

# SHUYUN ZHENG

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## Education

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### Western University

Bachelor of Science, Specialization in Computer Science

London, ON

Sep 2023 – Apr 2027

- Recipient of the Western Admission Scholarship

## Projects

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### Semantic Document Search Engine

*Python · sentence-transformers · SQLite · NumPy · pdfplumber*

- Built a CLI semantic search tool that indexes PDF, TXT, and Markdown files by splitting them into overlapping chunks and encoding each chunk into 384-dimensional embeddings using a fine-tuned `all-MiniLM-L6-v2` transformer model
- Implemented vector retrieval via cosine similarity (`numpy` matrix dot product on L2-normalized embeddings), returning ranked results with configurable `top-k` and a similarity threshold to suppress low-confidence matches
- Persisted chunk text and embedding blobs in SQLite, enabling sub-second search over hundreds of documents without recomputing embeddings on each query
- **Impact:** End-to-end pipeline from raw documents to natural-language query results, demonstrating practical application of NLP embedding techniques outside a research setting

### File Manager Application

*C++17 · wxWidgets · std::filesystem*

- Designed and implemented a desktop file management system integrating OS-level filesystem APIs (`directory_iterator`, `copy`, `rename`, `remove_all`) to manipulate real directory trees and file metadata
- Built an event-driven GUI layer with `wxWidgets`, decoupling UI events from core file operation logic to improve maintainability and testability
- Enforced defensive error handling via `std::error_code` rather than unchecked exceptions, ensuring consistent UI state under invalid paths and permission failures
- **Impact:** Demonstrated production-style C++ systems engineering with robust error recovery and clean separation of concerns

### Budget Tracker — Personal Finance Web App

*JavaScript · HTML/CSS · localStorage · Chart.js*

- Developed a fully client-side SPA with dynamic income/expense tracking, category breakdowns, and monthly trend charts rendered via `Chart.js`
- Architected a modular data layer persisting structured JSON records to `localStorage`, with CRUD operations decoupled from the UI rendering pipeline
- **Impact:** Shipped a usable, zero-backend financial tool demonstrating end-to-end frontend product thinking from data model to visual output

### Magic Tower — Browser-Based RPG Game

*JavaScript · HTML · CSS · OOP · LocalStorage*

- Managed complex game state (player stats, inventory, floor progression) using structured objects and arrays with event-driven state transitions and query-based DOM rendering
- Persisted save data to `localStorage`, enabling session continuity without a backend
- **Impact:** Demonstrated scalable frontend architecture and clean separation of game logic from presentation layer

## Skills

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- **Languages:** Python, C++, JavaScript, SQL
- **Libraries & Frameworks:** NumPy, Pandas, sentence-transformers, wxWidgets, Chart.js
- **Tools:** Git, SQLite, Jupyter, Linux/macOS, pdfplumber
- **Concepts:** Semantic Search, Embeddings, Data Structures, Event-Driven Systems, Filesystem APIs, Modular Design, Defensive Error Handling

## Certifications

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- **IBM — Databases and SQL for Data Science with Python** Score: 97.5%  
Relational modeling, SQL joins, subqueries, aggregation with Python
- **IBM — Data Analysis with Python**