GEN AI-BASED EMAIL CLASSIFICATION & OCR

This presentation explores the automation of loan servicing request processing through advanced email and attachment intent classification techniques, enhancing efficiency and accuracy in handling customer inquiries.

TEAM DOUBLE DRAGON
YAJAT MAHOTRA & HIMANSHU THAKUR

CHALLENGES IN LOAN SERVICING REQUESTS

Key Challenges in Managing Loan Requests

PROCESSING LOAN SERVICING EMAILS

Efficient management of loan servicing request emails with various attachments is crucial.

CLASSIFYING REQUEST TYPES

Identifying different types of requests, such as 'Loan Balance Inquiry', streamlines the workflow.

EXTRACTING SUB-REQUEST TYPES

Break down inquiries into specific sub-requests like 'Loan Account Number' and 'Current Balance'.

AVOIDING DUPLICATE PROCESSING

Identifying similar past emails helps prevent redundancy and improves efficiency.

INNOVATIVE EMAIL PROCESSING SOLUTION

An Overview of Our Approach to Email Management

DEVELOPED FASTAPI APPLICATION

Created a robust FastAPI application to efficiently process emails and their attachments.

UTILIZED OPENAI'S API

Implemented OpenAI's API for advanced classification and extraction of sub-requests with confidence scores.

INTEGRATED MONGODB FOR STORAGE

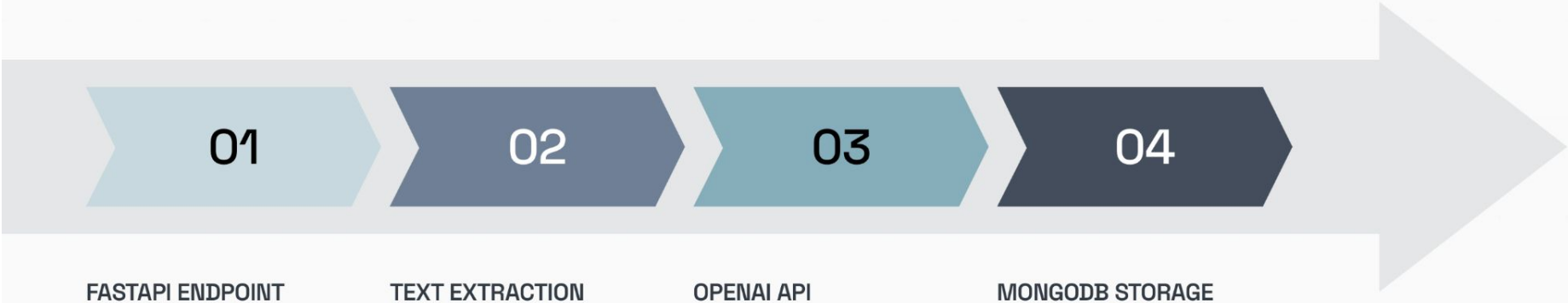
Stored all processed emails in a MongoDB database for reliable data management and retrieval.

VECTOR SEARCH IMPLEMENTATION

Employed vector search techniques to identify similar past requests, enhancing response accuracy.

INNOVATIVE SYSTEM ARCHITECTURE DESIGN

Overview of Email Processing Automation



FASTAPI ENDPOINT

Receives incoming emails and attachments for processing, acting as the entry point.

TEXT EXTRACTION MODULE

Utilizes libraries like PyPDF2, python-docx, and pytesseract to extract text from various file formats.

OPENAI API INTEGRATION

Classifies requests and extracts sub-requests for intelligent processing of email data.

MONGODB STORAGE

Stores emails along with their embeddings, enabling efficient vector search capabilities.

TECHNICAL IMPLEMENTATION OVERVIEW

Exploring the Core Technologies and Processes

FASTAPI POST ENDPOINT

Handles email uploads through the `/process_email` route efficiently.

MULTI-FORMAT TEXT EXTRACTION

Supports various formats: PDF, DOCX, images, and plain text for versatile email processing.

OPENAI API INTEGRATION

Utilizes GPT-4 for intelligent classification and embeddings for efficient vector search.

MONGODB FOR DATA STORAGE

Stores email data and enables nearest neighbor searches for quick retrieval.

ASYNCHRONOUS EMAIL PROCESSING

Ensures non-blocking operations for handling multiple email uploads simultaneously.

USER-FRIENDLY INTERFACE

Designed for ease of use, allowing quick email uploads and processing feedback.

ROBUST ERROR HANDLING

Incorporates error management to handle issues like file type mismatches and API failures.

OUTSTANDING SYSTEM FEATURES

Explore the Unique Aspects of the System

- **SUPPORTS MULTIPLE ATTACHMENT TYPES**

  Accepts PDFs, DOCX, text files, and images, enhancing versatility.

