

SENTIMENT ANALYSIS AND PERSONALIZED MESSAGING FOR CLINICAL TRIAL ON REDDIT

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<https://github.com/Devsharma1375/CLINICAL-TRAILS-REDDIT-RESPONSE-MODEL>

PROJECT SETUP INSTRUCTION:

- Install Python from the official Python website if not already installed.
- Install required libraries using pip: praw, nltk, and openai.
- Download the VADER lexicon using nltk in a Python environment.
- Obtain Reddit API credentials (client ID, client secret, user agent) and OpenAI API key from their respective platforms.
- Update the subreddit_names list in the code with relevant subreddits as per your choice related to clinical trials.

METHODOLOGY:

1. Scraping Reddit Data:

- Utilized the Python library PRAW (Python Reddit API Wrapper) to access Reddit's API.
- Defined a function to scrape posts from specified subreddits related to clinical trials.
- Extracted relevant information such as post titles, bodies, authors, and subreddit names for analysis.

2. Sentiment Analysis:

- Employed NLTK's VADER SentimentIntensityAnalyzer to perform sentiment analysis on the scraped post bodies.
- Classified the sentiment of each post as positive, negative, or neutral based on sentiment scores.
- Used sentiment analysis results to gauge user opinions and receptiveness towards clinical trials.

3. Message Generation:

- Leveraged OpenAI's API to generate personalized messages aimed at users based on their sentiment towards clinical trials.
- Incorporated user-specific context from the posts to create engaging and relevant messages.
- Messages were designed to encourage participation in clinical trials while respecting user sentiments.

CHALLENGES FACED:

1. Playing with PRAW: Unlocking Reddit's Treasure Trove

- Navigating the intricacies of PRAW (Python Reddit API Wrapper) to access Reddit's vast repository of data.
- Overcoming learning curves and mastering PRAW functionalities to effectively scrape relevant information from subreddits.

2. API Limits: The Battle Against Rate Restrictions!

- Strategizing and managing API calls to avoid hitting rate limits imposed by Reddit and other APIs.
- Implementing efficient code structures to optimize API usage and maximize data retrieval while staying within the limits.

3. Message Generation: Crafting Persuasive and Personalized Content

- Harnessing the power of AI to generate compelling and tailored messages for Reddit users.
- Balancing the tone, content, and context of messages to engage users positively and encourage participation in clinical trials.

4. Researching for Subreddits: Navigating the Sea of Communities

- Delving into Reddit's diverse ecosystem to identify and select subreddits relevant to clinical trials.
- Conducting thorough research to ensure the chosen subreddits align with the project's objectives and target audience.

“Embarking on Reddit for clinical trials was like exploring a bustling city; finding the right subreddit, navigating ethical paths, and dodging API dragons felt exhilarating. Crafting messages was akin to brewing magical potions – mixing humour, persuasion, and empathy. With newfound confidence, navigating Reddit became a delightful adventure, sprinkled with witty remarks and cheeky smiles, ready to gather valuable insights for clinical trials. ”

EXAMPLE OF SCRAPED DATA AND ANALYSIS USING SIA :

