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SDD

Software Design Description (SDD)

6.1 Introduction

This document presents the architecture and detailed design for the Insider Trading Alert mobile application. The project aims to provide real-time alerts based on insider trade filings, allowing users to make informed stock market decisions.

6.1.1 System Objectives

The objective of this application is to:

- Aggregate insider trading data from OpenInsider via web scraping.
- Store and process data using a FastAPI backend.
- Provide a mobile application interface using React Native.
- Offer AI-generated summaries of insider profiles and stock predictions.
- Authenticate users with Clerk and store user data in Supabase.
- Deliver notifications for significant insider trades.

6.1.2 Hardware, Software, and Human Interfaces

- Hardware Interfaces: Mobile devices (Android/iOS), cloud-hosted API services.
- Software Interfaces:
    - Backend: FastAPI (Python), Pandas (for data processing), Supabase (database), Fly.io (potential hosting option).
    - Frontend: React Native, Tailwind, for mobile app UI.
    - APIs: Gemini, Yahoo Stocks API for stock information.
- Human Interfaces: Mobile app UI with real-time stock charts, AI summaries, and notifications.

6.2 Architectural Design

6.2.1 Major Software Components

- Web Scraper: Collects insider trading data from OpenInsider.
- Data Processor: Uses Pandas to structure the data.
- FastAPI Backend: Serves data to the mobile application.
- Database (Supabase): Stores user information and preferences.
- Mobile App (React Native): Displays data, AI insights, and stock charts.
- AI Module: Summarizes insider activities and predicts stock trends.

6.2.2 Major Software Interactions

- Web scraper fetches data periodically and updates the FastAPI backend.
- Mobile app requests data from FastAPI.
- AI module processes insider trade data and generates summaries.
- Firebase sends notifications to users based on trade significance.

6.2.3 Architectural Design Diagrams

(To be included: UML diagrams for system architecture, data flow, and component interactions.)

6.3 CSC and CSU Descriptions

6.3.1 Class Descriptions

6.3.1.1 Web Scraper

- Fields: source_url, dataframe
- Methods: fetch_data(), parse_data()

6.3.1.2 DataProcessor

- Fields: dataframe
- Methods: clean_data(), transform_data()

6.3.1.3 FastAPIBackend

- Fields: endpoints, database
- Methods: get_insider_trades(), store_user_preferences()

6.3.1.4 MobileApp

- Fields: user_interface, notifications
- Methods: display_trades(), send_alerts()

6.3.2 Detailed Interface Descriptions

- FastAPI Endpoints: /trades, /user, /alerts
- Database Tables: Users, InsiderTrades, Notifications

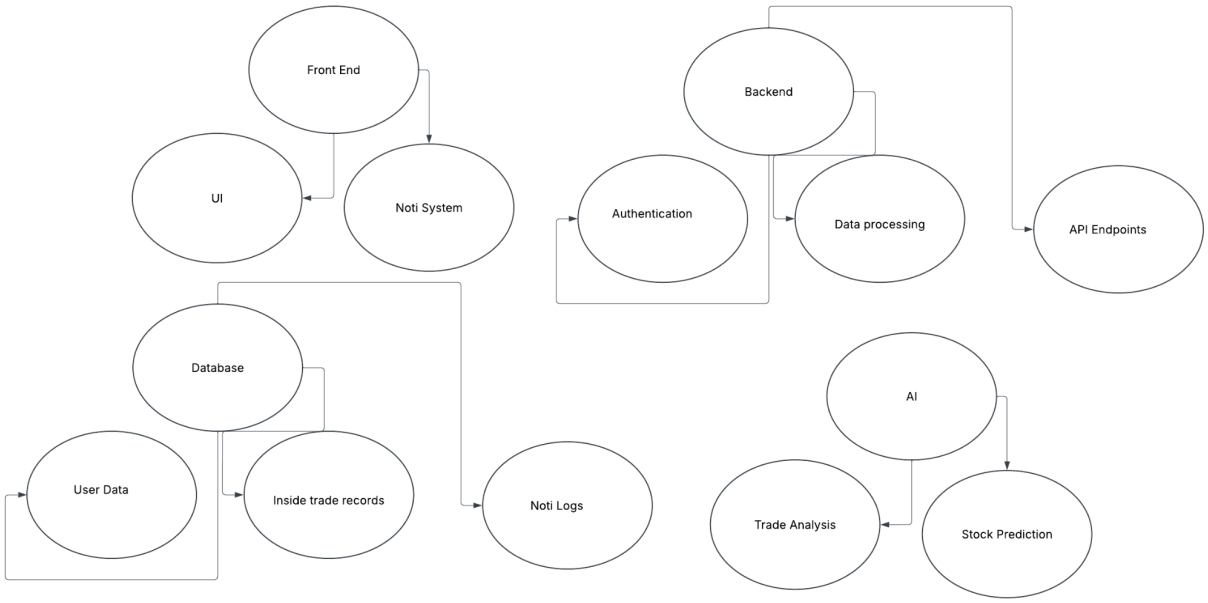
6.3.3 Detailed Data Structure Descriptions

Data attributes include:

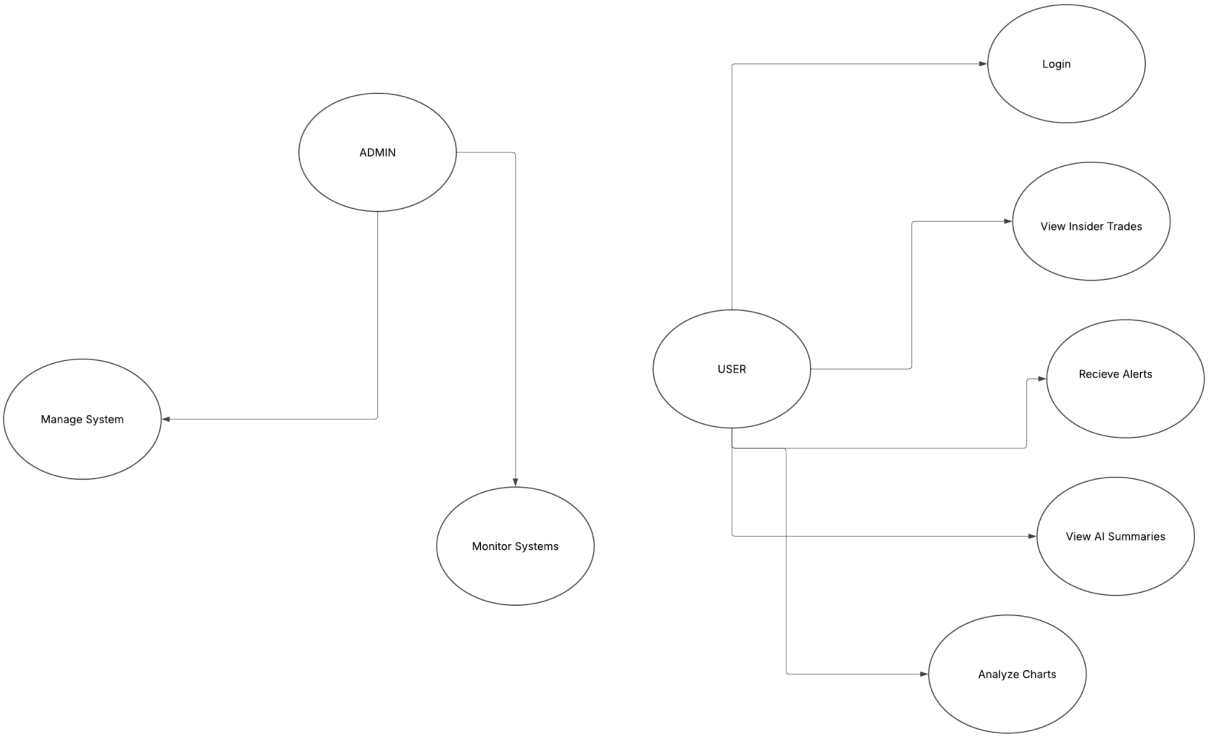
- filingDate, tradeDate, ticker, companyName, insiderName, tradeType, price, quantity, moneyValueIncrease

6.4 Database Design and Description

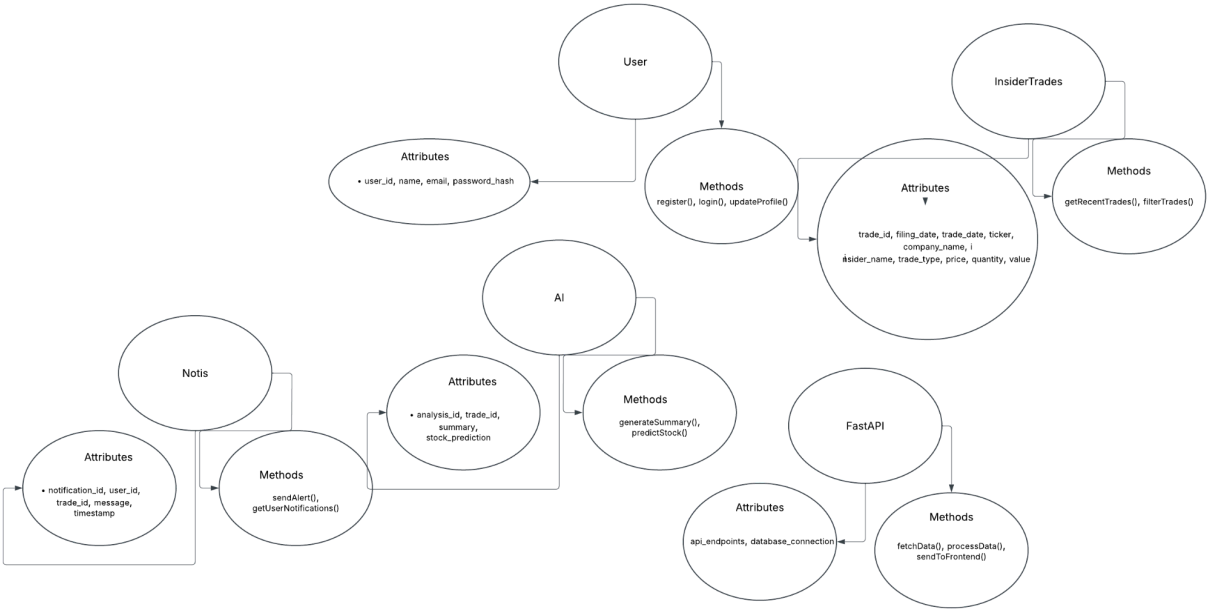
6.4.1 Use Case Diagram



Package Diagram



Class Diagram



6.4.2 Database Access

- Supabase API used for secure data access.

6.4.3 Database Security

- JWT authentication via Clerk.
- Role-based access control for data integrity.
