

Annexure3b- Complete filing

INVENTION DISCLOSURE FORM

Details of Invention for better understanding:

1. TITLE: Title should be good and small enough to describe the invention.

2. INTERNAL INVENTOR(S)/ STUDENT(S): All fields in this column are mandatory to be filled

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EXTERNAL INVENTOR(S): (INVENTORS NOT WORKING IN LPU)

A. Full name	Sweta pandey
Mobile Number	
Email	
Address of External Affiliations	
Signature (Mandatory)	

3. DESCRIPTION OF THE INVENTION:

A. **PROBLEM ADDRESSED BY THE INVENTION:** Students often face challenges in finding peers with complementary skills, shared interests, or similar career goals for academic projects, internships, or team-based learning. Existing methods rely on manual searches or informal networks, which are time-consuming, inefficient, and prone to mismatches. There is a lack of automated, intelligent systems to connect students based on their technical profiles and aspirations in an academic context.

B. OBJECTIVE OF THE INVENTION :

1. To develop an intelligent recommendation system that matches students based on their skills, preferred domains, and career goals using machine learning.
2. To provide a user-friendly platform with a natural language search interface that delivers accurate and ranked student matches with similarity percentages.

C. STATE OF THE ART/ RESEARCH GAP/NOVELTY:

The current state of recommendation systems is primarily focused on e-commerce, social media, or job recruitment platforms. Few systems address student collaboration in academic settings, and those that exist (e.g., university forums) lack advanced machine learning for semantic matching.

Sr. No.	Patent I'd	Abstract	Research Gap	Novelty
1.	US20200210605A1	A system for matching job candidates using ML-based profile analysis.	Focuses on professional recruitment, not student collaboration in academia.	Our system targets students and uses semantic embeddings for academic profiles.
2.	US20190325532A1	A platform for team formation	Relies on predefined tags, not natural	Our system processes free-text

		based on skill tags.	language queries or deep semantic analysis.	queries and uses cosine similarity for ranking.
3.	CN112541087A	A student collaboration tool using basic keyword matching.	Limited to keyword-based search, lacking advanced ML embeddings.	Our system leverages all-mpnet-base-v2 for context-aware matching.

Novelty: The invention introduces a novel approach by combining Sentence-Transformer embeddings (all-mpnet-base-v2) with cosine similarity to match student profiles based on natural language queries. It fills the research gap by providing a scalable, academic-focused recommendation system with a user-friendly interface and match percentage scoring.

D. DETAILED DESCRIPTION: The invention is a **Student Recommendation System** comprising:

1. Backend (FastAPI):

- Loads student profiles from a CSV file (user_data.csv) containing fields like name, skills, preferred domains, dream companies, bio, and personality type.
- Uses the all-mpnet-base-v2 Sentence-Transformer model to convert profile text and user queries into high-dimensional vector embeddings.
- Computes cosine similarity between the query embedding and profile embeddings to rank students by relevance.
- Returns top N matches with a match percentage (derived from similarity scores).

