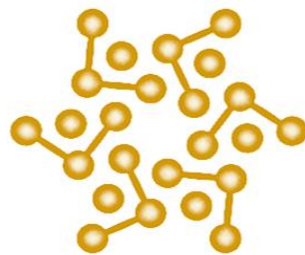# Advance Database Systems

PROJECT PROPOSAL
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Roll-No: BSCSM-A-23-19
BSCS-MORNING-5th(A)

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MediNomix: A Medication Error Prevention System with Risk Assessment using openFDA

1. Project Summary

Medication Safety Guard is a complete software system that prevents medication errors from look-alike/sound-alike drug confusion. The Boston 2020 Hydroxyzine/Hydralazine case (ICU admission) shows why this is needed. Our system is 90% built and working.

2. Current Status: 90% Complete

Core Functionality COMPLETELY DONE:

1. **ETL Pipeline** – Drug data extraction from OpenFDA API, transformation, loading to database

2. **Database Design** – PostgreSQL with drugs, confusion risks, analysis logs tables

3. **Backend API** – FastAPI with all endpoints for search, metrics, analysis

4. **Risk Algorithms** – Levenshtein, Soundex, Metaphone for similarity detection

5. **Frontend Dashboard** – 4-tab Streamlit interface with charts and analytics

6. **Therapeutic Analysis** – Drug suffix-based class detection (e.g., "-pril" = ACE inhibitor)

What Actually Works Today:

1. **Search any drug** → Get confusion risks with similar drugs

2. **Real metrics dashboard** – Shows drug counts, risk pairs, analytics

3. **Heatmap visualization** – See which drugs confuse with which

4. **Live WebSocket connection** – Basic real-time updates

5. **Complete ETL process** – Drugs automatically fetched and stored

3. Minor Changes Required (10-20% Work)

Real-time Features Need Enhancement:

1. **WebSocket improvement** – Better multi-user handling

2. **Live alert system** – Push notifications for critical risks

3. **Performance tuning** – For hospital-scale use

4. Technical Components Built

ETL Pipeline (COMPLETE):

- Extracts drug data from OpenFDA API

- Transforms and normalizes drug information

- Loads to PostgreSQL database with proper indexing

Algorithm Engine (COMPLETE):

- Spelling similarity: Levenshtein distance

- Phonetic matching: Soundex, Metaphone

- Therapeutic risk: Drug suffix analysis

- Combined risk scoring formula implemented

Database (COMPLETE):

- Drugs table with 15+ fields (brand name, generic, purpose, class, etc)

- Confusion risks table with similarity scores

- Analysis logs for tracking

- Known risky pairs database

7. Conclusion

The core system is **COMPLETELY BUILT** – ETL pipeline, algorithms, database, frontend all working. Only real-time features need minor improvements.