

Student Success Chatbot

A Machine Learning-Based Student Support System



Yu Chen (Tracy) Chou
Zhimin (Benny) Xiong
Haysam Elamin

The Problem

Student Success Advisors overwhelmed by repetitive low-complexity queries



Reduced staffing increases workload pressure



Risk of missing students in distress due to high volume



Our Solution



An AI-powered chatbot that answers FAQs instantly



Detects emotional distress and escalates to a human advisor



Available 24/7 for immediate student support

How It Works – Non-Technical



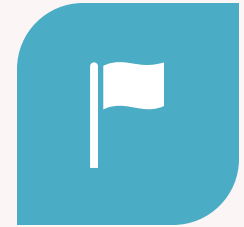
STUDENT TYPES A
QUESTION INTO THE
WEB CHAT INTERFACE



CHATBOT SEARCHES
KNOWLEDGE BASE FOR
RELEVANT ANSWER



PROVIDES A CLEAR AND
FRIENDLY RESPONSE



FLAGS DISTRESS OR
COMPLEX CASES FOR
HUMAN FOLLOW-UP

Distress Detection



Student: I'm feeling overwhelmed and not sure I can keep up this term.




Chatbot: I'm sorry you're feeling this way.
Please speak with a Student Success Advisor.



Provides booking link and phone number for immediate support.