- **CONFIDENCE SCORES FOR CLASSIFICATIONS**

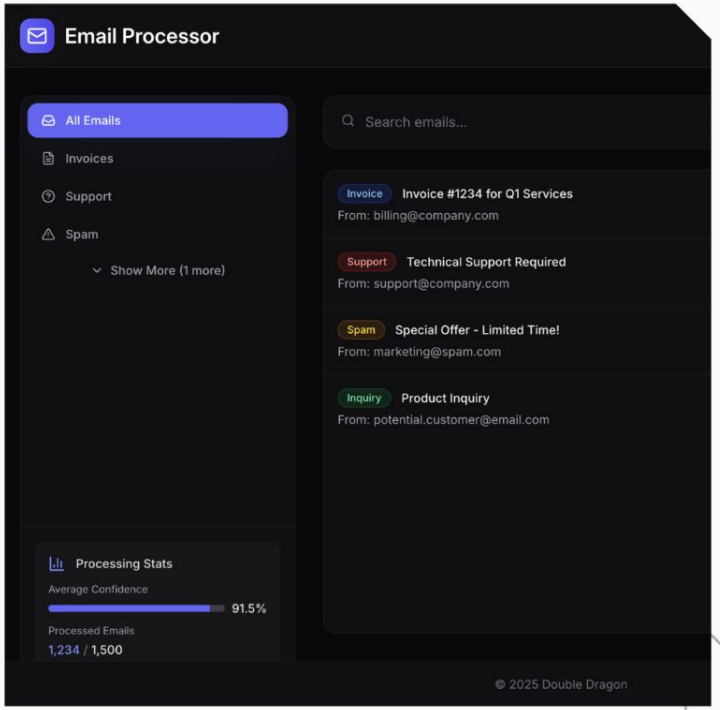
  Provides reliability in classifications, ensuring trust in results.

- **VECTOR SEARCH FOR SIMILAR EMAILS**

  Flags emails similar to past ones, improving retrieval efficiency.

- **REDUCES LLM API CALLS**

  Uses pre-computed embeddings to minimize unnecessary API usage.



EFFICIENT LOAN INQUIRY WORKFLOW

Understanding the Loan Inquiry Process

01

RECEIVE EMAIL REQUEST

An email is received requesting loan balance information for a specific account.

02

TEXT EXTRACTION

Extract text from the attached PDF document and combine it with the email body for context.

03

GENERATE EMBEDDING

Create an embedding from the combined text to facilitate searching for similar inquiries in the database.

04

CLASSIFY INQUIRY

Classify the email as 'Loan Balance Inquiry' with a confidence level of 80%.

05

EXTRACT SUB-REQUESTS

Identify specific sub-requests such as loan account number and current balance from the email.

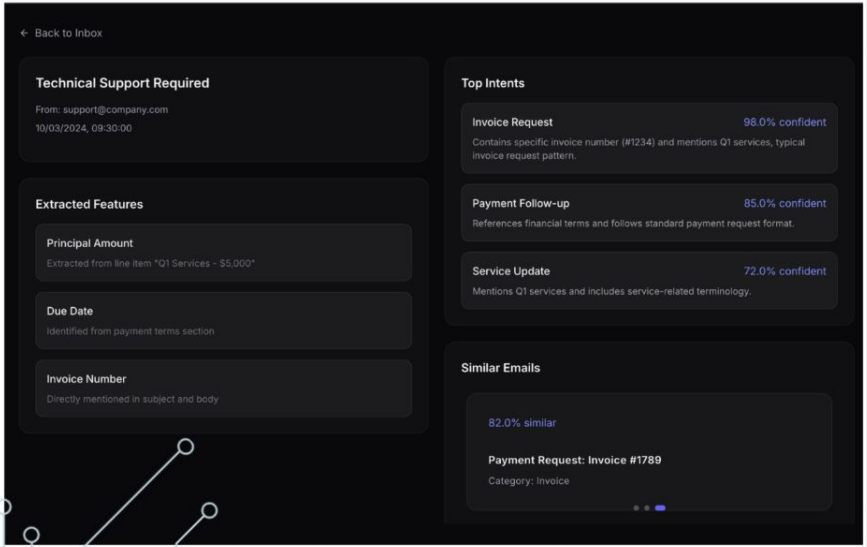
06

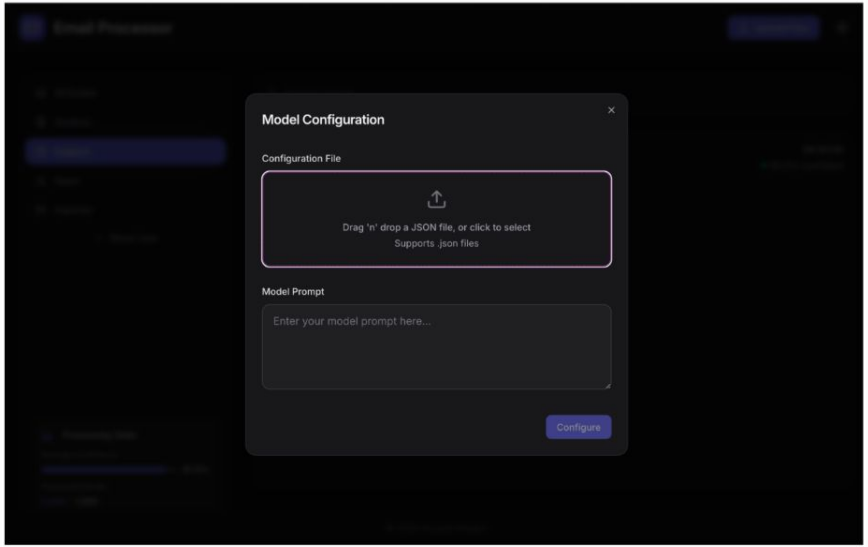
RETURN RESULTS

Provide the requested information along with IDs of similar emails, if available.