subreddit	title	body	positive	negative	neutral
Symptoms	r/Symptoms needs moderators and is current	If you're interested and willing to moderate and	0.148	0	0.852
Symptoms	Is this a sore throat?	Last Monday, I woke up regularly and all of a su	0.055	0.074	0.871
Symptoms	Sudden onset of nausea and dry mouth	I have to breath at a controlled rate to make it	0.149	0.194	0.657
Symptoms	Chest pain!	It's not a lingering chest pain they last like 1 sec	0.091	0.15	0.759
Symptoms	Could you please tell me what it is?	I am 15 years old. Athlete hitting the gym 4	0.158	0.038	0.804
Symptoms	Chest and back pain for several days	I have been experiencing chest tightness along	0.054	0.156	0.79
Symptoms	Occasionally blurred vision with headaches.	I get blurred vision right out of the blue.	0.125	0.13	0.745
Symptoms	I think I may have some minor food poisoning	Extremely dry mouth: If I don't have water	0.048	0.094	0.858
Symptoms	Can't eat anything, dizzy, for months	[deleted]	0.217	0	0.783
Symptoms	What happened?	So I was sitting on a stool and my ears felt plugg	0.046	0.069	0.885
Symptoms	Swollen lymph node in armpit .	Hi I have a swollen lymph node under my armpit	0	0.061	0.939
Symptoms	I go light headed and sometimes have spasms	So I get this quite often.	0.146	0	0.854
Symptoms	FULL BOOK "Anniversaries by Uwe Johnson"	Ryan Montoya	0	0	1
Symptoms	FULL BOOK "The Waters of Kronos by Conrad	Nikkirj Senthilkumar	0.086	0	0.914
Symptoms	My fingers won't stop shaking!	I'm 20 F and my hands won't stop shaking. Its	0.164	0.128	0.708
psychology	Weekly Discussion Thread	# Welcome to the	0.078	0.116	0.806
psychology	HPPD or other causes?	Hi all, I recently stumbled across a snapchat	0.078	0.163	0.759
psychology	Has anyone watched "The Cereal Martha" inter	I'm curious what the psych community think	0.102	0	0.898
psychology	Weekly Discussion Thread	# Welcome to the	0.078	0.116	0.806
psychology	Psychological Research/Surveys Thread	# Welcome to the	0.048	0.103	0.849
psychology	Reading The Sociopath Next Door where the	The author, Martha Stout, is incredibly	0.136	0.123	0.741
psychology	Weekly Discussion Thread	# Welcome to the	0.078	0.116	0.806
psychology	"Like a film in my mind": hyperphantasy		0	0	1
psychology	Weekly Discussion Thread	# Welcome to the	0.078	0.116	0.806
psychology	Weekly Discussion Thread	# Welcome to the	0.078	0.116	0.806
psychology	Genetic variations help explain the link betwe	*..."Within families, a sibling with a higher IQ	0.171	0	0.829
psychology	Weekly Discussion Thread	# Welcome to the	0.078	0.116	0.806
depression	Life is so damn hard	I just want to know I'm not alone honestly unus	0.311	0.124	0.565
depression	Can't take being this loser any longer, at 33 y	I can't take this any longer, at 33 I feel this	0.116	0.194	0.69
depression	Working	It's hard to be depressed if I'm always working s	0.137	0.187	0.676
depression	Just want to say that May has been shit so fa	If it can go wrong, it will go wrong ðŸ™•	0.031	0.306	0.664
depression	trying so hard not to self harm	16f and i had a severe panic attack today becau	0.218	0.291	0.491
depression	Fallen back into deep depression after loosin	Hi, I havent made any reddit posts in awhile.	0.17	0.242	0.588
depression	Treatment Resistant Depression: What do yo	My husband suffers from extremely severe	0.096	0.137	0.767
depression	How to still do your job when dealing with de	Going through a rough patch with depression	0.048	0.083	0.869
depression	Overthinking	All I want is someone that cares enough and	0.181	0.06	0.76
depression	How someone gets diagnosed for Depression	I mean what are the symptoms, how they check	0	0.188	0.812
depression	How did this rejection make me absolutely h	I've been 6 months and I still cry about it! I	0.069	0.293	0.638
depression	Feeling extremely depressed after car accide	The accident was 100% my fault. i don't	0.093	0.228	0.679
depression	Please, just one advice, please!!?	Hello to everyone!	0.097	0.182	0.721
depression	I want to starve myself	My mom is always telling me everyone loves th	0.192	0.17	0.639
depression	Hey, does it do it too you too ?	Hi, I've been diagnosed depressive at 8 and i'm	0.147	0.177	0.675
depression	I feel very empty and lonely even though I ha	(F19) am struggling with depression and have	0.232	0.107	0.66
depression	i dont think my gf still cares - as i, TW as i,	so i opened up to her how I was harming myself	0.131	0.092	0.777
depression	I feel like such a bad person right now.	I don't even know where to start but I will try	0.107	0.131	0.763
depression	Nobody likes me why do I even bother	I can't even fucking talk to people. I go thro	0.159	0.237	0.603
depression	My pillow is starting to feel too real...	I put my own shirt and underwear on it just to	0.142	0.058	0.8
depression	It's getting bad again	I was finally starting to get my mental health st	0.104	0.233	0.663
depression	I'm Not Sure How To Feel	Ok so I was diagnosed with MDD (Major	0.11	0.178	0.712
depression	Why Do I Want To Be Hurt?	Ever since I was like 12-13 I started fantasizing	0.089	0.247	0.664
depression	I want to die. Idk why	I, 23M, have been dating, lg? 23M. Only a few v	0.054	0.266	0.68
depression	One step forward two steps back	I feel like anytime I start to feel happy with som	0.137	0.173	0.69
depression	Anxiety and depression.	So I just found out I've also got anxiety and	0.061	0.149	0.79
depression	i woke up today sad, i dont know why	i am diagnosed with depression but i havent	0.146	0.29	0.565
depression	How to make myself happy	I'm 22F and I don't know what to do to i	0.225	0.105	0.67

EXAMPLE OF MESSAGES:

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[Running] python -u "c:\Users\Dev Sharma\Desktop\reddit\tempCodeRunnerFile.python"
Post Title: How I keep positive in life
Sentiment: Positive
OpenAI Message: It's great that you're focusing on staying positive! Would you like to learn more about how clinical trials work and their potential benefits? Participating might offer new insights into maintaining a positive outlook.

