STUDENT PROJECT SCHEME 2025-2026

Project Proposal On

A Low-Code Framework for Conversational AI Assistants Leveraging Retrieval-Augmented Generation and LLMs

Submitted to

TNSCST

TAMIL NADU STATE COUNCIL FOR SCIENCE AND TECHNOLOGY

(Department of Higher Education, Government of Tamil Nadu)

Submitted by

Dr.S.Thirumal (guide)

Dr.N.Kumar (guide)

Thanigaivel G

Under the Supervision of

VELS INSTITUTE OF SCIENCE & TECHNOLOGY & ADVANCED STUDIES

APPLICATION FORMAT FOR STUDENT PROJECT PROPOSAL

Please fill all the details in this MS word file. Convert to pdf file, get it approved from the project guide / head of the department and head of your institution. Keep ready the scanned pdf file of 1) Signed Application form 2) Declaration and Endorsement and fill-up the Google Form. Note: Handwritten proposals & multiple entries in Google form will not be accepted.

https://tinyurl.com/TNSCST-SPS-2025

1.	**Project Title:** *A Low-Code Framework for Conversational AI Assistants Leveraging Retrieval-Augmented Generation and LLMs*
2.	**Sector** : **Computer Science**
3.	**Name of project guide :** 1. Name: **Dr.S.THIRUMAL** **Designation / Department:** **Associate professor / DEPARTMENT OF COMPUTER SCIENCE** **Email id: thirumal.se@vistas.ac.in** **Contact No : 98402 07652** 2. Name: **Dr.N.Kumar** **Designation / Department:** **professor / DEPARTMENT OF COMPUTER SCIENCE** **Email id: kumar.se@vistas.ac.in** **Contact No : 99402 04116**
4.	**Name of Team Members (Strictly not more than four students in a batch):** *(Type names in Capital Letters as provided in your college)* **Name: THANIGAIVEL.G** **Year of Studying/Department/Course: 2nd year/MTECH CSE** **Email id: thanigaivelrubesh1@gmail.com** **Mobile No : 8608969313**
5.	**Institution Details:** **Name of the Institution: VELS INSTITUTE OF SCIENCE & TECHNOLOGY & ADVANCED STUDIES** **Institution category: Self Finance** **Address: Velan Nagar, P.V. Vaithiyalingam Road ,Pallavaram** **District: Tamil Nadu** **Pincode: 600117**

6.	**Introduction:**
	Conversational AI has advanced with Large Language Models (LLMs), enabling intelligent, context-aware interactions. However, integrating them into enterprise applications often requires high technical expertise. This project proposes a low-code framework leveraging Retrieval-Augmented Generation (RAG) and LLMs within platforms like Oracle APEX. The assistant allows natural, domain-specific queries, improving accessibility and productivity in ERP/CRM systems. The approach reduces development time, minimizes reliance on technical staff, and bridges AI with existing enterprise infrastructure.
7.	**Objectives of the project:**
	• **To integrate a LLM-based smart assistant that simplifies enterprise application interaction using RAG (Retrieval-Augmented Generation).**
	• **To enable understanding of user queries and perform related data actions through LLM integration.**
	• **To retrieve relevant documents and data using a RAG model for accurate responses.**
	• **To reduce technical overhead by leveraging low-code tools and reusable components.**
	• **To build an extensible architecture supporting future modules such as ERP and CRM.**
	• **To ensure a secure and scalable framework suitable for enterprise environments.**
8.	**Methodology:**
	1. **System Design & Architecture**
	o Develop a modular architecture combining low-code frontend, AI backend, and RAG-based data sources.
	o Define integration layers: frontend (Oracle APEX), middleware (Python Flask), and backend (LLM + RAG engine).
	2. **Frontend Development**
	o Build a chatbot interface using Oracle APEX with dynamic actions and RESTful API integration.
	o Enable user interaction through natural language queries.
	3. **Middleware & API Integration**
	o Configure Flask-based backend to receive queries from the frontend via REST APIs.
	o Handle query embedding and orchestration of the RAG pipeline.
	4. **RAG Model Implementation**
	o Use LangChain or LlamaIndex to retrieve relevant document chunks from internal knowledge bases.
	o Match embeddings with stored data for contextual accuracy.

	5. LLM Response Generation
	  o Integrate GPT or open-source models to generate responses using the retrieved context.
	  o Ensure domain-specific accuracy and clarity in answers.
	
	6. Data Integration & Retrieval
	  o Connect the system with Oracle ERP tables, policy documents, and internal resources.
	  o Maintain an up-to-date knowledge base for efficient retrieval.

9.	**Workplan:** **Week Activity**

Week	Activity
1	Finalize system architecture and required tools (Oracle APEX, Flask, LangChain/LlamaIndex, LLM).
2–3	Develop chatbot UI in Oracle APEX and set up RESTful communication with Flask backend.
4–5	Implement RAG pipeline using LangChain/LlamaIndex and integrate internal knowledge base.
6–7	Connect LLM for response generation and test complete workflow (frontend → backend → response).

