

# **FinSight AI – Agentic System for Automated Financial Close & Compliance**

**Final Year Project Proposal**

**Session FALL 2025**

BS in CS



Department of CS

Fast School of Computing

Fast National University, Karachi Campus

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## Project Registration

|   |  |                 |      |  |              |                        |
|---|--|-----------------|------|--|--------------|------------------------|
| Project ID (for office use)   | F25-224  |                 |      |  |              |                        |
| Type of project   | <input checked="" type="checkbox"/> Traditional <input type="checkbox"/> Industrial <input type="checkbox"/> Continuing  |                 |      |  |              |                        |
| Nature of project   | <input checked="" type="checkbox"/> Development <input type="checkbox"/> Research & Development <input type="checkbox"/> Research  |                 |      |  |              |                        |
| Sustainable Development Goals(SDGs)   | <input type="checkbox"/> Good Health and Well-Being <input type="checkbox"/> Quality Education<br><input checked="" type="checkbox"/> Industry, Innovation, and Infrastructure <input type="checkbox"/> Gender Equality<br><input checked="" type="checkbox"/> Decent Work and Economic Growth <input type="checkbox"/> Climate Action   |                 |      |  |              |                        |
| Area of specialization  | <input checked="" type="checkbox"/> Artificial Intelligence (AI) <input type="checkbox"/> Data Science and Analytics<br><input type="checkbox"/> Internet of Things (IoT) <input type="checkbox"/> Blockchain<br><input type="checkbox"/> Mobile App Development <input type="checkbox"/> Web Development <input type="checkbox"/> Cybersecurity<br><input type="checkbox"/> Game Development <input type="checkbox"/> Natural Language Processing (NLP)<br><input type="checkbox"/> Other |                 |      |  |              |                        |
| <b>Project Group Members</b>  |  |                 |      |  |              |                        |
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## Project Abstract

The Financial close process is one of the most critical functions in corporate finance, ensuring that organizations maintain accurate records, comply with regulations, and provide timely insights for decision-making. However, this process is traditionally manual, time-consuming, and error-prone, especially in Pakistan where many businesses still depend on spreadsheets or partially automated ERP modules. Inefficiencies in financial closing can lead to delayed reporting cycles, increased risk of fraud, and penalties due to non-compliance with standards such as IFRS, State Bank of Pakistan (SBP) guidelines, and Federal Board of Revenue (FBR) rules.

This project, **FinSight AI**, proposes the design and development of an **Agentic AI-powered financial assistant** that automates the month-end financial close cycle. The system leverages multiple specialized agents, each responsible for critical sub-tasks such as accruals and adjustments, bank and ledger reconciliations, journal entry validation, compliance monitoring, document extraction, anomaly detection, and management

reporting. By integrating Natural Language Processing (NLP), anomaly detection algorithms, and rule-based validation engines, FinSight AI provides a collaborative ecosystem for accountants, auditors, and financial managers.

The expected outcomes of this project include reduced financial close cycle time, improved accuracy in reconciliations and compliance checks, real-time anomaly detection, automated audit trails, and decision-support dashboards with narrative summaries. Success will be measured against benchmarks of efficiency, accuracy, compliance, and user satisfaction compared to manual processes. Ultimately, FinSight AI aims to modernize financial operations in Pakistan by shifting accountants from routine data entry to higher-value analysis and advisory roles. This solution not only strengthens financial transparency and governance but also contributes to the growing global research on the use of agentic AI systems in accounting and compliance automation.

## 1 Introduction

The financial close is one of the most critical processes in any organization, ensuring accuracy, compliance, and transparency in reporting. Yet, it remains highly manual, repetitive, and error-prone, especially in Pakistan where most businesses still rely on Excel-based workflows or partially automated ERP systems. Accountants spend days performing reconciliations, posting accruals, validating journal entries, and checking compliance, often resulting in delayed reports, fraud risks, and weak regulatory oversight. Global firms such as PwC, EY, and Oracle have already adopted AI-driven financial close automation, reducing cycle times and improving compliance. However, localized adoption in Pakistan is minimal despite increasing requirements under IFRS, SBP regulations, and FBR tax rules. This gap creates an urgent need for intelligent systems tailored to the local regulatory and financial environment.