Post Title: I feel like I'm so messed up💎just want advice or someone that can relate💎
Sentiment: Negative
OpenAI Message: It sounds like you're going through a tough time. Would you like to learn more about how clinical trials work and their potential benefits? Participating could connect you with support and strategies tailored to your experiences.

Post Title: How to prepare for death?
Sentiment: Neutral
OpenAI Message: Preparing for death can be a challenging topic. Would you like to learn more about how clinical trials work and their potential benefits? Participating could offer insights into end-of-life care and support research in this area.

Post Title: How can I change my personality
Sentiment: Neutral
OpenAI Message: Exploring changes in personality is a personal journey. Would you like to learn more about how clinical trials work and their potential benefits? Participating might provide insights into behavior modification techniques.

Post Title: When will it end?
Sentiment: Negative
OpenAI Message: It sounds like you're feeling overwhelmed. Would you like to learn more about how clinical trials work and their potential benefits? Participating could offer new perspectives and support during challenging times.

Post Title: I do everything to improve in life. I do my best to make myself happy. I overcame so much but no matter what I do, I end up in the same place as before.
Sentiment: Neutral
OpenAI Message: It's commendable that you're dedicated to self-improvement. Would you like to learn more about how clinical trials work and their potential benefits? Participating might offer new strategies for overcoming obstacles.

Post Title: Destructive binge-procrastination lasting several days
Sentiment: Negative
OpenAI Message: Dealing with binge-procrastination can be challenging. Would you like to learn more about how clinical trials work and their potential benefits? Participating might provide insights into behavior management techniques.
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Post Title: I do everything to improve in life. I do my best to make myself happy. I overcame so much but no matter what I do, I end up in the same place as before.
Sentiment: Neutral
OpenAI Message: It's commendable that you're dedicated to self-improvement. Would you like to learn more about how clinical trials work and their potential benefits? Participating might offer new strategies for overcoming obstacles.

Post Title: Destructive binge-procrastination lasting several days
Sentiment: Negative
OpenAI Message: Dealing with binge-procrastination can be challenging. Would you like to learn more about how clinical trials work and their potential benefits? Participating might provide insights into behavior management techniques.

Post Title: Everything seems so calm now that I've made my decision
Sentiment: Positive
OpenAI Message: It's great that you're feeling calm after making a decision! Would you like to learn more about how clinical trials work and their potential benefits? Participating could offer new experiences and contribute to medical advancements.

Post Title: I'm just so tired and scared
Sentiment: Negative
OpenAI Message: Feeling tired and scared is tough. Would you like to learn more about how clinical trials work and their potential benefits? Participating could connect you with resources and support to help manage these feelings.

Post Title: Baby birds died in my care
Sentiment: Negative
OpenAI Message: Dealing with loss, especially when caring for animals, can be difficult. Would you like to learn more about how clinical trials work and their potential benefits? Participating might offer distraction and contribute to meaningful research.

Post Title: Idk what to do
Sentiment: Negative
OpenAI Message: Uncertainty can be overwhelming. Would you like to learn more about how clinical trials work and their potential benefits? Participating could provide new insights and opportunities for learning.

Post Title: It sucks how I get treated over things I can't even control.
Sentiment: Negative
OpenAI Message: It's frustrating to be treated unfairly. Would you like to learn more about how clinical trials work and their potential benefits? Participating could empower you and contribute to research on human behavior.
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ETHICAL CONSIDERATIONS

1. **User Privacy:** Respecting Reddit's policies and users' privacy by anonymizing data and avoiding the collection of personally identifiable information (PII).
2. **Data Use:** Ensuring ethical data use by limiting data scraping to public information and refraining from accessing restricted or private content.
3. **Informed Consent:** Upholding transparency and obtaining informed consent when interacting with Reddit users, especially regarding data collection and message generation.
4. **API Limits:** Adhering to API usage limits to avoid disrupting Reddit's services or violating their terms of use.
5. **Message Tone:** Messages were crafted with the utmost care to ensure they did not hurt anyone's personal sentiments. The tone was respectful, informative, and empathetic, aiming to engage users positively without causing offense or discomfort. Special attention was given to avoid coercive language or content that could be perceived as insensitive or misleading, ensuring ethical communication throughout the process.

GITHUB LINK OF THE REPOSITORY

<https://github.com/Devsharma1375/CLINICAL-TRAILS-REDDIT-RESPONSE-MODEL>