10.	**Expected Outcome of the project:** • **A conversational AI assistant that simplifies access to Enterprise systems using natural language.** • **Demonstration of LLM and low-code synergy in solving real-world business problems.** • **Reduced training and onboarding time through intuitive application interaction.** • **A modular and scalable architecture ready for future enterprise integrations.** • **An impactful combination of low-code platforms and AI technologies for enterprise modernization.**

11.	**Is the project proposed relevant to the Industry / Society?** **Yes** **If yes, please provide details of the industry details:** • **Business Units and Analysts seeking easier access to enterprise data and reports via natural language.** • **IT and Digital Transformation Teams for reducing development effort through low-code platforms.** • **Organizations using legacy systems that need intelligent, scalable AI integration without major overhauls.** • **Training and Support Departments that benefit from reduced user onboarding and support overhead.** (**Note:** Preference will be given to projects relevant to the Industry / Society. Hence be specific in giving detailed information). Is the industry extending support - technology / funds / use the final product, please specify.
12.	**Can the product or process developed in the project be taken up for filing a Patent?** **Yes – The project introduces a novel approach by integrating LLMs with low-code platforms and RAG for intelligent, context-aware enterprise interactions. Its modular design, natural language interface, and low-code implementation for real-time data retrieval present a unique technical solution. This innovative framework for enhancing legacy systems with minimal development effort holds strong potential for patent filing.** **Prior Art search done?** **Yes/No:** **Note:** If your answer is "Yes", you may contact Patent Information Centre of TNSCST. For more details, email: **ms.tanscst@nic.in**

13.	Budget details (The following is a tentative budget with break-up details; it is subject to change depending on the specific project requirements):

Budget	Amount
Oracle APEX hosting (if paid service is used)	1000
Backend server costs (Flask deployment on cloud)	1500
ChatGPT API usage (subscription or token cost)	2000
Printing & documentation	500
Miscellaneous expenses	1000
Total	**Rs 6000**

14.	**Has a similar project been carried out in your college / elsewhere? If so furnish details of the previous project and highlight the novelty & improvements suggested in the present one: No**
15.	**Any other details (Please specify): N\A**
16.	**SPS Coordinator (Identified by the college):** **Note:** To be identified by the Head of the Institution. The project proposals must be submitted to TNSCST through SPS coordinator designated. **Name: Prof. / Dr. / Mr. / Mrs.** **Designation/Department:** **Email id:** **Contact No.:**

Note: Any mismatch between the scanned PDF, the details filled in the Google Form, and the hard copy as well as multiple submissions via the Google Form will lead to **disqualification** of the proposal.

Name & Signature of the Project Guide	Name & Signature of the HOD	Name & Signature of the Principal / Head of the Institution (with seal)

<div align="center">**DECLARATION**</div>

<div align="center">**(From Project Students)**</div>

We, the project team hereby declare that the information provided in the enclosed project proposal (Title of the Project: **A Low-Code Framework for Conversational AI Assistants Leveraging Retrieval-Augmented Generation and LLMs** Branch: **Computer Science** College: **VELS Institute of Science and Technology and Advance Studies** are true and correct to the best of our knowledge and belief. We understand that the Tamil Nadu State Council for Science and Technology (TNSCST) will not entertain any changes to the project title or the names of the team members under any circumstances.

We further declare that the proposed project work is original, not copied or purchased from any source. We are committed to carrying out the project independently, with appropriate guidance from our faculty and project guide, and by utilizing the facilities provided by our institution. We pledge to maintain academic integrity, avoid plagiarism, and work sincerely and diligently to execute and complete the project as proposed.

We understand that any false, incorrect, or misleading information provided in this proposal may lead to disqualification or other consequences as deemed appropriate. We also authorize the sharing of the project details contained in this proposal with TNSCST, Chennai.

We acknowledge that, if selected, our team is required to exhibit and present the project at the **Annual State-Level Seminar-cum-Exhibition** organized by TNSCST.

The endorsement form for TNSCST, Chennai is enclosed herewith.

Name of the student with Register No.   **Signature with date**

Thanigaivel G (24880107)

G. Than 26/08/25

Name & Signature of project Guide   **Name & Signature of HOD (with Seal)**

ENDORSEMENT

(From College, endorsement to be taken in the Institution / Department Letter head)

This is to certify that the following students:

1. Mr. / Ms. _____,
2. Mr. / Ms. _____,
3. Mr. / Ms. _____,
4. Mr. / Ms. _____,

are bonafide final year students of the Department of _____, enrolled in the _____ degree program at our institution and it is certified that 2 copies of Utilization Certificate (UC) and final report along with seminar paper will be sent to the Council after completion of the project within specified timeline.

We hereby confirm that, if the project proposal submitted by the above-mentioned students under the **Student Project Scheme** is selected by **TNSCST**, our institution will extend full support by providing the necessary laboratory, computer, and infrastructure facilities required for the successful execution of the project.

Furthermore, we assure that appropriate measures will be taken to ensure the project team participates in the **Annual State-Level Seminar-cum-Exhibition** (if selected) and exhibits/demonstrates their project.

If the student team or project guide fails to submit the completed project report and the Utilisation Certificate within the timeline specified by TNSCST (if selected), our institution will ensure that the sanctioned project amount is returned to TNSCST.

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<td>Name & Signature of
Project Guide</td>
<td>Name & Signature of
HOD (with Seal)</td>
<td>Name & Signature of the
Principal / Head of the
Institution (with Seal)</td>
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