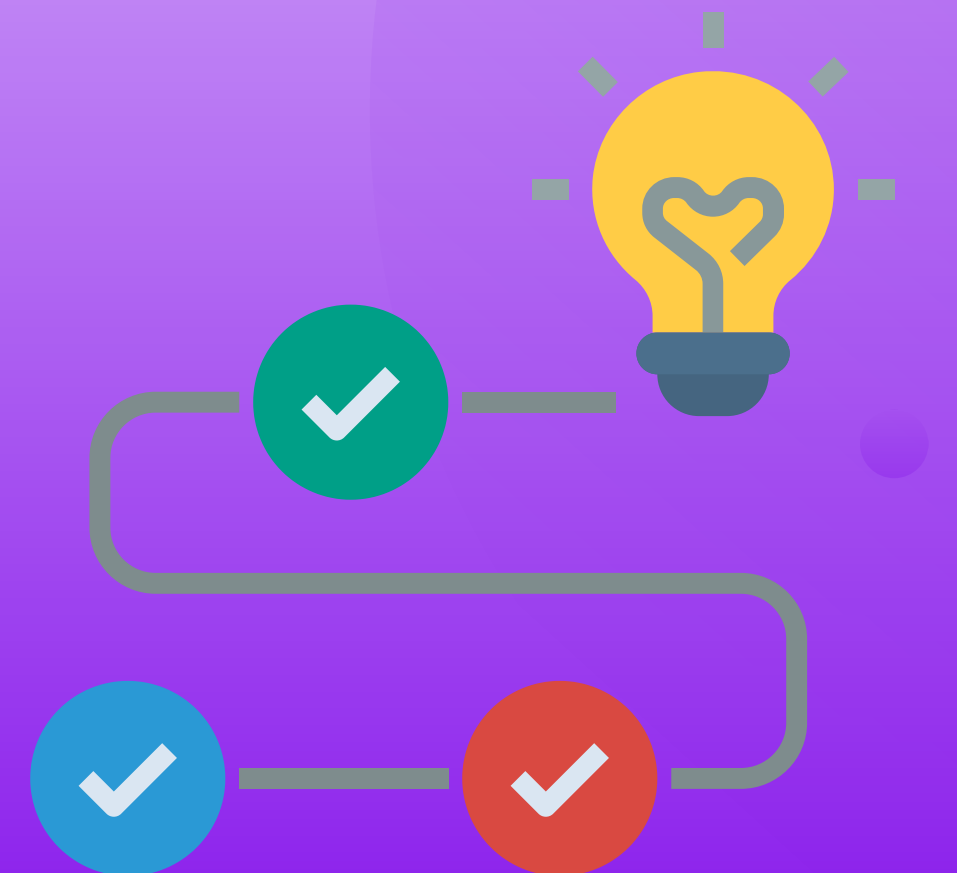
# Limitations & Future Scope:

- Optimization required for handling large-scale document processing efficiently.
- Exploring cloud-based deployment for enhanced scalability.
- Potential integration with high-performance computing resources to overcome hardware bottlenecks.



# Conclusion

**Despite our best efforts, we were unable to achieve our goal due to significant hardware constraints. Running the AI models locally required more powerful machines, and cloud deployment presented challenges such as access restrictions and high operational costs. These limitations hindered real-time document processing, making the system impractical for large-scale use. Moving forward, optimizing resource allocation and exploring alternative cloud solutions with better cost efficiency and accessibility will be crucial to improving deployment and performance.**





**Thank You**