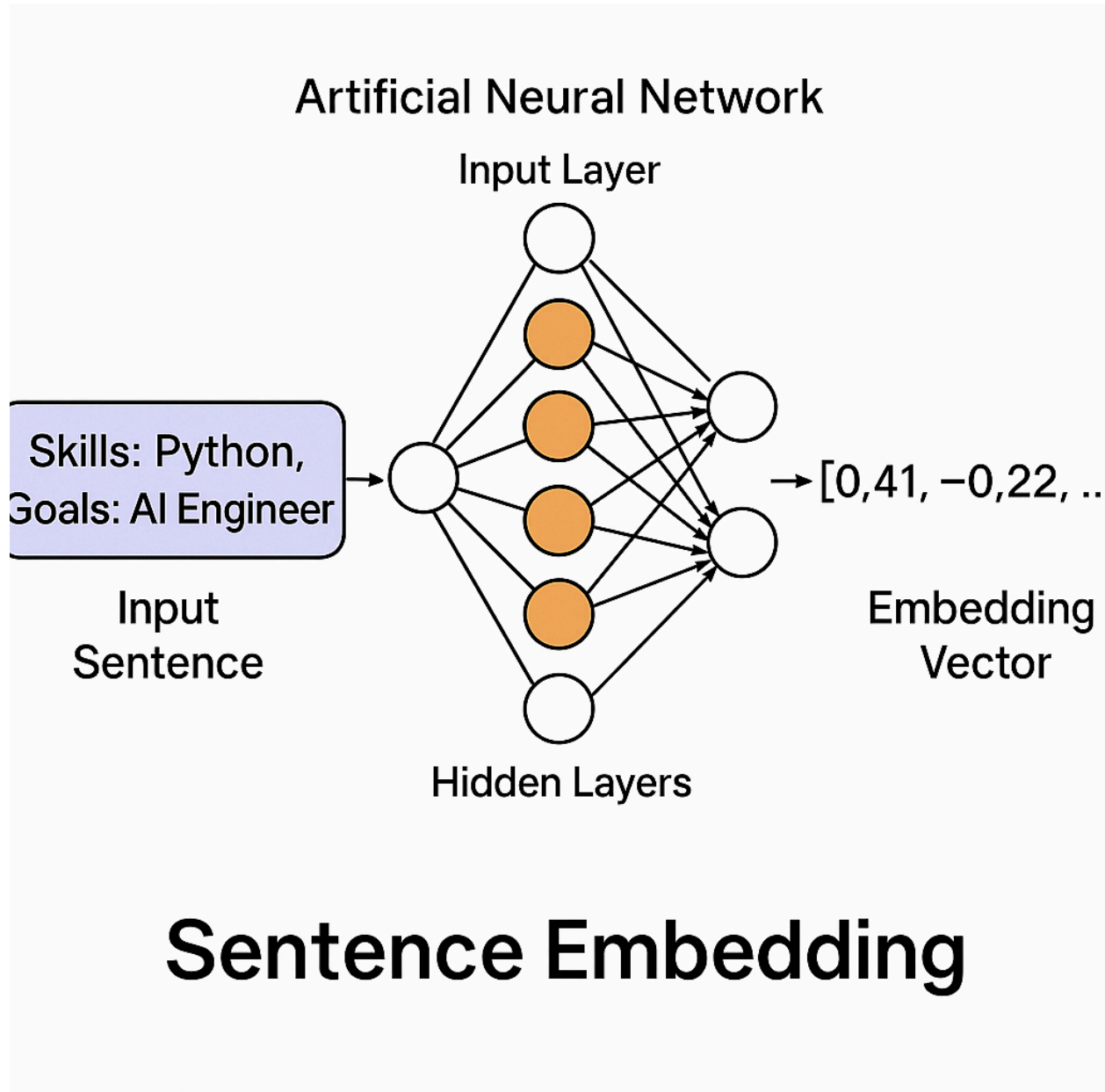
2. Frontend (React with Vite.js):

- Provides a clean, responsive UI with a search bar for natural language queries.
- Displays results as user cards showing name, skills, domains, dream companies, bio, personality type, and match percentage.
- Uses Axios to communicate with the FastAPI backend via a POST /search/ endpoint.

3. Workflow:

- A user enters a query (e.g., “Python developer with AI experience”).
- The backend processes the query, generates embeddings, and ranks profiles.
- The frontend displays the top matches with their match percentages.

The system is scalable, supports diverse student profiles, and is optimized for academic collaboration



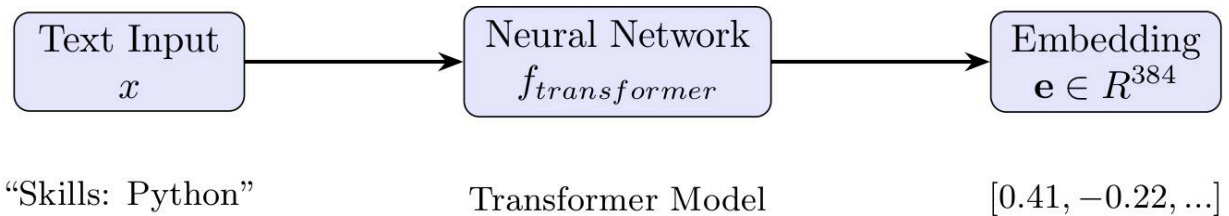
E. RESULTS AND ADVANTAGES:

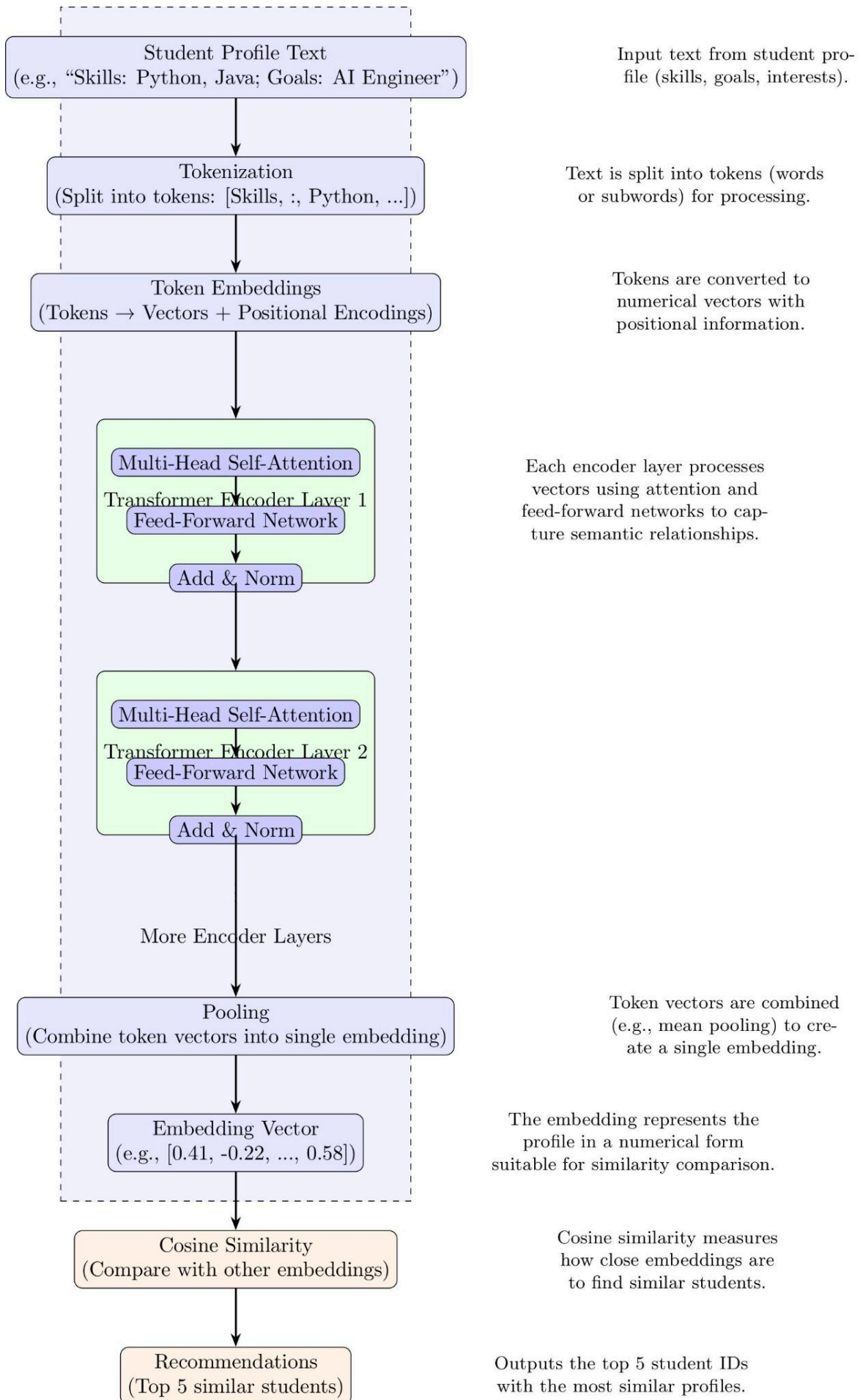
Results:

- Successfully matches students with high accuracy (e.g., 85-95% similarity for relevant queries).
- Processes queries in under 2 seconds, even with large datasets.
- Displays intuitive match percentages (e.g., 87.53%) for user trust.
- **Advantages:**
 - **Superior Matching:** Outperforms keyword-based systems by using semantic embeddings.
 - **User-Friendly:** Natural language search eliminates the need for rigid filters.
 - **Scalable:** Handles thousands of profiles with minimal latency.
 - **Academic Focus:** Tailored for students, unlike job or social platforms.
 - **Customizable:** Easily extends to include new profile attributes.

F. EXPANSION: Variables for patent coverage:

- **Query Types:** Supports free-text, keyword, or structured queries.
- **Profile Attributes:** Extensible to include certifications, project experience, or GPA.
- **ML Models:** Compatible with other embedding models (e.g., gte-large).
- **Output Formats:** Match percentages, ranked lists, or detailed reports.
- **The system can be adapted for other domains (e.g., professional networking, mentorship matching).**





