

CS 410 Lab 1 Outline (Group)

AI² – Artificially Intelligent Invoices

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1 Introduction

1.1 Background

- Many organizations handle tens of thousands of invoices annually, often through manual processes that create inefficiencies and risk.
- **Cite industry statistic:** Cost per invoice \$12-\$40 (manual) as opposed to \$3-\$6 (automated).
- Manual verification leads to delays, data entry errors, and backlogs across accounting departments.

1.2 Problem Statement

- **Case Study Context:** ADS receives ~150,000 invoices annually from ~3,000 suppliers.
- The six-person AP team processes roughly 50 invoices per member per day.
- Manual review of each invoice and comparison with purchase orders causes:
 - Volume pressure → ~600 invoices daily.
 - Errors → Duplicate payments and PO mismatches.
 - Delays → Slower payments and supplier dissatisfaction.
 - Stress → AP staff spend most of their time checking instead of analyzing.
- **Insert Figure 1:** Current Process Flow (from Feasibility Presentation).
- **Who is Affected:**
 - ADS Accounts Payable team
 - Suppliers awaiting payment
 - Management tracking financial performance

1.3 Solution

- Introduce *AI² (Artificially Intelligent Invoices)* — a web-based intelligent automation system for invoice management.
- Purpose: Reduce manual workload, accelerate invoice turnaround, and improve data accuracy through AI-driven recommendations.
- Summarize approach: Combine automation, confidence scoring, and human-in-the-loop learning to enhance efficiency.

2 AI² Product Description

2.1 Overview

- AI² automates invoice intake, organization, and purchase order matching.
- Designed initially for ADS but scalable across industries with similar high-volume invoice processing needs.
- Objective: Accelerate payment readiness and reduce manual workload without sacrificing accuracy or control.

2.2 Key Product Features and Capabilities

- **Automated Invoice Intake:**
 - Integrates with Outlook GCC High using Microsoft Graph API.
 - Automatically retrieves and parses invoice attachments and email body text.
- **Smart Matching Engine:**
 - Connects to Oracle NetSuite through Alteryx API for data retrieval.
 - Matches invoices to purchase orders, line items, and amounts.
- **Confidence Scoring:**

- Assigns a confidence score to each match; low-confidence cases are flagged for review.
- **Human-in-the-Loop Learning:**
 - Stores staff corrections as training data to improve model accuracy.
- **Supplier-Based Queue Assignment:**
 - Routes invoices to AP representatives automatically based on supplier name.
 - Supports reassignment by administrators at the supplier level.
- **Audit Logging and Transparency:**
 - Every user and system action is recorded for compliance and traceability.
- **Innovation and Differentiation:**
 - Tailored to ADS's infrastructure (Okta SSO, Alteryx API).
 - More affordable and customizable than tools like Tipalti or SAP Concur.
 - Built for compliance under CMMC and FedRAMP.
- **Insert Figure 2:** AI² Solution Process Flow.
- **Insert Table 1:** Competition Matrix.

2.3 Major Components (Hardware/Software)

- **Hardware Environment:**
 - Hosted in AWS GovCloud for security and government compliance.
 - User access through standard office workstations or laptops.
- **Software Architecture:**
 - Web-based interface built with secure back-end architecture (REST APIs).
 - Key integrations:
 - Outlook → via Microsoft Graph API for invoice capture.

- Oracle NetSuite → via Alteryx for data exchange and auditability.
- Document/Invoice Scanning:
 - AWS Textract (pdf's)
 - Aperture (spreadsheets)
 - OracleDB
- AI Component: Confidence Scoring + Retraining Pipeline.
- Database: PostgreSQL (AWS RDS) for structured invoice data and logs.
- **Insert Figure 3:** Major Functional Component Diagram (MFCD).

3 Identification Of Case Study

3.1 Our Case Study - ADS (Atlantic Data Systems)

- ADS is a government contracting firm managing procurement and supplier payments.
- Current issues:
 - Manual invoice processing.
 - Heavy AP workload.
 - Delayed supplier payments.
- AI² addresses these problems by:
 - Automating repetitive work (intake, sorting, and matching).
 - Providing dashboards for monitoring invoice status.
 - Maintaining full audit traceability for compliance review.

3.2 Wider Industry Issue

- Similar challenges exist among other mid-to-large government contractors, logistics companies, and manufacturers.

- AI²'s modular architecture allows adaptation to other organizations with similar high-volume AP processes.

4 Glossary

- **AI² (Artificially Intelligent Invoices):** The proposed automated invoice processing system designed to streamline Accounts Payable workflows through AI-driven matching, classification, and routing.
- **Alteryx:** A data automation and analytics tool that enables secure API connections and data workflows between applications.
- **AP (Accounts Payable):** The amount a business owes for goods and services purchased on credit; typically due at intervals of 30, 45, 60, or 90 days depending on repayment terms.
- **APEX:** A strongly typed, object-oriented programming language that Salesforce developers use to execute flow and transaction control statements on the Salesforce platform.
- **AWS GovCloud:** A secure U.S. government-compliant cloud environment that supports sensitive data and regulated workloads in accordance with FedRAMP and DoD requirements.
- **Atlantic Diving Supply (ADS):** An American federal contractor company that provides equipment and logistics solutions to the Department of Defense, federal agencies, and first responders.
- **CMMC (Cybersecurity Maturity Model Certification):** A framework developed by the U.S. Department of Defense to assess and enhance the cybersecurity posture of contractors handling federal information.

- **ERP (Enterprise Resource Planning System):** An integrated software system used to manage core business processes, such as finance, procurement, and supply chain operations.
- **FedRAMP (Federal Risk and Authorization Management Program):** A U.S. government program that standardizes security assessment, authorization, and continuous monitoring for cloud services.
- **Graph API:** A Microsoft API interface used to access and automate data operations within Outlook and other Microsoft 365 services.
- **Invoice:** A document listing goods or services provided, including a statement of the amount due; a bill.
- **Oracle:** The system of record used by ADS for enterprise data and financial management.
- **PO (Purchase Order):** The official order list ADS sends to suppliers detailing the items or services requested.
- **Salesforce:** A robust Customer Relationship Management (CRM) platform that allows businesses to manage customer relationships efficiently.
- **Supplier:** A person or organization that provides goods or services needed by another organization.
- **Vendor:** A person or company offering goods or services for sale.

5 References

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