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INSTITUTE OF SYSTEMS SCIENCE

TalkToMe User Guide

Practical Language Processing

Practice Module

Semester Two 2021/2022

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1 Objectives

The objective of this document is to provide an overview of TalkToMe, An Emotional Detection and Psychological Support Chatbot, and its necessary information to use the application. The manual assumes that the reader has sufficient understanding on system implementation, machine learning, programming language (Python), and natural language processing.

2 Scopes

The high-level scope of the user guide will encompass THREE (3) sections:

1. System Overview
2. Installation and Configuration
3. User Manual (Use Case)

3 System Overview

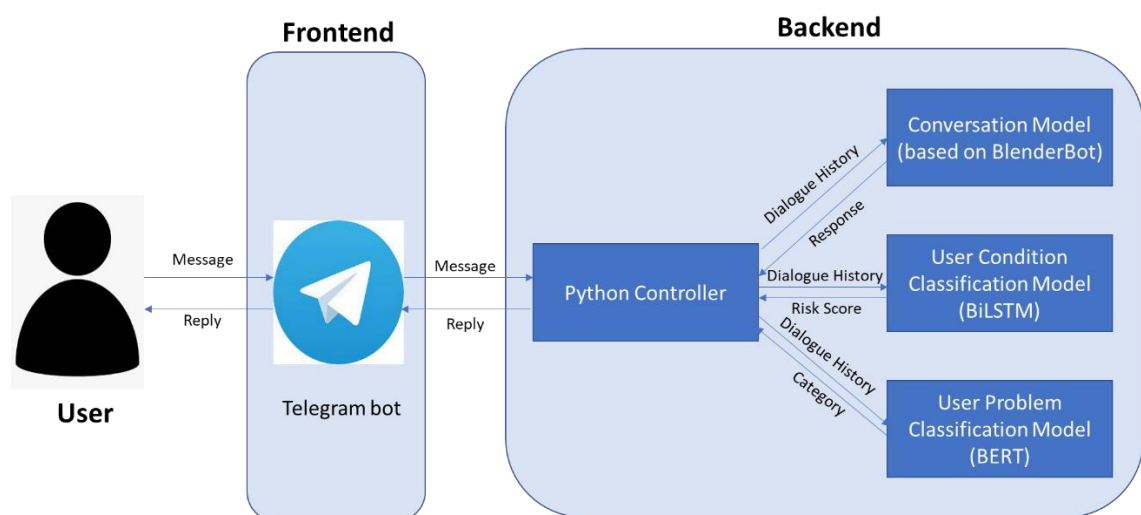


Figure 1 System Overview

Figure 1 shows the system architecture diagram for TalkToMe. Following are the components used in TalkToMe.

1. Telegram Bot – Chat Messaging Platform for interaction between TalkToMe and users. It sends user messages to the backend for processing and return the responses from TalkToMe to users.
2. Conversation Model – BlenderBot model uses to support the general conversation between TalkToMe and users by generating the text response based on the user utterances and session dialogue history

3. User Condition Classification Model – Bi-LSTM model uses to predict the users' probability of having self-harm by generating a risk score between 0 to 1 (more than 0.5 categorized as high)
4. User Problem Classification Model – BERT model uses to predict the category of the users' problem including emotional, work, partner relationship, friendship, school, family and others.

4 Installation

4.1 Requirements

Description	Specification
Hardware	Computer with NVIDIA graphic card supporting cuda
OS / Software	OS: Windows / Linux / MacOS Software: Python 3.x
Packages	All packages needed are included in requirements.txt. You may install using "pip install -r requirements.txt"

4.2 Front-End Setup and Configuration

4.2.1 Generate Telegram Token (Initial)

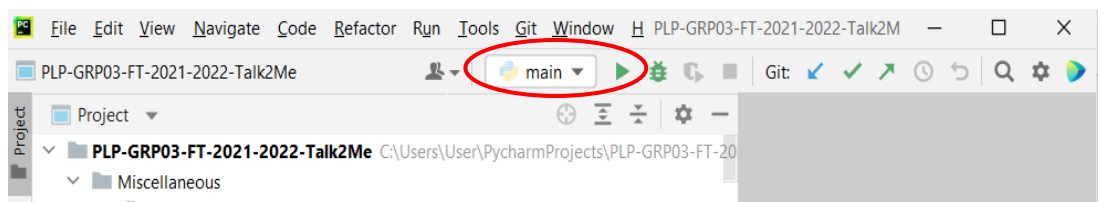
Telegram token or key is managed by *BotFather*, the token is required to connect between backend server and telegram. Below are the steps to obtain the telegram token.