To address this, **FinSight AI** proposes an **Agentic AI-powered Financial Assistant** that automates the month-end close cycle. The system will integrate multiple specialized agents, each responsible for a sub-task such as:

- Automating accruals and adjustments
- Reconciling bank and ledger balances
- Validating journal entries against policies
- Extracting structured data from invoices and statements
- Ensuring compliance with IFRS, SBP, and FBR regulations
- Generating dashboards, forecasts, and narrative summaries for management

The system will employ **Natural Language Processing (NLP)**, **anomaly detection**, **rule-based validation**, **OCR for document processing**, and a **multi-agent architecture** to streamline workflows.

Success will be measured by:

- Reduced financial close cycle time
- Improved accuracy in reconciliations and compliance checks
- Effective anomaly and fraud detection
- Usability of dashboards and narrative reports
- Maintenance of clear audit trails for regulators and auditors

Evidence of these outcomes will be demonstrated in the dissertation through benchmarking against manual processes, system testing, and validation with domain experts. By combining agentic AI with localized compliance knowledge, FinSight AI aims to modernize Pakistan's financial sector while contributing to the global research on AI-driven accounting automation.

## 2 Success Criterion

The success of FinSight AI will be determined by its ability to achieve the stated objectives of automating critical financial close tasks while ensuring compliance with regulatory standards. To qualify as a successful project, the system must satisfy the following measurable criteria:

- 2.1 Automation of Core Tasks**
  - The system should successfully automate at least three key financial close activities: accruals, reconciliations, and compliance checks.
  - Evidence: Demonstrated through functional testing against sample financial datasets.
- 2.2 Accuracy and Compliance**
  - The system should achieve as much **accuracy** in reconciliations and journal entry validations compared to manual methods.
  - Compliance checks should flag all policy violations and anomalies in line with IFRS and SBP standards.
  - Evidence: Benchmarking against manually verified financial close results.
- 2.3 Efficiency Improvement**
  - The financial close cycle should be reduced as compared to a manual process.
  - Evidence: Comparative time trials between manual and system-based financial closing.
- 2.4 Anomaly and Fraud Detection**
  - The anomaly detection module should correctly identify unusual or suspicious transactions.
  - Evidence: Testing against a controlled dataset with injected anomalies.
- 2.5 Decision-Support Outputs**
  - The system should generate human-readable narrative summaries and dashboards that are clear and usable for decision-makers
  - Evidence: User evaluation and feedback from finance professionals or domain experts.
- 2.6 Audit Trail and Transparency**
  - All system and user actions must be logged in an immutable audit trail.
  - Evidence: Verification of audit log reports during testing.

## 2.7 User Acceptance

- The prototype must be accepted by the project supervisor as meeting the defined goals.

By meeting these criteria, the project will demonstrate success in delivering an AI-powered assistant that improves accuracy, efficiency, compliance, and transparency in financial closing. Any performance beyond these thresholds, such as greater efficiency gains or higher anomaly detection accuracy, will be considered as exceeding expectations.

## 3 Related work

Financial close and compliance processes have traditionally been manual, resource-intensive, and prone to errors. Recent literature emphasizes the importance of automation and AI in streamlining accounting workflows. Studies demonstrate that automation significantly reduces the financial closing cycle while improving compliance and accuracy in reporting [1] [2].

Artificial Intelligence has increasingly been adopted in accounting and auditing research. Kokina and Davenport [3] highlight that AI-driven systems enhance auditing efficiency by automating reconciliations, anomaly detection, and fraud prevention. Similarly, Issa et al. [4] argue that AI can formalize audit tasks such as journal entry validation and compliance monitoring, offering higher consistency compared to manual methods.

The integration of **multi-agent systems (MAS)** into financial applications has also been explored. Jennings et al. [5] present MAS as an effective paradigm for tasks requiring distributed intelligence and collaboration, which aligns with the multi-agent architecture proposed in FinSight AI. More recent work has applied MAS in areas such as risk management [6] and fraud detection [7], demonstrating the potential of distributed AI systems in financial domains.

Another critical dimension in financial automation is regulatory compliance. Research by Moll and Yigitbasioglu [8] shows that incorporating compliance rules into digital accounting systems minimizes errors and regulatory penalties. Baldwin et al. [9] highlight that AI can produce transparent audit trails to strengthen accountability, while studies on Pakistan's financial practices reveal that businesses still struggle with outdated manual methods, weak automation, and frequent errors [10]. Evidence from local surveys further shows that 71% of Pakistani businesses face cash flow difficulties [11], indirectly reflecting delays and inefficiencies in financial reporting. These findings align with global studies such as Hackett Group and CFO.com, which report that many firms still rely on spreadsheets and take up to a week to close their books [12] [13]. Joshi [14] expands this perspective by outlining how AI multi-agent frameworks enable automation of complex financial workflows, including compliance, risk assessment, and fraud detection, which are critical to transforming financial services.

