

CS 410 Lab 1 Outline (Group)

AI<sup>2</sup> – 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 *AI<sup>2</sup> (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 AI<sup>2</sup> Product Description

### 2.1 Overview

- AI<sup>2</sup> 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:** AI<sup>2</sup> 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.
- AI<sup>2</sup> 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.

- AI<sup>2</sup>'s modular architecture allows adaptation to other organizations with similar high-volume AP processes.

#### 4 Glossary

- **AI<sup>2</sup> (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.

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