Automated Email Processing using FastAPI and Hugging Face NLP

Overview
This project implements an automated email processing system using FastAPI and Hugging Face NLP. It extracts and analyzes email content, classifies emails, detects duplicates, assigns priorities, and routes requests based on predefined rules.

Step 1: Start FastAPI Server

Run the following command to start the FastAPI server:

uvicorn main:app --reload

The server will be available at http://127.0.0.1:8000/.

Step 2: Upload an Email File

Use the /process_email/ endpoint to upload an email file. The system will parse the email body and attachments.

Example Request:

Send a request using curl:

```
curl -X 'POST' \
  'http://127.0.0.1:8000/process_email/' \
  -H 'accept: application/json' \
  -H 'Content-Type: multipart/form-data' \
  -F 'file=@sample_email.eml'
```

Step 3: View Processed Results

The system will return the following information:

- **Primary Request Type**: Classification of the email
- **Sub Request Type**: Further categorization of the email request
- **Confidence Level**: Model's confidence in classification
- **Extracted Fields**: Key information from the email
- **Duplicate Indicator**: Whether the email is a duplicate
- **Assigned Team**: The appropriate department to handle the request
- **Priority**: Urgency level of the email

Example Response:

```json
{
  "primary_request": "Loan Modification",
  "sub_request_type": "Interest Rate Change",
  "confidence": 0.87,
  "reasoning": "Customer requests a change in loan terms.",
  "extracted_fields": {
    "deal_name": "Home Loan 2024",
    "amount": "$150,000",
    "expiration_date": "12/31/2024"
  },
  "duplicate_indicator": false,
  "duplicate_reason": "Unique email.",
  "assigned_team": "Modification Team",
  "priority": "Medium"
}
```

Email Parsing & Processing Logic

- Extracts text from email body and attachments (.pdf, .docx, .txt)
- Identifies key fields like deal name, amount, expiration date
- Classifies email type using Hugging Face's zero-shot classification model
- Assigns priority and routes request to the appropriate team
- Detects duplicate emails based on email content

Deployment & Usage

1. Install dependencies:
2. pip install fastapi uvicorn pdfplumber transformers python-docx
3. Run the server:
4. uvicorn main:app --reload
5. Upload email files and get processed results.

Sample Email Format

From: customer@example.com
Subject: Loan Modification Request

Dear Support,
I would like to modify my home loan terms. My current deal is:
Deal Name: Home Loan 2024
Amount: $150,000
Expiration Date: 12/31/2024

Please let me know the process.
Best Regards,
John Doe

Conclusion

This system enables automated email classification, key data extraction, and routing, improving efficiency in handling customer requests.