Despite advancements, gaps remain in the literature. Current research focuses heavily on fraud detection, auditing, or forecasting, but there is little evidence of integrated, agentic AI solutions targeting **end-to-end month-end financial closing**. Moreover, the adaptation of AI systems to local regulatory requirements in emerging markets remains underexplored. FinSight AI aims to address this gap by developing a multi-agent system

tailored for Pakistan’s financial ecosystem, providing automation in accruals, reconciliations, compliance checks, anomaly detection, and reporting.

## 4 Project Rationale

The project addresses inefficiencies in Pakistan’s finance sector. By automating critical closing tasks, it will reduce human error, improve compliance, and enhance transparency. It will also shift the role of accountants from data entry to strategic analysis, creating long-term value. Additionally, the system will support SMEs and government institutions where ERP adoption is limited.

### 4.1 Aims and Objectives

#### 4.1.1 Aims:

To design and develop an AI-driven, agentic financial assistant that automates the month-end financial closing and compliance process.

#### 4.1.2 Objectives:

1. Automate accruals, adjustments, and reconciliations.
2. Ensure compliance with IFRS, SBP, and tax rules.
3. Detect anomalies and fraud in real time.
4. Provide plain-language narrative summaries and dashboards.
5. Reduce closing cycle time and manual workload.
6. Enable forecasting and scenario simulations.

### 4.2 Scope of the Project

The project will focus on:

- Automating month-end financial close tasks.
- Integrating with accounting data (trial balance, ledgers, bank statements).
- Providing dashboards and audit trails.
- Enabling compliance validation.

The project does not cover:

- Full ERP replacement.
- Global multi-currency integrations.
- High-frequency trading or advanced treasury modules.

## 5 Proposed Methodology and Architecture

The FinSight AI system will use a monolithic architecture for a cohesive deployment, with the entire backend and its Python agents encapsulated in a single Docker image. The system will consist of multiple AI-driven agents, each focusing on a specific financial

closing responsibility. Together, these agents will form a collaborative ecosystem that streamlines the entire financial close process.

### **5.1 Architecture Overview:**

- The system's core is a single deployable backend unit built with
- Python and the FastAPI framework.
- It will expose a RESTful API and host specialized AI agents, such as the Accruals & Adjustments Agent and the Bank Reconciliation Agent.
- Agents will be developed using the
- LangChain framework, leveraging its capabilities for agentic AI and workflow automation.
- The entire backend application will be containerized using Docker for consistent performance across environments. The Docker image will contain the FastAPI application and all necessary Python dependencies.

### **5.2 Deployment Strategy (Tentative):**

- To make the backend API accessible for production, it will be exposed using **Cloudflare**. Cloudflare will provide a public URL and handle security, caching, and performance optimization.
- The frontend will be a portable executable (.exe file) that communicates with the backend API, allowing for flexible distribution to end-users without needing a separate server.

### **5.3 Agent Communication and Workflow:**

- The core agents will communicate via internal functions and API calls within the monolithic backend.
- This collaborative ecosystem will be orchestrated to streamline the financial closing process.
- For example, the Document Extraction Agent will process data and pass it to other agents like the Accruals & Adjustments Agent for further validation and processing.
- This step-by-step procedure is designed to mimic a real-world financial closing pipeline.