No	Steps
1	Go to your Telegram account, and type BotFather in the search bar.
2	Click command /newbot to create a new bot
3	Type a name and username for your bot. If the username is already taken, BotFather will prompt you to change to another available username
4	After successfully choose a username, BotFather will provide the Telegram token along with other information.
5	Save the token and input into the backend script (refer to 4.6)
6	In the BotFather chat window, you may also click /setcommands to change the list of commands

TalkToMe chatbot has been created, users may directly access the chatbot by searching **@Talk2me_plp_bot** in the Telegram.

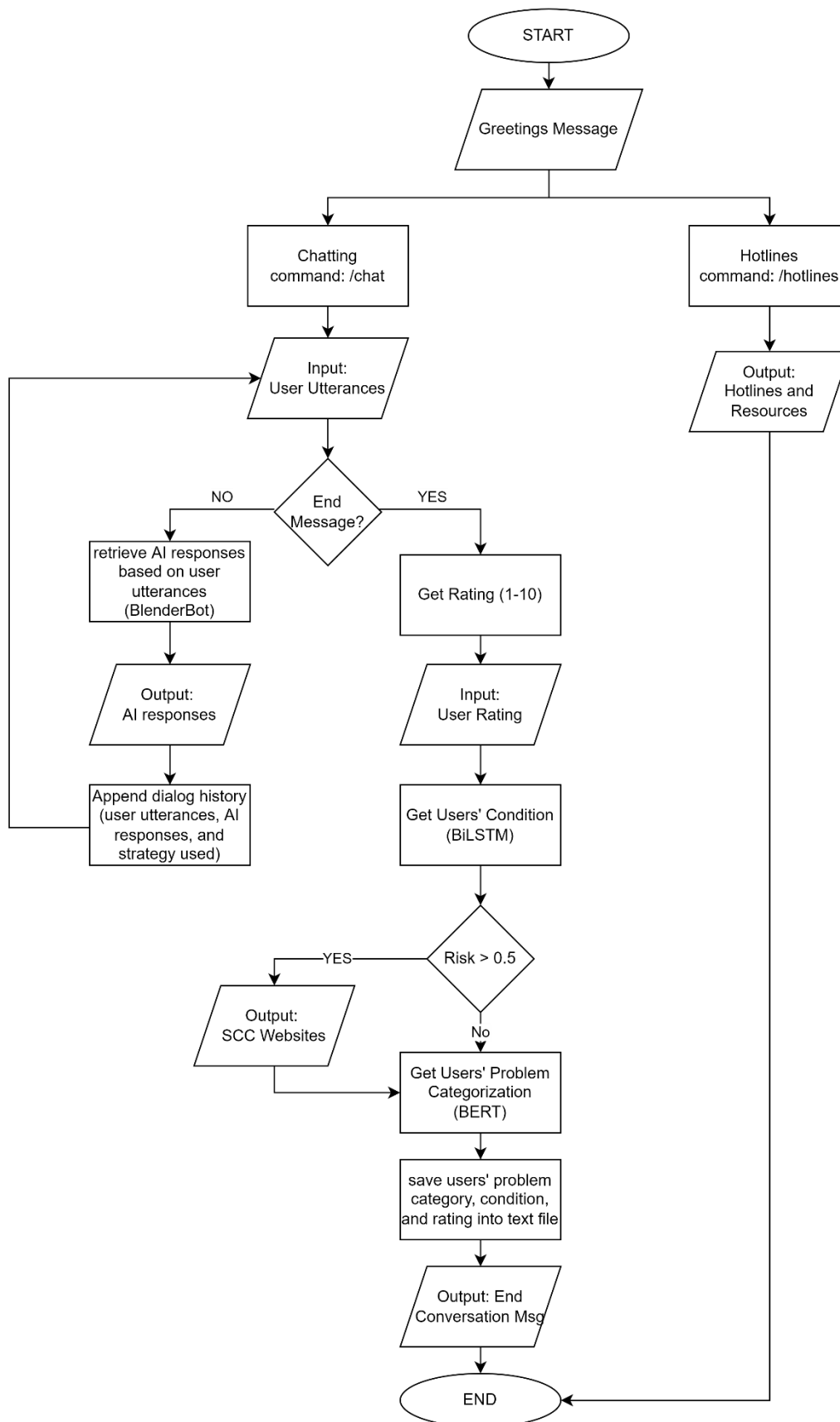
4.3 Backend Server Setup and Configuration

