eyouth X DEPI Project Proposal

Submitted by:
eyouth

Final Project– Proposal Submission Guidelines

As part of your current project, you are required to submit a proposal that includes the following:

- Project Description: Provide a clear and concise explanation of the project.
- Group Members & Roles: List all team members along with their assigned roles.
- Team Leader: Specify the name of the team leader.
- Objectives: Outline the main goals of the project.
- Tools & Technologies: Mention the tools and technologies that will be used.
- Milestones & Deadlines: Define key project milestones with their respective deadlines
- **KPIs (Key Performance Indicators):** Each team should customize the following KPIs based on their project requirements.

1. Data Preparation Quality

- Measures the completeness, cleanliness, and suitability of the dataset used for training (including preprocessing, tokenization, and splitting).

2. Model Performance & Accuracy

- Evaluates how well the trained model performs on key metrics (e.g., BLEU, ROUGE, Perplexity, FID, or human evaluation), showing how accurate or realistic its output is.

3. Pipeline Integration & Automation Level

- Assesses how effectively all components (data preprocessing, training, inference, post-processing) are integrated into a single automated workflow or pipeline.

4. MLOps & Deployment Readiness

- Measures how well MLOps practices (tracking, versioning, CI/CD, deployment, monitoring) are implemented to ensure scalability and maintainability.

5. Output Quality & Usability Score

- Evaluates the quality and usefulness of the generated content/output — text, chatbot responses, or generated images — from a human usability perspective.

6. Documentation & Presentation Quality

- Assesses clarity and completeness of all reports, notebooks, code documentation, and the final presentation/demo..

Submission Deadline: 12/10/2025

Thank you for your efforts. Best of luck!

Final Project Proposal

Project Name : AI-Powered VR Interior Design Assistant

1. Project Description

An immersive VR application where users can interact with a virtual apartment using voice commands to modify interior design elements and generate AI-powered design images.

Key Features:

- **VR navigation in 3D apartment**
- **Voice-controlled AI chatbot**
- **Real-time interior modifications (colors, materials)**
- **AI-generated design images using Stable Diffusion**
- **Natural voice input/output**

2. Group Members & Roles

Name	Role
Ahmed Mahmoud Faheem	Team Leader - VR Development & Unity- Integration Ai with
Ayman ibrahim gamal	AI/ML Engineer - GPT, Image Generation , Video Generation
Youssef Abdelnasser Ahmed	AI/ML Engineer - Backend Developer - FastAPI, APIs, Database
Nermeen Elsayed Mohammed	Speech AI - Whisper, Text-to-Speech
shahd abd rab elnaby	AI/ML Engineer - GPT, LangChain
Ahmed Mansour Atef	AI/ML Engineer - GPT, LangChain, Image Generation , Open AI

Team Leader: Ahmed Mahmoud Faheem

3. Objectives

- ✅ **Develop functional VR apartment environment**
- ✅ **Implement voice-controlled AI assistant**
- ✅ **Enable real-time interior design modifications**
- ✅ **Integrate AI image generation (Stable Diffusion)**
- ✅ **Deploy scalable backend system**

4. Tools & Technologies 🛠️

➢ VR & Frontend

- **Unity 2022 LTS + XR Interaction Toolkit**
- **C# for Unity scripting**
- **Meta Quest 2/3 SDK**

➢ AI & ML

- **OpenAI GPT-4 (Conversational AI)**
- **LangChain (LLM orchestration)**
- **OpenAI Whisper (Speech-to-Text)**
- **ElevenLabs (Text-to-Speech)**
- **Stable Diffusion via Replicate API**
- **ChromaDB (Vector database)**

➢ Backend & Infrastructure

- **Python + FastAPI**
- **PostgreSQL + Redis**
- **Docker + Docker Compose**

➢ **MLOps & DevOps**

- **MLflow (Experiment tracking)**
- **GitHub Actions (CI/CD)**
- **AWS EC2 / GCP (Cloud hosting)**

5. Milestones & Deadlines 🗓️

Milestone	Duration	Deadline	Deliverables
M1: Setup	Weeks 1-2	2 week	Unity VR + FastAPI setup
M2: AI Integration	Weeks 3-5	5 week	GPT-4 + Speech APIs working
M3: VR-Backend	Weeks 6-7	7 week	Voice commands in VR
M4: Modifications	Weeks 7-8	8 week	Real-time color/material changes
M5: Image Gen	Weeks 9-10	10 week	Stable Diffusion integration
M6: Testing	Weeks 10-11	11 week	User testing + optimization
M7: Deployment	Week 12	12 / 2025	Production deployment + docs

6. Key Performance Indicators (KPIs) 📊

KPI 1: Data Preparation Quality (Target: 95%)

Metric	Target	Method
Dataset Completeness	100%	Validation scripts
Data Cleaning	>95%	Manual review + automation
Audio Quality (SNR)	>20dB	Librosa analysis
Preprocessing Success	>98%	Automated checks

Deliverable: Data quality report

KPI 2: Model Performance & Accuracy (Target: 85%)

Component	Metric	Target
Conversational AI	Response Relevance	>90% (human eval)
Intent Recognition	>85% (automated test)	
Speech-to-Text	Word Error Rate	<10%
Text-to-Speech	MOS Score	>4.0/5.0
Image Generation	Prompt Adherence	>85%

Testing:

- **50 human evaluations**
- **200 automated intent tests**

KPI 3: Pipeline Integration & Automation (Target: 90%)

Metric	Target	Method
Component Integration	100%	All APIs connected
Automation Coverage	>90%	Manual intervention <10%
End-to-End Success Rate	>95%	100 test workflows
Pipeline Uptime	>99%	Monitoring logs

Components:

- Unity ↔ FastAPI ↔ OpenAI APIs
- Automated workflows : Voice → Response, Command → Modification, Description → Image

KPI 4: MLOps & Deployment Readiness (Target: 85%)

Category	Metrics	Target
Experiment Tracking	All models logged	100% (MLflow)
CI/CD	Automated tests	>80% coverage
Build success	>95%	
Monitoring	System uptime	>99%
API response time	<500ms	
Versioning	Model versioning	100%

Tools:

- **MLflow, GitHub Actions, Prometheus/Grafana**

KPI 5: Output Quality & Usability (Target: 4.0/5.0)

Component	Metric	Target	Method
Voice Interaction	Natural flow	4.0/5.0	User survey (n=20)
	Response time	4.0/5.0	User satisfaction
Design Changes	Accuracy	4.5/5.0	Task completion
Generated Images	Quality	4.0/5.0	Human rating
VR Experience	Overall UX	4.0/5.0	SUS score >70

KPI 6: Documentation & Presentation (Target: 90%)

Category	Deliverables	Completeness
Code Docs	Inline comments	>30%
	API docs (Swagger)	100%
Project Docs	User guide	100%
	Technical docs	100%
	Architecture diagrams	100%
Presentation	Demo video	3-5 min professional
	Final slides	Clear & engaging

	GitHub README	Complete setup guide

Quality Check:

- **Peer review (5-point scale) + external reviewer**

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7. Expected Deliverables 📦

- ✅ **Working VR application (Unity build)**
- ✅ **Deployed FastAPI backend**
- ✅ **Complete documentation package**
- ✅ **Demo video (3-5 minutes)**
- ✅ **GitHub repository with CI/CD**
- ✅ **Final presentation**

8. Success Criteria ✅

- **VR runs at >72 FPS**
- **Voice recognition >85% accuracy**
- **Interior changes apply in <2 seconds**
- **All KPIs meet targets**
- **System deployed and scalable**
