Eva- The Gamified Companion

1. Project Overview (Eva – The Gamified Learning AI)

What is Eva?

Eva is an AI-powered learning assistant that transforms study materials into interactive game-like challenges. It incorporates quizzes, quests, community competitions, and a reward system to make studying engaging and adaptive to student needs.

What Problem Does It Solve?

Many students struggle with traditional learning methods due to a lack of engagement and personalized feedback. Eva addresses this issue by:

- Converting study materials into interactive challenges, such as quizzes, levels, puzzles, and battles.
- Providing real-time feedback and hints to guide learning progress.
- Tracking progress and awarding achievements through a badge and point system.
- Allowing students to collaborate or compete through community challenges and leaderboards.
- Adapting to each student's learning pace to ensure a personalized experience.

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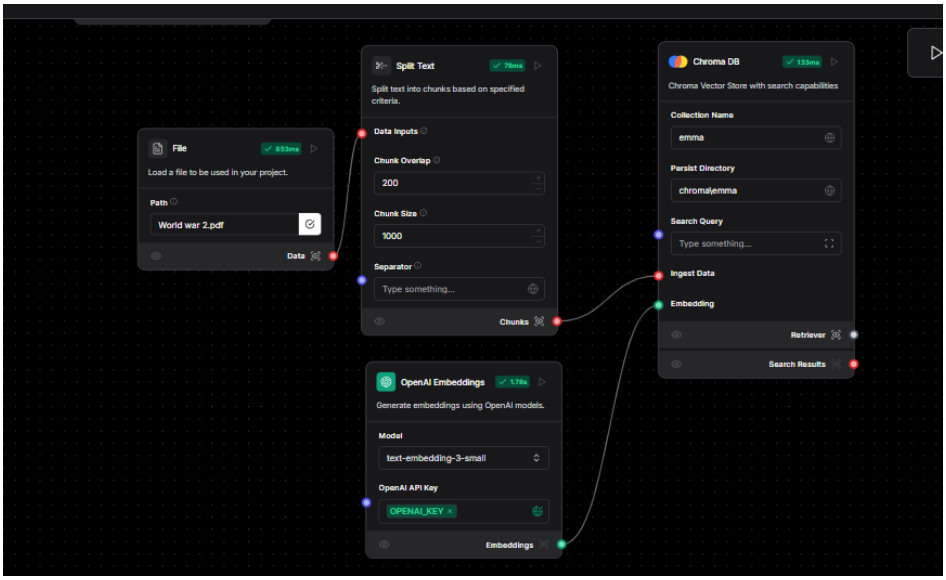
2. LangFlow Components & Pipeline

Eva is built using LangFlow with a Retrieval-Augmented Generation (RAG) system to dynamically generate personalized learning quests. The pipeline includes data ingestion, retrieval, and gamified content generation.

Data Loader Pipeline (Study Material Processing)

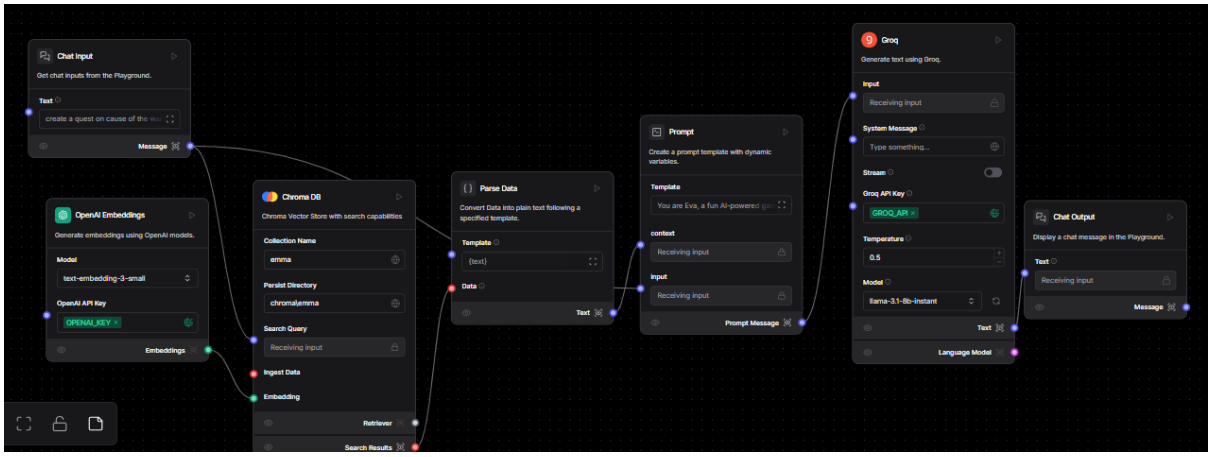


This pipeline processes educational content (quizzes, readings, notes) into a structured gamified database for retrieval and transformation into learning challenges.