No	Steps
1	Use 'git clone' command to download the project from the following URL: https://github.com/mediana-medy/PLP-GRP03-FT-2021-2022-Talk2Me.git
2	Install the packages required using the "pip install -r requirements.txt"
3	Download the following model and checkpoint from Google Shared Drive ¹ : <ul style="list-style-type: none">• problem_bert.pt model (users' problem classification model, BERT)• pytorch_model.bin (conversation model, BlenderBot)• epoch-1.bin (conversation model checkpoint, BlenderBot after training)
4	Copy problem_bert.pt to folder SystemCode/problem/
5	Copy pytorch_model.bin to folder SystemCode/TrainingCode/ConversationModel/Blenderbot_small-90M/
6	Copy epoch-1.bin to folder SystemCode/conversation/checkpoint_/
7	Run main.py Working Directory: PLP-GRP03-FT-2021-2022-Talk2Me/SystemCode



¹ <https://drive.google.com/drive/folders/1BI9YKyL3kcCkyzXQ8ujgSVzVob9LvU4?usp=sharing>

5 User Guide



5.1 Use Case Overview

TalkToMe provides 2 commands, chatting and hotlines as shown in Figure 4. In chatting mode, TalkToMe aims to chat with users who are feeling down and need someone to talk to or get comfort. It converses with users continuously using 8 strategies including question, restatement or paraphrasing, reflection of feelings, self-disclosure, affirmation and reassurance, information, providing suggestions and others, until users end the conversation with END_PHRASES like “quit”, “end” or “bye”.

Upon ending the conversation, TalkToMe request users to provide overall rating with regards to the system from 1 to 10 (bad to excellent). TalkToMe also perform text classification to predict the users’ condition and problem categories using Bi-LSTM and BERT model respectively. When the users are in high-risk condition, it will output professional counselling centre website, SCC. The information regarding the rating, users’ condition and categories are saved as a text file in the system for further analysis and insights.

The second mode that users may perform with TalkToMe is hotlines. As shown in Figure 6, when user type /hotlines or click on the /hotlines command in the menu bar, TalkToMe responds with the hotline and resources support that user may refer to, including National Care Hotline, Mental Well-Being, Violence or Abuse, TOUCHline (Counselling), etc.