5.4 Figures:

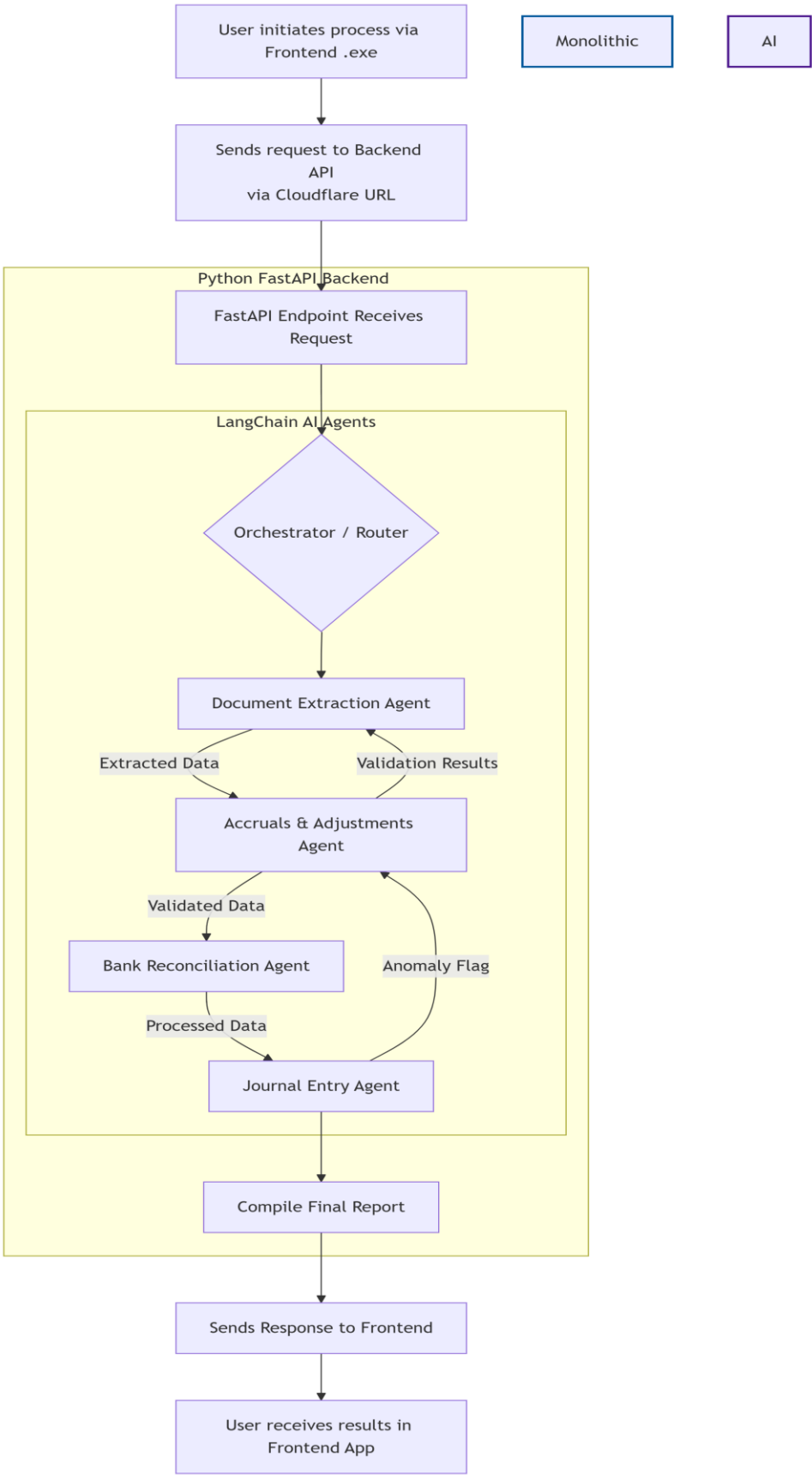


Fig. 1. Architecture



### 5.5 Dataset (Tentative):

The dataset for this project is tentative and will be sourced from multiple publicly available repositories, synthetic datasets, and regulatory reports. The following resources will serve as the basis of our data collection:

- [General Ledger Dataset \(Kaggle\)](#) – Contains synthetic but realistic ledger entries useful for simulating journal postings and reconciliations.
- [Synthetic Financial Accounting Dataset \(Kaggle\)](#) – Provides structured financial accounting records to test compliance workflows.
- [BlackLine Financial Close Whitepaper](#) – Offers anonymized close-cycle examples and process flows to simulate real-world scenarios.
- [Federal Board of Revenue \(FBR\), Pakistan](#) – Source for taxation policies, compliance data, and reporting standards.
- [State Bank of Pakistan \(SBP\)](#) – Provides regulatory guidelines, financial statements, and reporting structures.
- [World Bank Open Data](#) – Offers macroeconomic and financial indicators to contextualize compliance with international reporting standards.

Data from these sources will undergo cleaning, transformation, and preprocessing to ensure suitability for the system's requirements. Since the project involves simulating an automated financial close and compliance framework, the datasets will be adapted and integrated as per the use cases.

## 6 Individual Tasks

The expected individual task list with the tentative plan is given below.