SCREENSHOTS OF OUR APPLICATION

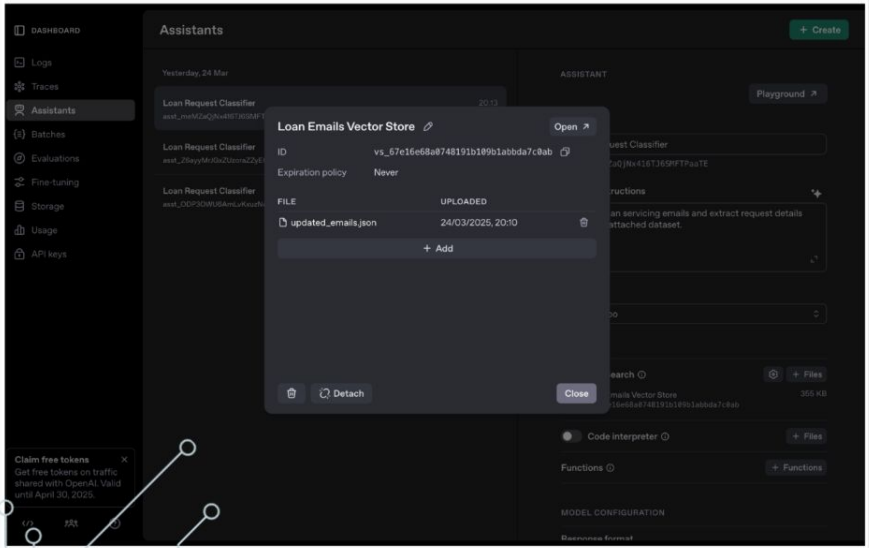
Visual insights into the features and functionalities of our innovative application.





DATASET

Dataset for context of Open AI LLM model was generated via GrokAI and uploaded to vector space of open AI assistant.




```
{
  "email": "Hello Wells Fargo Customer Support,\n\nI am writing to discuss my loan with the account number 789123456. I've recently enrolled in auto-pay, but I would like to ensure that my Wells Fargo bank account ending in 6789 is the one configured for withdrawals. Additionally, please guide me through setting up partial payments and if any specific instructions are necessary for your process.\n\nThank you for helping me manage my payments more effectively. Looking forward to your detailed response.\n\nSincerely,\nMaxwell Smart",
  "category": "Payment Related Requests",
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    "Partial Payment Instructions"
  ],
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},
{
  "email": "Email: Dear Wells Fargo Team,\n\nI hope this message finds you well. I am writing to request an extension on my loan payment this month. My loan account number is 9876543210. I would have made the payment amount due, but I encountered an unexpected financial setback. I would appreciate if you could inform me about any payment processing fees that might be involved with this request. Additionally, could you please provide instructions for making a partial payment? I intend to catch u fully by next month.\n\nThank you for your cooperation and understanding.\n\nSincerely,\nCamden Reeves",
  "category": "Payment Related Requests",
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    "Partial Payment Instructions"
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},
{
  "email": "Hello Wells Fargo Service Team,\n\nI need assistance with my loan payment scheduled initially for the 15th of this month. I would like to change this so that the new payment due date is the 30th. My account details are as follows: Account Number 123456789. Could you confirm if there are any implications for the auto-pa enrollment status or any specific changes required from my end?\n\nThanks for your help!\n\nBest regards,\nCamden Reeves",
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  "request_type": "Payment Extension Request",
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    "Auto-Pay Enrollment Status",
    "Bank Account Details"
  ],
  "serial_number": 41,
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},
{
  "email": "Hi Wells Fargo Support,\n\nI am contacting you regarding my auto-pay settings for my loan with the account number 1122334455. I would like to modify the
```

ENHANCING FUTURE WORK CAPABILITIES

Exploring Upcoming Enhancements and Features

SUPPORT FOR MORE ATTACHMENT TYPES

Future plans include adding support for various attachment types like spreadsheets to improve productivity.

ENHANCED ACCURACY WITH LARGER DATASETS

Increasing the volume of data will significantly improve the accuracy of our systems and predictions.

INTEGRATION WITH CUSTOMER SERVICE PLATFORMS

We aim to seamlessly integrate with major customer service platforms to enhance user experience.

IMPROVEMENT OF OCR TECHNOLOGY

Focusing on improving Optical Character Recognition for better handling of scanned documents.

INNOVATIVE SOLUTIONS FOR LOAN SERVICE REQUESTS

We have delivered an innovative solution for processing loan emails using cutting-edge technologies like FastAPI, OpenAI, and MongoDB, ready to enhance your loan servicing workflows.