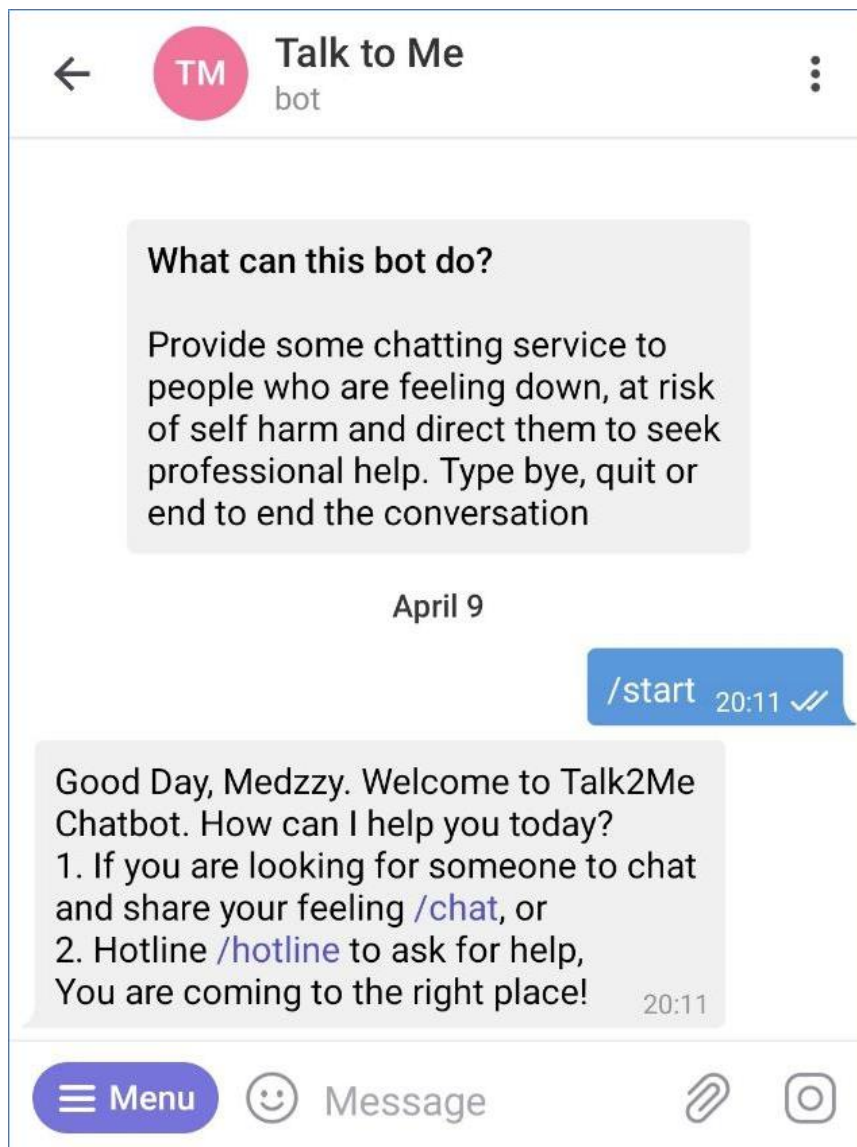


Figure 3 TalkToMe Introduction and Start Message

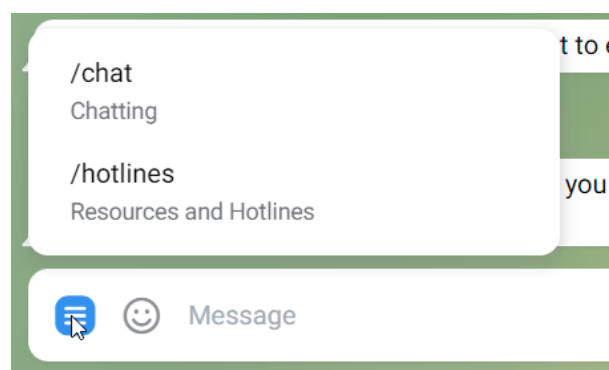


Figure 4 Two Commands/Modes: Chatting and Hotlines Retrieval

5.2 Chatting Mode

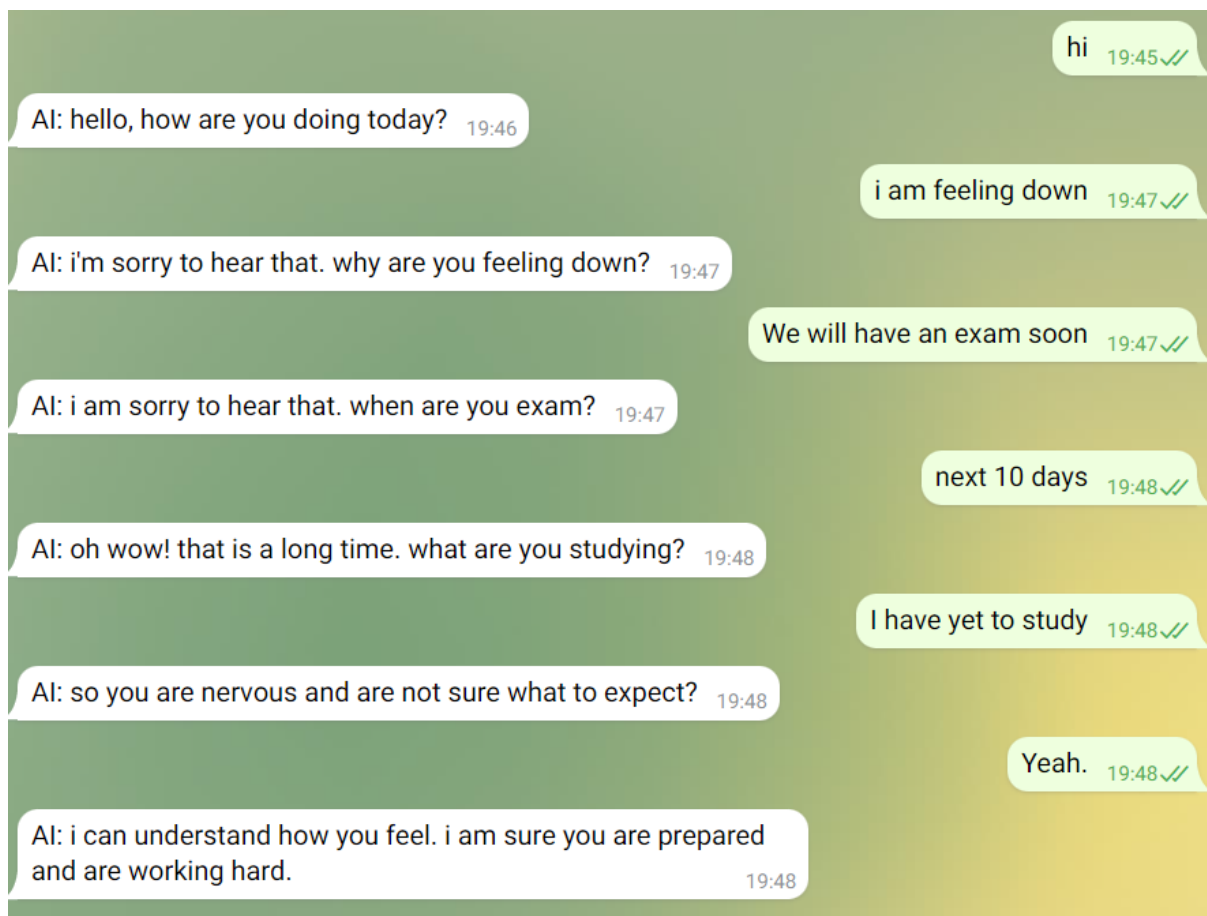


Figure 5 TalkToMe Chatting Mode

5.3 Hotlines

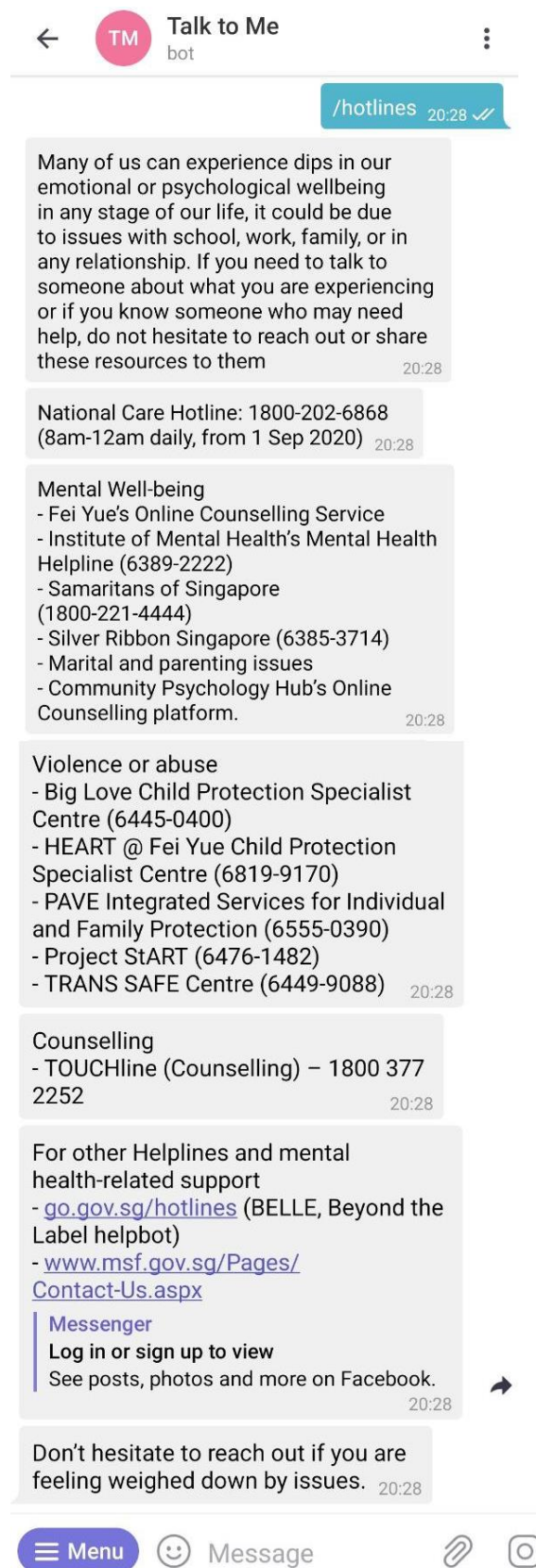


Figure 6 Retrieve Hotlines and Resources

```

1 username, condition_type, risk_score, feedback
2 Medzzy, friendship, 0.032313105, 7
3 Medzzy, relationship, 0.6609159, 8
4 Medzzy, relationship, 0.25677308, 7
5 Medzzy, relationship, 0.25677308, 6
6 katmsmw, friendship, 0.006685709, 8
7 sarahh_sy, friendship, 6.734532e-05, 9
8 sarahh_sy, friendship, 0.85455924, 7
9 sarahh_sy, friendship, 0.000120161, 8
10 sarahh_sy, friendship, 0.03770089, 6
11 sarahh_sy, relationship, 0.0024466119, 5
12 sarahh_sy, friendship, 0.0016224032, 6
13 sarahh_sy, friendship, 0.024175035, 8
14 sarahh_sy, school, 1.44820415e-05, 8
15

```

Figure 7 insight_data.txt storing information for further analysis and improve the chatbot

```

1 import time
2 import re
3 import telepot
4 from telepot.loop import MessageLoop
5 from config import *
6 from conversation.conv.interact import *
7 from SystemCode.condition.condition_inference import get_risk