Pipeline Components & Workflow:

1. **File Loader (Study Material Input)**
    - Purpose: Loads study documents, PDFs, or notes into the system.
    - Node: File
    - Functionality: Reads raw text from the document and sends it for processing.
2. **Text Splitting (Chunking Study Materials)**
    - Purpose: Splits large study content into smaller, manageable sections.
    - Node: Split Text
    - Configuration:
        - Chunk Size: 1000 characters
        - Chunk Overlap: 200 characters (to maintain context)
    - Functionality: Ensures quizzes and challenges pull relevant study content efficiently.
3. **Embedding Generation**
    - Purpose: Converts text chunks into vector embeddings for semantic search.
    - Node: OpenAI Embeddings
    - Model Used: text-embedding-3-small
    - API Key: Required for embedding processing
    - Functionality: Enables Eva to retrieve related study content when generating quizzes.
4. **Vector Database (ChromaDB Storage)**
    - Purpose: Stores vector embeddings for fast retrieval.
    - Node: ChromaDB
    - Configuration:
        - Collection Name: eva
        - Persist Directory: storage (ensures data persistence)
    - Functionality: Allows Eva to search and retrieve relevant study content when needed.

Retriever Pipeline (Context-Aware Quiz & Quest Generation)



Eva's retriever flow fetches the most relevant study materials and converts them into interactive learning quests.

1. **User Input (Quest or Quiz Request)**
    - Node: Chat Input
    - Functionality: Captures user input (e.g., "Create a quest for photosynthesis").
    - Output: Sends the request to ChromaDB for retrieval.
2. **ChromaDB Retrieval**
    - Node: ChromaDB
    - Functionality: Searches the vector database for relevant learning materials.
    - Configuration:
        - Collection Name: eva
        - Persist Directory: storage
    - Output: Retrieves the most relevant content for the learning quest.
3. **Parsing Retrieved Data**
    - Node: Parse Data
    - Functionality: Converts the retrieved study content into a structured, readable format.
4. **Prompt Template (Gamified Challenge Generation)**
    - Node: Prompt
    - Functionality: Uses the retrieved content to create a personalized learning challenge.

    Example Prompt:
    "You are Eva, a fun AI-powered gamification assistant designed to create engaging and interactive study experiences. Your purpose is to transform study materials into game-like quests to make learning fun and motivating.

    Instructions:

    -If the user asks about your introduction, role, or capabilities, explain what you do without creating a gamified experience.

-Analyze the user's input and convert it into a gamified learning format, including tasks like levels, battles, or puzzles.

-Only create quests, levels, or puzzles if the user explicitly requests gamified content.

-Move to the next level after the user has answered the current level

-Incorporate a reward system (points, badges, or progress bars) as part of the gamification.

-Design engaging tasks that align with study goals and material while maintaining an element of fun and challenge.

-Present progress updates, rewards, and quest objectives in a way that motivates users to continue learning.

-Provide clear instructions for each task or quest to guide users effectively.

-Ensure the gamified experience is relevant, well-structured, and simple to follow.

-Maintain a friendly, encouraging tone to make users feel excited and supported.

+ User Input: {input}

+ Relevant Course Content: {context} "

- Template Variables:
  - Context: Retrieved text from ChromaDB
  - Input: User's original request

Quiz & Quest Generation Pipeline

This stage turns retrieved study materials into interactive learning challenges.

1. **LLM Processing (Gamified Content Creation)**
   - Node: Groq AI Model
   - Functionality: Uses the retrieved context and prompt template to generate quizzes and quests.
   - Model Used: llama-3.1-8b-instant
   - Temperature: 0.5 (balanced creativity and accuracy)
   - Output: Creates structured quizzes, puzzles, or quests.
2. **Displaying the Quiz/Quest**
   - Node: Chat Output
   - Functionality: Displays the generated learning challenge in a gamified format.
   - Example Output:
     - Level 1: The Basics of Photosynthesis
     - Answer three questions correctly to unlock the next level.

- What is the main pigment responsible for photosynthesis?
  a) Hemoglobin
  b) Chlorophyll
  c) Melanin
  d) Keratin
- Bonus: Complete in 30 seconds for a speed badge.

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3. Gamification Features in Eva

Eva enhances student engagement with a comprehensive gamification system.

- **Game-Like Quests**
  - Converts study topics into interactive levels, puzzles, and battles.
  - Example: "Solve five chemistry puzzles to unlock the next quest."
- **Reward System**
  - Earn points and badges for completing learning tasks.
  - Example: "Get 100 points to become a Physics Master."
- **Community Challenges**
  - Compete on leaderboards and join group study quests.
  - Example: "Top five students with the highest scores this week get featured."
- **Personalized Learning Paths**
  - Adjusts difficulty based on user progress.
  - Provides feedback and study suggestions.