Invoice Processing System

# Project Overview

The Automated Invoice Processing System is designed to streamline invoice management using Azure services for authentication, OCR (Optical Character Recognition) for document processing, and AI-driven validation algorithms. The system supports two primary methods for invoice submission:

1. **Email-based Invoice Processing**: The system will automatically download invoices received via email and store them in a designated repository for processing.
2. **Manual Upload via Admin Dashboard**: Admins/users can manually upload invoices through a designated dashboard feature, allowing them to submit invoices in various formats.

The system will validate invoices using predefined checks and ensure compliance with purchase order details. If an invoice passes verification, it will be marked as processed. Otherwise, the system will notify the sender with reasons for rejection via Azure email services.

# System Features

#### **1. User Authentication & Access Control**

* **Azure Authentication Service** for secure login and user identity verification.
* Single-click login for registered users using credentials stored in Azure Active Directory.
* Role-based access control, restricting features based on user roles (e.g., Admin, Finance Team, General User).
* Admin dashboard with a section for defining, modifying, and updating user roles and access rights.
* Logging and monitoring of all login attempts and access activities for security compliance.

#### **2. Invoice Submission & Processing**

* **Email Integration**: System automatically fetches invoices from configured email accounts and stores them in a processing queue.
* **Manual Upload Feature**: Admins and authorized users can upload invoices manually through the dashboard, supporting multiple formats such as PDF, Word, and image files.
* **OCR Processing**: Utilizes Azure OCR services to extract text and data from uploaded invoices, ensuring accurate digital conversion.
* **AI-Based Verification**:
  + Ensures invoices match purchase order details, including supplier name, invoice amount, tax, and itemized details.
  + Detects missing or incorrect information by cross-referencing predefined rules.
  + Handles invoices from multiple suppliers with different formats through adaptable AI processing.
* **Multi-Format Support**: Capable of reading invoices in various layouts, including structured and unstructured formats.
* **Invoice Validation Checks**: 15-16 predefined validation rules such as:
  + Verifying invoice amount matches the corresponding purchase order.
  + Checking applicable tax rates (e.g., USPS tax should be 9%).
  + Ensuring mandatory fields like invoice number, supplier name, and issue date are present.
* **Error Handling & Rejection**:
  + If missing or incorrect information is detected, an automated email is sent with predefined rejection reasons.
  + Rejected invoices are flagged and can be reviewed manually by the admin.
  + System stores rejection history for audit and compliance purposes.

#### **3. Admin Dashboard**

* **Invoice Overview Section**:
  + Total invoices received daily, weekly, and monthly.
  + Number of invoices successfully processed and stored.
  + Number of invoices rejected, along with rejection reasons and timestamps.
  + Pending invoices awaiting validation and processing.
  + Graphical representation of processing trends.
* **Invoice Rules & Policies Section**:
  + Displays specific policies and validation criteria.
  + Allows admins to define, modify, and update invoice rules.
  + Updates automatically when new policies are implemented to ensure compliance.
* **User Management**:
  + Add, edit, or remove users with appropriate permissions.
  + Assign and update user rights dynamically, ensuring secure role management.
  + Track user activity logs for security and audit purposes.

#### **4. Automated Email Notifications**

* **Invoice Processing Status Updates**:
  + Successful processing confirmation emails sent to relevant stakeholders.
  + Rejected invoices trigger automated email responses with predefined rejection reasons.
  + Pending invoices may trigger reminder emails to ensure timely resolution.
* **Azure Email Services** used for all communication, ensuring reliability and security.
* **Configurable Email Templates** to allow customization of messages sent to vendors and internal teams.

# Technology Stack

* **Cloud Services**: Microsoft Azure (Authentication, Email, OCR, Storage)
* **AI & Machine Learning**: Adaptive algorithms for invoice validation
* **Database**: Secure storage of invoice records and user access logs
* **Frontend**: Web-based admin dashboard with responsive UI
* **Backend**: API-driven processing and validation logic

# System Workflow

1. **Invoice Submission**
   * System downloads invoices from email or receives manual uploads from the dashboard.
2. **OCR Processing & Text Extraction**
   * Invoice content is converted into machine-readable format using Azure OCR.
3. **Validation & Matching**
   * AI algorithms check invoice details against purchase orders and validation rules.
4. **Approval or Rejection**
   * Verified invoices are processed and securely stored.
   * Rejected invoices trigger automated email responses with failure reasons.
5. **Dashboard Updates**
   * Admins view real-time invoice processing statistics and system logs.
6. **User Access & Rights Management**
   * Admins manage user roles, rights, and permissions dynamically.

# Expected Outcomes

* Reduced manual effort in invoice processing through automation.
* Faster and more accurate invoice verification with AI-based validation.
* Improved compliance with company policies and tax regulations.
* Enhanced security through Azure authentication and role-based access control.
* Transparent reporting of invoice processing status with real-time insights.
* Increased efficiency in handling multi-format invoices across different vendors.

The Automated Invoice Processing System is a smart, AI-driven platform designed to streamline invoice management using Azure services. It supports two submission methods: automatic email-based invoice retrieval and manual uploads via an admin dashboard. The system employs Azure OCR to extract text from various document formats and validates invoices using AI-based checks against predefined rules. If an invoice passes verification, it is processed; otherwise, an automated rejection email is sent with detailed reasons. The admin dashboard provides real-time insights into invoice status, user management, and validation policies. The system enhances efficiency, reduces manual effort, ensures compliance, and improves security with Azure authentication and role-based access control.