8 from SystemCode.problem.problem_inference import get_problem

```

```

{ 'sarahh_sy': [ { 'text': '/chat', 'speaker': 'usr', 'text': 'hello! how are you doing today?', 'speaker': 'sys', 'strategy': 'Restatement or Paraphrasing', 'text': 'I
AI: you are studying plp? what is plp for?
text private 30746995 sarahh_sy practical language processing
{ 'sarahh_sy': [ { 'text': '/chat', 'speaker': 'usr', 'text': 'hello! how are you doing today?', 'speaker': 'sys', 'strategy': 'Restatement or Paraphrasing', 'text': 'I
AI: that is a great way to put it!
text private 30746995 sarahh_sy yes, thank you
{ 'sarahh_sy': [ { 'text': '/chat', 'speaker': 'usr', 'text': 'hello! how are you doing today?', 'speaker': 'sys', 'strategy': 'Restatement or Paraphrasing', 'text': 'I
AI: i am in the same boat as you. i can relate to it being a very stressful time.
text private 30746995 sarahh_sy quit
{ 'sarahh_sy': [ { 'text': '/chat', 'speaker': 'usr', 'text': 'hello! how are you doing today?', 'speaker': 'sys', 'strategy': 'Restatement or Paraphrasing', 'text': 'I
text private 30746995 sarahh_sy 8
{ 'sarahh_sy': [ { 'text': '/chat', 'speaker': 'usr', 'text': 'hello! how are you doing today?', 'speaker': 'sys', 'strategy': 'Restatement or Paraphrasing', 'text': 'I
