PROFORMA FOR THE APPROVAL PROJECT PROPOSAL

(Note: All entries of the proforma of approval should be filled up with appropriate and complete information. Incomplete proforma of approval in any respect will be summarily rejected.)

PRN No.: **2023016401383476** Roll no: **22306**

1. Name of the Student: **Atharv Ramesh Divekar**
2. Title of the Project: **AI Powered Vendor and Contract Management System**
3. Name of the Guide: **Asst.Prof. Khalil Mujawar**
4. Teaching experience of the Guide: **10 Years**
5. Is this your first submission? Yes ☐ No ☐

Signature of the Student Signature of the Guide

Date: …… Date: …….

Signature of the Co-Ordinator

Date: ……

1. Project Title:

AI Powered Vendor and Contract Management System

Prepared By: Atharv Ramesh Divekar

2. Introduction

In modern organizations, vendor relationships and contractual agreements play a critical role in operational efficiency, cost management, and regulatory compliance. As organizations grow, managing multiple vendors and contracts becomes increasingly complex due to large volumes of contractual documents, varying service-level agreements (SLAs), compliance requirements, and performance metrics.

Traditional vendor and contract management practices rely heavily on manual processes, spreadsheets, and static document storage, which are time-consuming, error-prone, and lack analytical insights. This often leads to missed contract renewals, unmanaged risks, inefficient vendor selection, and poor decision-making.

With advancements in Artificial Intelligence (AI), Natural Language Processing (NLP), and data analytics, it is now possible to automate contract analysis, evaluate vendor performance intelligently, and support data-driven business decisions. This project proposes an AI Powered Vendor and Contract Management System that integrates intelligent document analysis, predictive analytics, and centralized vendor management to enhance efficiency, transparency, and strategic planning.

3. Problem Statement

Organizations face significant challenges in managing vendors and contracts effectively due to:

- Manual handling of large volumes of contract documents
- Difficulty in extracting key contractual information such as clauses, deadlines, and penalties
- Lack of systematic vendor performance evaluation
- Inability to predict risks related to contract compliance and vendor reliability
- Absence of centralized analytics for decision-making
- Delayed alerts for contract expiration and SLA violations

These challenges result in operational inefficiencies, financial risks, and poor vendor relationship management. There is a need for an intelligent system that automates contract analysis, monitors vendor performance, and provides actionable insights using AI-based techniques.

4. Proposed Solution

The proposed system is an **AI Powered Vendor and Contract Management System** that centralizes vendor information and contract documents while leveraging Artificial Intelligence and data analytics to automate analysis and support decision-making.

The system will:

- Digitally manage vendors and contracts in a centralized platform
- Use Natural Language Processing (NLP) to extract and analyze contractual clauses
- Evaluate vendor performance based on historical data and SLA metrics
- Predict potential risks related to contracts and vendors
- Provide alerts for contract renewals, compliance risks, and performance issues
- Present analytical dashboards for management-level insights

The solution aims to transform static contract documents into intelligent data sources and enable proactive vendor and contract management.

5. Objectives

The main objectives of the project are:

- To design and develop an intelligent system for managing vendors and contracts
- To automate extraction and analysis of key contractual information using NLP
- To assess and rank vendors based on performance and compliance metrics
- To predict potential risks associated with contracts and vendor behavior
- To provide real-time alerts for contract expiry and SLA violations
- To support data-driven decision-making through analytical dashboards
- To improve operational efficiency and reduce manual intervention

6. Scope

- Vendor onboarding and profile management
- Contract document upload and lifecycle tracking
- NLP-based extraction of contract clauses and metadata
- Vendor performance monitoring and scoring
- Risk assessment and alert generation
- Analytical dashboards and reporting
- Role-based access (Admin / Manager)

7. System Modules

- **User Management Module**
  Handles authentication, authorization, and role-based access control.
- **Vendor Management Module**
  Manages vendor profiles, categorization, historical performance, and ratings.
- **Contract Management Module**
  Handles contract uploads, lifecycle tracking, version control, and document storage.
- **AI Contract Analysis Module**
  Uses NLP techniques to extract clauses, detect risks, and summarize contracts.
- **Vendor Performance Evaluation Module**
  Analyzes SLA metrics, delivery performance, and compliance history.
- **Risk Prediction & Alert Module**
  Predicts contract and vendor risks and generates alerts for critical events.
- **Analytics & Reporting Module**
  Provides dashboards, KPIs, and decision-support insights.

8. Methodology

The project will follow a **modular and iterative development methodology**, consisting of the following stages:

- **Requirement Analysis**
  Study of vendor management processes and contract structures.
- **System Design**
  Design of system architecture, database schema, and module interactions.
- **Data Collection & Preparation**
  Collection of sample vendor data and contract documents for analysis.
- **AI Model Design**
  Implementation of NLP techniques for clause extraction and risk classification.
- **Backend Development**
  Development of APIs and business logic.
- **Frontend Development**
  Design of dashboards and user interfaces.
- **Testing & Validation**
  Functional testing and validation of AI outputs.
- **Deployment & Documentation**
  Final deployment (local/cloud) and preparation of project documentation.

9. Tools and Technologies

Frontend: React.js with TypeScript**,** HTML5, CSS3

Backend: Python**,** FastAPI

Database: PostgreSQL**,** Redis (for caching and alerts)

AI / ML / NLP: spaCy**,** scikit-learn**,** pandas, NumPy

Document Processing: PDF text extraction tools

DevOps & Version Control: Git & GitHub**,** Docker (optional)

10. Project Timeline

Phase	**Duration**
Requirement Analysis	1 Week
System Design	1 Week
Backend Development	3 Weeks
AI & NLP Implementation	3 Weeks
Frontend Development	2 Weeks
Testing & Optimization	1 Week
Documentation & Review	1 Week

11. Expected Outcomes

- A centralized AI-powered platform for vendor and contract management
- Automated contract clause extraction and risk analysis
- Data-driven vendor evaluation and ranking
- Predictive alerts for contract expiration and SLA risks
- Interactive dashboards for decision support
- Improved efficiency, transparency, and risk management

12. References

1. **Russell, S., & Norvig, P.** (2021).
   Artificial Intelligence: A Modern Approach (4th ed.). Pearson Education.
2. **Jurafsky, D., & Martin, J. H**. (2023).
   Speech and Language Processing (3rd ed.). Pearson.
3. **Goodfellow, I., Bengio, Y., & Courville, A.** (2016).
   Deep Learning. MIT Press.
4. **Aggarwal, C. C.** (2018).
   Machine Learning for Text. Springer.
5. **Han, J., Kamber, M., & Pei, J.** (2012).
   Data Mining: Concepts and Techniques (3rd ed.). Morgan Kaufmann.
6. **Sommerville, I.** (2016).
   Software Engineering (10th ed.). Pearson Education.
7. **Pressman, R. S., & Maxim, B. R.** (2020).
   Software Engineering: A Practitioner's Approach (9th ed.). McGraw-Hill.
8. **Manning, C. D., Raghavan, P., & Schütze, H.** (2008).
   Introduction to Information Retrieval. Cambridge University Press.
9. **Géron, A.** (2022).
   Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow (3rd ed.). O'Reilly Media.
10. **Silberschatz, A., Korth, H. F., & Sudarshan, S.** (2020).
    Database System Concepts (7th ed.). McGraw-Hill.
11. **Kleppmann, M.** (2017).
    Designing Data-Intensive Applications. O'Reilly Media.
12. **Tan, P.-N., Steinbach, M., & Kumar, V.** (2019).
    Introduction to Data Mining (2nd ed.). Pearson.