## horizontal line



AI PERSONAL TUTOR FOR UPSKILLERS

Start Date - 6/2/2025

Joel 2:27 - "You shall know that I am in the midst of Israel, and that I, the LORD, am your God and there is none else. And my people shall never again be put to shame".

TEAM MEMBERS   
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# Overview

VLearn is an AI-powered personal tutor that leverages advanced machine learning techniques to deliver tailored learning experiences. The name "vLearn" stands for "Virtual Learning" and also reflects the concept of "We Learn" collaboratively. Our project, vLearn, adapts courses to each learner's capabilities by generating customized multiple-choice questions (MCQs) using our fine-tuned T5 model.

# Goals Stage 1

1. Pre Course survey of the course to check their level of the course
2. Generate our own course content with three level – rag and llm
3. Module wise assessment

**Stage 2**

1. Basic interactive UI for our VLearn
2. Integration of chatbot and AI tutor

# Specifications

**Pre-Course Survey**

* Assesses user expectations and prior knowledge
* Determines the learner’s level:
  + Score > 40%: Start from *Intermediate*
  + Score > 70%: Start from *Advanced* (with summary of previous modules)

**Course Generation**

* 6 modules per level: Beginner, Intermediate, and Advanced
* Sourced from reliable educational materials
* Converted to .txt format for readability and database compatibility

**Module-Wise Assessment**

1. AI-generated MCQs using a fine-tuned T5 model
2. Each question is tagged by difficulty level
3. Incorrect answers trigger targeted sub-topic review with explanation

**System Workflow**

**1. Frontend Development**

* Built with **React.js** for dynamic user interactions
* Utilizes **Node.js** for API calls and handling data

**2. Backend Services**

* Developed using **Express.js**
* **MongoDB** for database management
* API endpoints handle user data, course content, assessments, and AI model integration

**3. Model Fine-Tuning**

* **T5 model** trained on a custom MCQ dataset
* Uses **Transformers** library and **ONNX** for optimization
* Further optimized using **Intel’s OpenVINO Toolkit** for edge deployment

**4. Database (MongoDB)**

Stores:

* Course .txt files
* User progress and scores
* Adaptive MCQs
* Hosted on **MongoDB Atlas** for scalability

**Integration**

* REST APIs bridge frontend, backend, and AI models
* **FastAPI/Flask** serves T5 model predictions
* Real-time communication ensures adaptive learning flow

**Additional Features**

**Chatbot Support *(DeepSeek-R1 7B via Ollama)***

* Assists with course queries, motivation, and navigation

**AI Assistant**

* Generates custom study plans
* Targets weak areas based on quiz performance

**Model Optimization with OpenVINO**

* Converted fine-tuned T5 → ONNX → IR format (.xml, .bin)
* Deployed using OpenVINO Inference Engine
* Benefits:
  + Faster inference
  + Lower resource usage
  + Excellent performance on Intel CPUs/VPUs

**Future Scope**

* **Community Learning**: Forums and group chats
* **Video Lessons**: Visual content per module
* **Real-Time Coding Tests**: For practical skills
* **Gamified Learning**: Interactive games and quizzes

**Contact**

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