2022-04-11 16:46:34.986159: I tensorflow/core/platform/cpu_feature_guard.cc:142] This TensorFlow binary is optimized with oneAPI Deep Neural Network Library (oneDNN) to u
To enable them in other operations, rebuild TensorFlow with the appropriate compiler flags.
2022-04-11 16:46:35.547359: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1510] Created device /job:localhost/replica:0/task:0/device:GPU:0 with 1607 MB memory: ->
WARNING:tensorflow:Layer lstm_7 will not use cuDNN kernels since it doesn't meet the criteria. It will use a generic GPU kernel as fallback when running on GPU.
WARNING:tensorflow:Layer lstm_7 will not use cuDNN kernels since it doesn't meet the criteria. It will use a generic GPU kernel as fallback when running on GPU.
WARNING:tensorflow:Layer lstm_7 will not use cuDNN kernels since it doesn't meet the criteria. It will use a generic GPU kernel as fallback when running on GPU.
2022-04-11 16:46:35.961833: I tensorflow/compiler/mlir/mlir_graph_optimization_pass.cc:185] None of the MLIR Optimization Passes are enabled (registered 2)
problem, risk_score: school 1.44820415e-05 8
AI: Feel free to come chat with me again anytime!

```

Figure 8 Users' Condition Risk Score (output counselling centre information for reference when risk>0.5)