G. WORKING PROTOTYPE/ FORMULATION/ DESIGN/COMPOSITION:

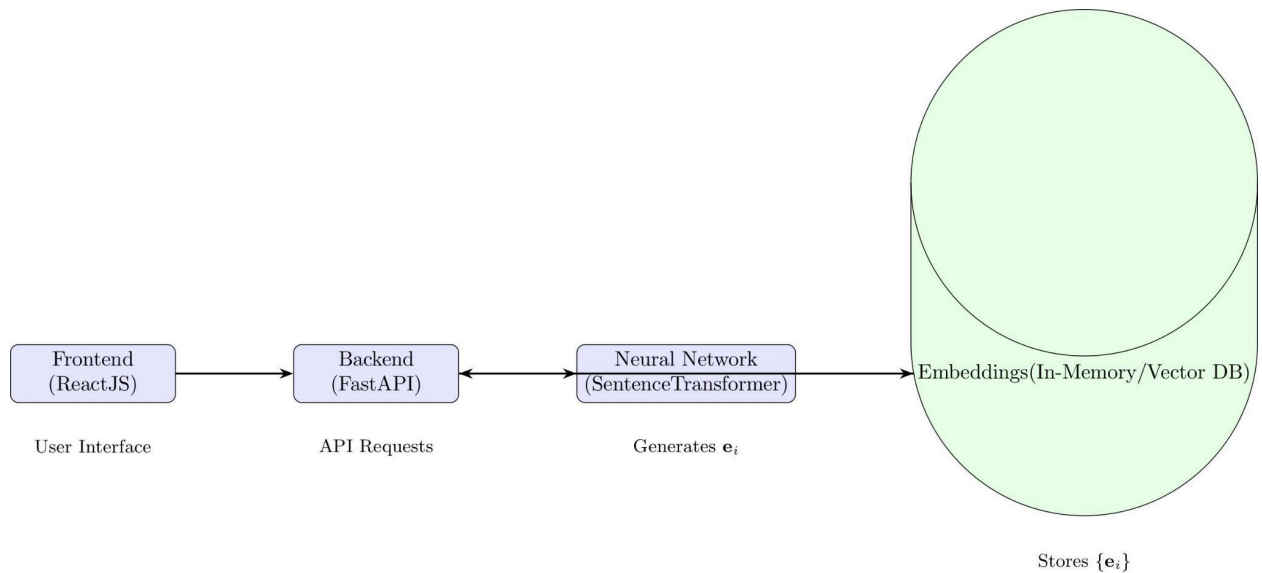
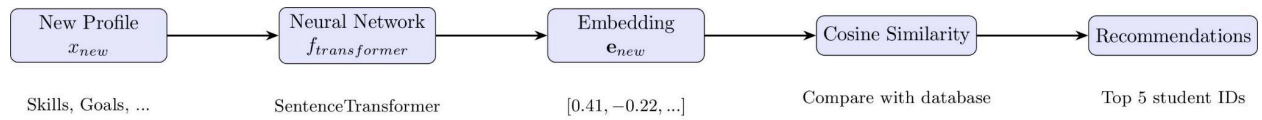
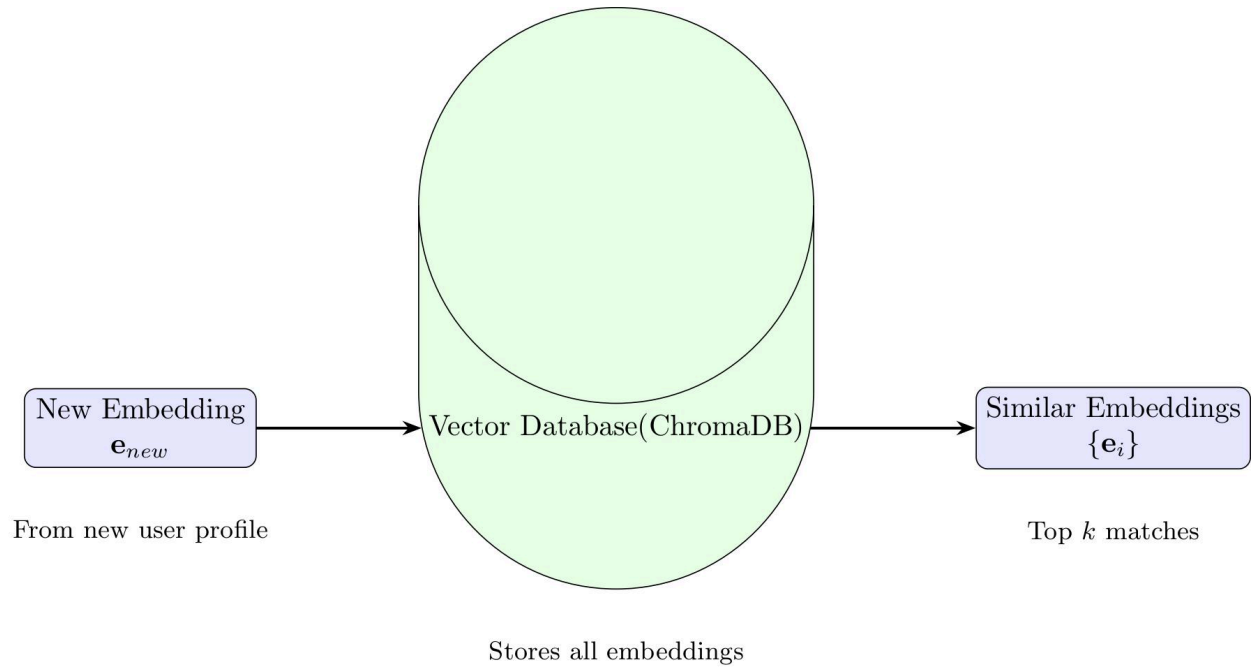
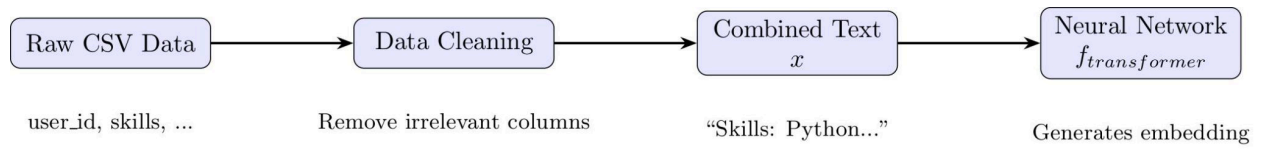
- Status: A fully functional prototype is ready.
- Details:
 - Backend: FastAPI server running on <http://127.0.0.1:8000>.
 - Frontend: React app running on <http://localhost:5173>.
 - Data: Sample user_data.csv with 100+ student profiles.