TABLE 1. Individual Tasks

| Team Member | Activity                          | Tentative Date         |
|-------------|-----------------------------------|------------------------|
| All 3       | Project Planning & Setup          | 20-Sep-25 – 30-Sep-25  |
| Mishkaat    | Accruals & Adjustments Agent      | 1-Oct-25 – 4-Nov-25    |
| Ayesha      | Bank Reconciliation Agent         | 4-Oct-25 – 8-Nov-25    |
| Fahad       | Document Extraction Agent         | 4-Oct-25 – 15-Nov-25   |
| Mishkaat    | Journal Entry Validator Agent     | 9-Nov-25 – 29-Nov-25   |
| Ayesha      | Narrative/Forecast/Scenario Agent | 09-Nov -25 – 13-Dec-25 |
| Fahad       | Compliance Policy Checker         | 16-Nov -25 – 13-Dec-25 |
| Mishkaat    | Database Schema & Setup           | 30-Nov -25 – 20-Dec-25 |
| Ayesha      | Vendor/Customer Reconciliation    | 14-Dec -25 – 27-Dec-25 |

|          |  |                           |
|----------|--|---------------------------|
| Fahad    | Tax Adjustment Agent                                 | 14-Dec -25 –<br>27-Dec-25 |
| Mishkaat | Audit Trail & Log System                             | 01-Jan-26 –<br>14-Jan-26  |
| Ayesha   | API Development &<br>Integration                     | 01-Jan-26 –<br>29-Jan-26  |
| Fahad    | Agent Orchestration &<br>Workflow                    | 01-Jan-26 –<br>05-Feb-26  |
| Mishkaat | Notification & Alerts API                            | 15-Jan-26 –<br>29-Jan-26  |
| Ayesha   | Security & Authentication                            | 30-Jan-26 –<br>12-Feb-26  |
| Fahad    | Dashboard Design &<br>Mockups                        | 06-Feb-26 –<br>19-Feb-26  |
| Mishkaat | Core Dashboards (KPIs)                               | 13-Feb-26 –<br>26-Mar-26  |
| Ayesha   | Conversational Copilot UI                            | 13-Feb-26 –<br>19-May-26  |
| Fahad    | Reporting & Narrative UI                             | 20-Feb-26 –<br>26-Mar-26  |
| Mishkaat | User Roles & Access<br>Control                       | 27-Mar-26 –<br>16-Apr-26  |
| All 3    | Integration Testing (Agents<br>+ Backend + Frontend) | 17-Apr-26 –<br>01-May-26  |
| All 3    | User Acceptance Testing<br>(UAT)                     | 02-May-26 –<br>15-May-26  |
| All 3    | Documentation & Final<br>Presentation Prep           | 16-May-26 –<br>29-May-26  |
| All 3    | Final Submission                                     | 30-May-26                 |

## 7 Gantt Chart

The project is organized into four phases: Phase 1 — Agent Development, Phase 2 — Backend Development, Phase 3 — Frontend Development, and Phase 4 — Testing & Finalization. Tasks within each phase include owner assignment and clear start / end dates. Several tasks are developed in parallel (especially agent development and frontend modules) to shorten calendar time and reflect real-world concurrent workstreams; others are sequential where dependencies require it (e.g., orchestration follows individual agent development).

### 7.1 Parallel work highlights

- **Oct–Dec 2025 (Phase 1):** Multiple agents (Accruals, Bank Reconciliation, Document Extraction) and Database schema are developed concurrently to accelerate agent availability for later orchestration and integration.
- **Jan 2026 (Phase 2):** API development, and agent orchestration run largely in parallel (overlapping early-Jan) so backend and orchestration components mature together.

- **Feb–Mar 2026 (Phase 3):** Frontend pieces (dashboard KPIs, conversational copilot UI, reporting UI) overlap so UI/UX and API contracts evolve together and can be tested in integration.
- **Apr–May 2026 (Phase 4):** Integration testing, UAT, and documentation run in sequence/overlap to finalize the system for submission.