How It Works – Technical

Intent Classifier (BERT) → Detects topic of question



Emotion Classifier (BERT) → Detects emotional tone



FAISS Semantic Search → Finds most relevant document chunks

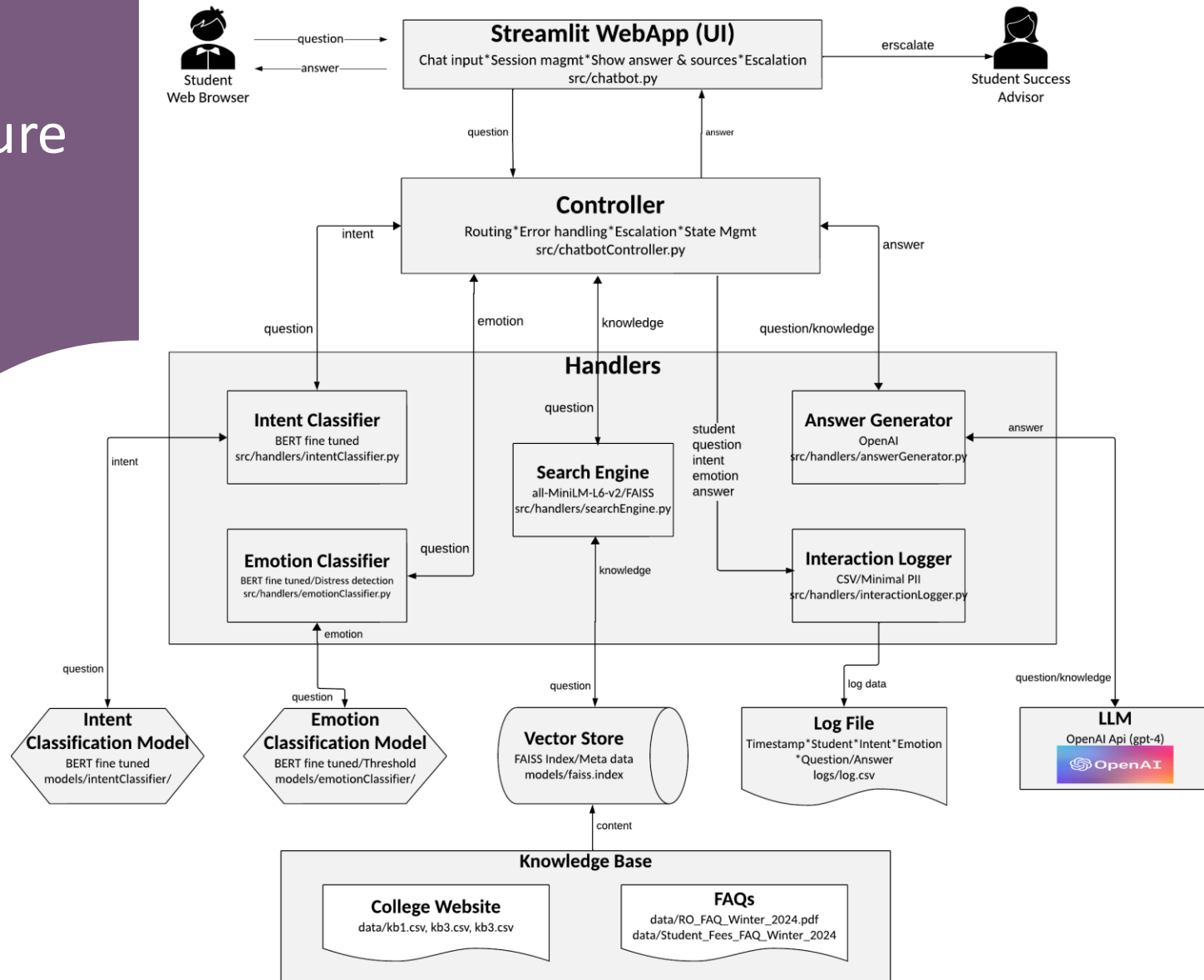


LLM (OpenAI GPT / Ollama) → Generates response from context



Logger → Records anonymized interaction data

System Architecture



Emotion Prediction

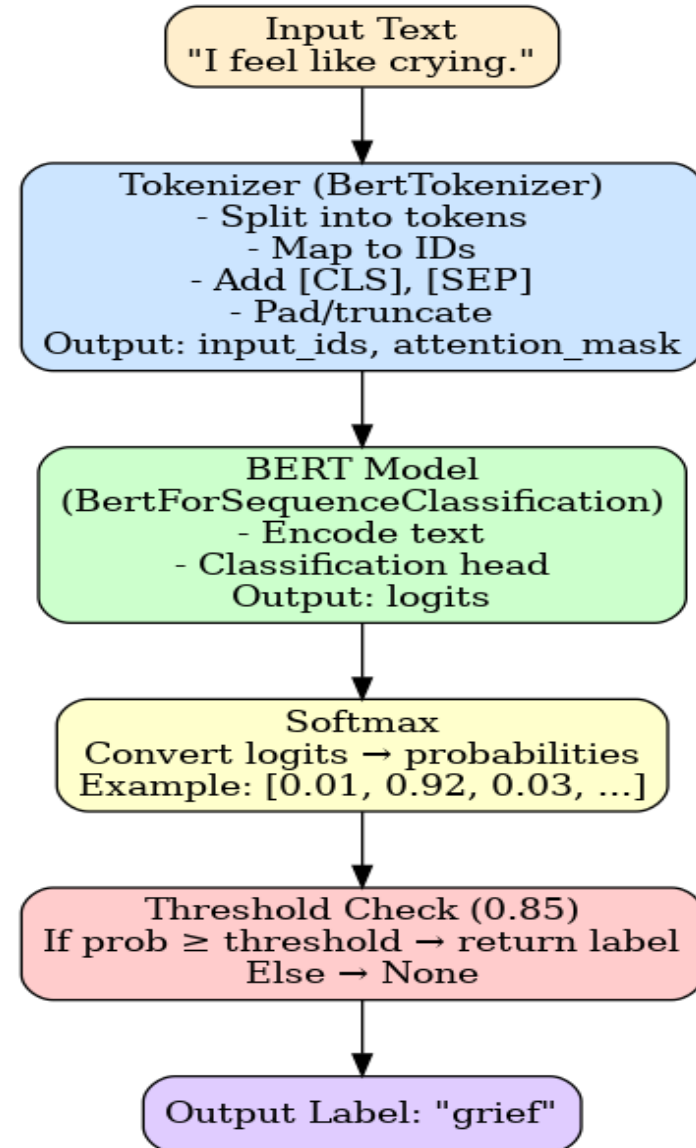
Load a fine-tuned BERT and tokenizer from disk.

Tokenize the input sentence into model-friendly tensors.

Run the tensors through BERT to get raw prediction scores.

