

Material Atlas for Coastal Construction

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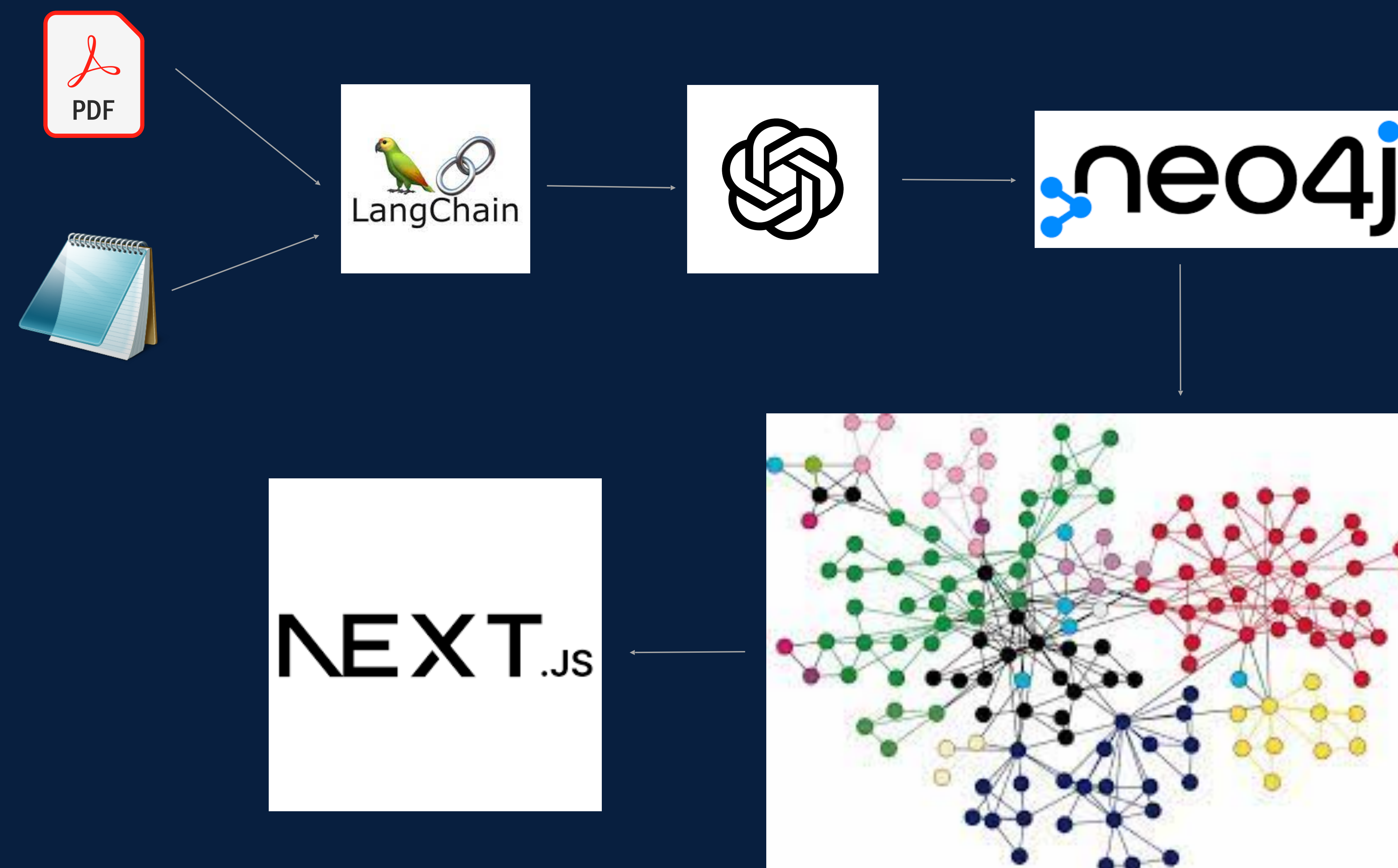
PROBLEM

- There is currently little cross-collaboration between material scientists and the engineers and architects who apply their work.
- A big reason for this is a lack of knowledge sharing platform. The goal of Material Atlas is to connect materials to applications.

REQUIREMENTS

- Users of the platform can search for materials by application
- Materials can be compared based on their properties / attributes
- When viewing a material, the system should recommend similar based on graph / semantic similarity.
- Uploading a material needs to be as streamlined as possible to promote adaption
- Users can register / login to accounts

ARCHITECTURE



TECH STACK

- **Langchain and OpenAI** are used to parse data (mix tables, metadata) from research papers to simplify the upload process
- **OpenAI ADA** embeddings are used to embed the abstract of the paper. We create a vector index in Neo4j and cosine similarity to implement a user-friendly natural language search engine.
- **Neo4j** is used to encode the materials and relationships in a graph structure. This enables efficient and scalable search.
- **Next.js** is used for the frontend of the website, along with Tailwind for styling
- **NextAuth** is used for authentication and user management
- **Docker and AWS** are used for hosting and deployment

ACKNOWLEDGEMENT

The material presented in this poster is based upon the work supported by XXXXX (name of the project sponsor: federal, state or local government, or corporate partners, where applicable). We/I thank XXXX for his/her/their assistance and mentorship that I/we received throughout the senior design project.