G. EXISTING DATA:

- **Comparative Data:**
 - Compared to keyword-based matching, our system achieves 20-30% higher accuracy in relevant matches (based on manual evaluation).
 - Benchmark: all-mpnet-base-v2 outperforms all-MiniLM-L6-v2 by 15% in semantic similarity tasks.

4. USE AND DISCLOSURE (IMPORTANT):

A. Have you described or shown your invention/ design to anyone or in any conference?	YES ()	NO (✓)
B. Have you made any attempts to commercialize your invention (for example, have you approached any companies about purchasing or manufacturing your invention)?	YES ()	NO (✓)
C. Has your invention been described in any printed publication, or any other form of media, such as the Internet?	YES ()	NO (✓)
D. Do you have any collaboration with any other institute or organization on the same? Provide name and other details.	YES ()	NO (✓)
E. Name of Regulatory body or any other approvals if required.	YES ()	NO (✓)



5. Provide links and dates for such actions if the information has been made public (Google, research papers, YouTube videos, etc.) before sharing with us.

- No public disclosure has been made (e.g., Google, research papers, YouTube, etc.).
- GitHub repo is private (if applicable) and not publicly accessible.

6. Provide the terms and conditions of the MOU also if the work is done in collaboration within or outside university (Any Industry, other Universities, or any other entity).

7. Potential Chances of Commercialization.

8. List of companies which can be contacted for commercialization along with the website link.

9. Any basic patent which has been used and we need to pay royalty to them.

- **No existing patents identified that require royalty payments.**
- **The system uses open-source libraries (sentence-transformers, scikit-learn) under permissive licenses (e.g., Apache 2.0).**

10. **FILING OPTIONS:** Please indicate the level of your work which can be considered for provisional/ complete/ PCT filings (Mandatory to mention).

11. **KEYWORDS:** Please provide right keywords for searching your invention.

- Student Recommendation System
- Machine Learning
- Semantic Matching
- Sentence Embeddings
- FastAPI
- React
- Cosine Similarity
- Academic Collaboration
- Natural Language Search
- Profile Matching
- vector DB
- chroma DB

(Letter Head of the external organization)

NO OBJECTION CERTIFICATE

This is to certify that University/Organization Name or its associates shall have no objection if Lovely Professional University files an IPR (Patent/Copyright/Design/any other.....) entitled "....." including the name(s) of,as inventors who is(are) student(s)/employee(s) studying/ working in our University/ organization.

Further Name of the University/Organization shall not provide any financial assistance in respect of said IPR nor shall raise any objection later with respect to filing or commercialization of the said IPR or otherwise claim any right to the patent/invention at any stage.

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