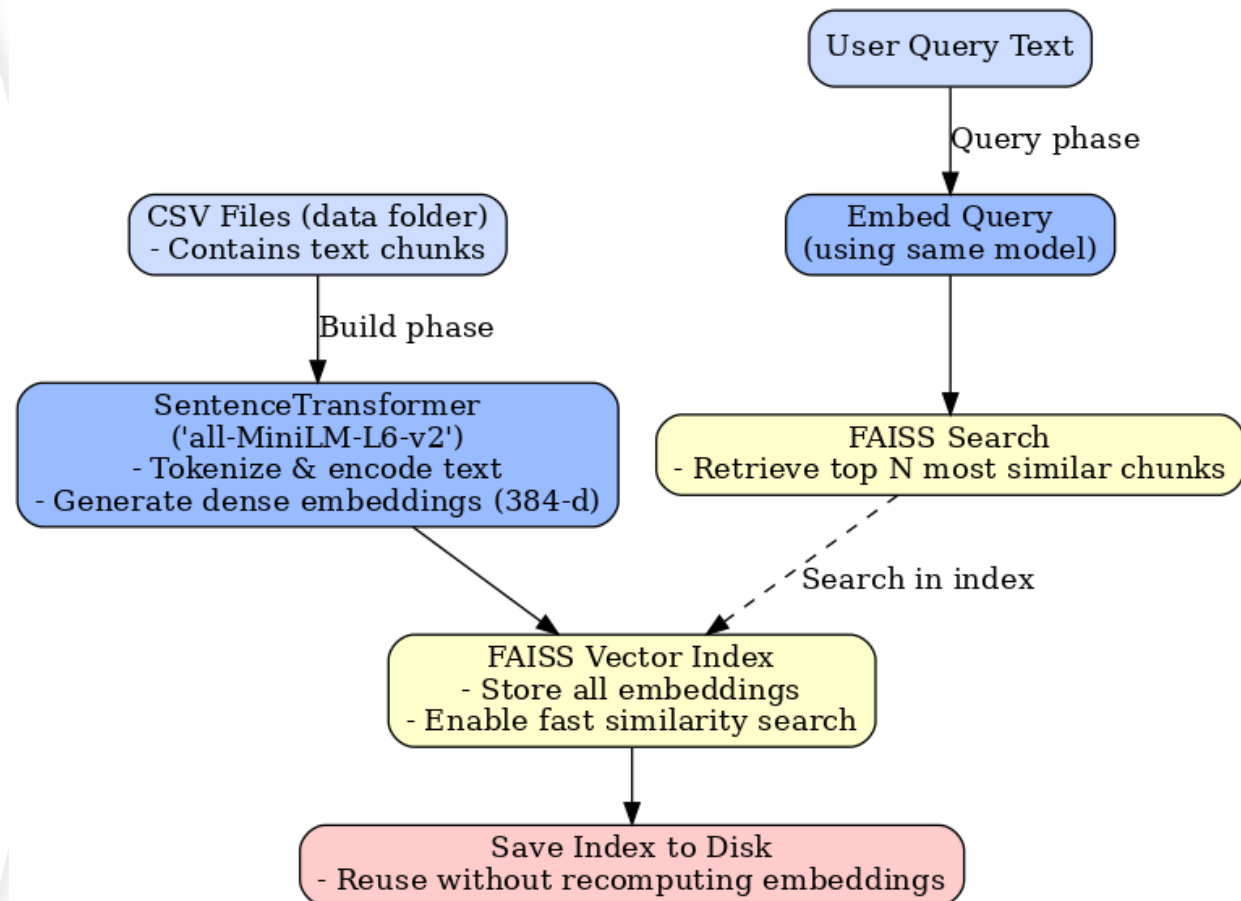
Softmax → get probabilities for each emotion.

Filter by threshold → return the label if confidence is high enough, else None.



Search Engine NLP Pipeline

- **Text Acquisition** → Read human language from CSV files.
- **Text Encoding** → Use SentenceTransformer (all-MiniLM-L6-v2) to map text to semantic embeddings.
- **Vector Space Storage** → Store embeddings in FAISS for efficient semantic similarity search.
- **Semantic Retrieval** → When queried, return chunks closest in meaning to the query text.



Why It Matters – Impact

Social: Supports students 24/7 and provides mental health safety net

Economic: Reduces workload for advisors, speeds up responses

Industrial: Tech adaptable to mental health chatbots, tutoring, customer support

Challenges & Lessons Learned

Model loading and
path issues

Data cleaning for
mixed-format
sources

Balancing cost vs
accuracy for
OpenAI vs local
models

Importance of
modular,
explainable
components

Next Steps

Integrate

Integrate with real student portal



Expand

Expand knowledge base to cover more topics



Add

Add analytics dashboard for advisors



Support

Support multiple languages

Demo



Student Support Chatbot

You

Hi, I'm trying to figure out how to pay my tuition fees.



Lulu

Student Success Advisor

You can make a payment through one of three options: 1. Student Portal: You can log in to your Student Portal and go to the "Financial" tab, then select "Program Fees Payment". This option accepts credit card payments. 2. Web Banking: You can use your Mobile Banking App to add College College as a payee and use your Student ID as the account number. 3. Flywire or Convera (international funds): If you're an international student, you can find more information on our website under "International" > "Apply to College" > "Fees and payment" > "Payment options". You can also check your invoice and make a payment by going to the "My Fees" tab in the Student Portal. Please note that online banking payments must be received by the payment due date, and payments received after the stated due date will be assessed a late fee of \$150. Additionally, you may want to consider setting up a Payment Schedule if you're eligible (students in Level 2 or higher can opt into this). This allows for 50% of the fees to be paid by the due date, with the remaining 50% due three days before classes start. A fee applies for opting into this schedule. Let me know if you have any further questions!