## 7.2 Figure

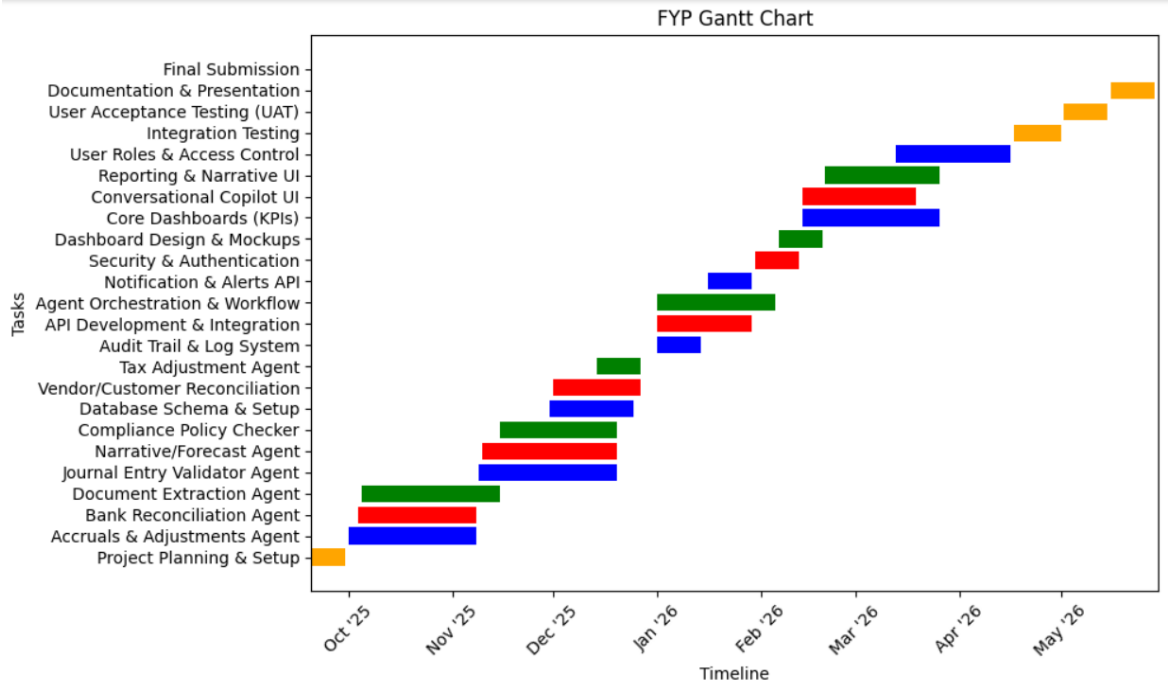


Fig. 2. Gantt Chart

## 8 Tools and Technologies (Tentative)

The successful implementation of **FinSight AI** requires a modern, scalable, and maintainable technology stack. The following tools and technologies are tentatively planned:

### 8.1 Frontend (User Interface):

- **React.js** → A robust JavaScript library for building interactive dashboards and financial reporting interfaces. It will allow users to visualize reconciliations, anomalies, and compliance summaries in real-time.
- **Chart.js / Plotly** → For rendering interactive charts and graphs in the financial dashboards.

### 8.2 Backend (Core Business Logic):

- **Django (Python Framework)** → A secure, scalable web framework for handling core financial workflows, user management, and integration with databases. Django REST Framework (DRF) will expose APIs for communication between frontend and backend.
- **PostgreSQL** → A relational database for storing structured financial data, including ledgers, journal entries, and compliance records.

### 8.3 AI & Agentic Automation Layer:

- **LangChain** → To build specialized AI agents for tasks like document extraction, anomaly detection, reconciliations, and compliance validation.
- **LangGraph** → To manage multi-agent orchestration, allowing different agents (e.g., Accruals Agent, Reconciliation Agent, Anomaly Detection Agent) to collaborate in workflows that replicate the month-end financial close cycle.
- **NLP Libraries (Hugging Face Transformers)** → For generating plain-language financial summaries and compliance explanations.
- **Tesseract OCR** → For extracting data from scanned invoices, receipts, and financial documents.

### 8.4 Deployment & Security:

- **Docker** → For containerizing the Django backend and AI services, ensuring consistent deployment across environments.
- **Cloudflare** → For API hosting, load balancing, and securing external access.

### 8.5 Version Control & Collaboration:

- **Git + GitHub** → For source code management and team collaboration.
- **CI/CD Tools** → For automated testing and deployment pipelines.

This technology stack ensures that FinSight AI will be **modular, scalable, and production-ready**. The **React frontend** provides an intuitive user interface, while **Django with LangChain and LangGraph** powers the intelligent backend, enabling financial teams to automate month-end closing with transparency, speed, and accuracy.

## 9 References

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