

Empathetic Dialogue System



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Efficient Methods in Machine Learning (Master Project)






Goal

- Develop an Empathetic Dialogue System
 - Understand emotions from input
 - Generate an empathetic response





Current State

<input type="checkbox"/> 4 Open <input checked="" type="checkbox"/> 6 Closed		Author ▾	Label ▾	Projects ▾	Milestones ▾	Assignee ▾	Sort ▾
<input type="checkbox"/>	<input checked="" type="checkbox"/> Try out NanoGPT model weekly-goal					 1	
#10 by CallMeL was closed 2 hours ago 2 tasks done training-models							
<input type="checkbox"/>	<input checked="" type="checkbox"/> Choose models and datasets model						 5
#6 by CallMeL was closed 4 hours ago 3 tasks done set up the proje...							
<input type="checkbox"/>	<input checked="" type="checkbox"/> Large datasets in medical domain						
#4 by ryuruz was closed 5 days ago set up the proje...							
<input type="checkbox"/>	<input checked="" type="checkbox"/> Possible References						 2
#3 by sofiagermer was closed 5 days ago set up the proje...							
<input type="checkbox"/>	<input checked="" type="checkbox"/> Create a MLP for initial talk product					 1	 1
#2 by CallMeL was closed 4 hours ago create the intra...							
<input type="checkbox"/>	<input checked="" type="checkbox"/> Goal 1 - Set up the project						
#1 by CallMeL was closed 5 days ago 2 tasks done set up the proje...							

Milestones

🔗 4 Open ✓ 0 Closed		Sort ▼
set up the project 📅 Due by November 19, 2024 ⌚ Last updated about 5 hours ago We need to achieve: form the group set up the GitHub repository ch...(more)	<div><div></div></div> 100% complete 0 open 4 closed Edit Close Delete	
training-models 📅 Due by December 15, 2024 ⌚ Last updated 2 minutes ago	<div><div></div></div> 50% complete 3 open 3 closed Edit Close Delete	
create the intractable product 📅 Due by January 15, 2025 ⌚ Last updated about 5 hours ago user can interact with the trained model (query the model and get output)	<div><div></div></div> 100% complete 0 open 1 closed Edit Close Delete	
Presentations and documentation 📅 Due by January 31, 2025 ⌚ Last updated 2 days ago <ul style="list-style-type: none">3 talksFinal report	<div><div></div></div> 0% complete 1 open 0 closed Edit Close Delete	



Data - 1



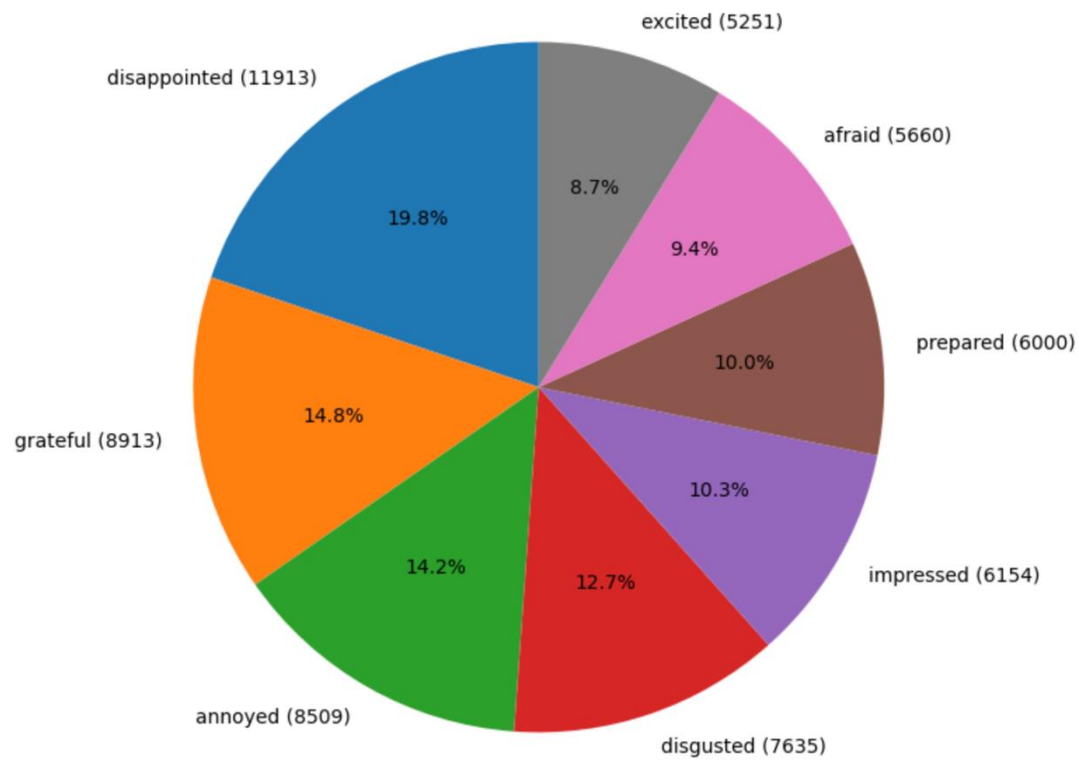
A dataset of 69k conversations grounded in emotional situations to facilitate training and evaluating dialogue systems

id	Situation of the Chat	Emotion of the Chat	Dialogues between customer and agent	Labels: Agent answer to customer
32958	i knew i shouldnt have trusted my brother with my dog	trusting	I knew i shouldnt have trusted my brother with my dog	Why? What happened? I hope it was nothing really bad.

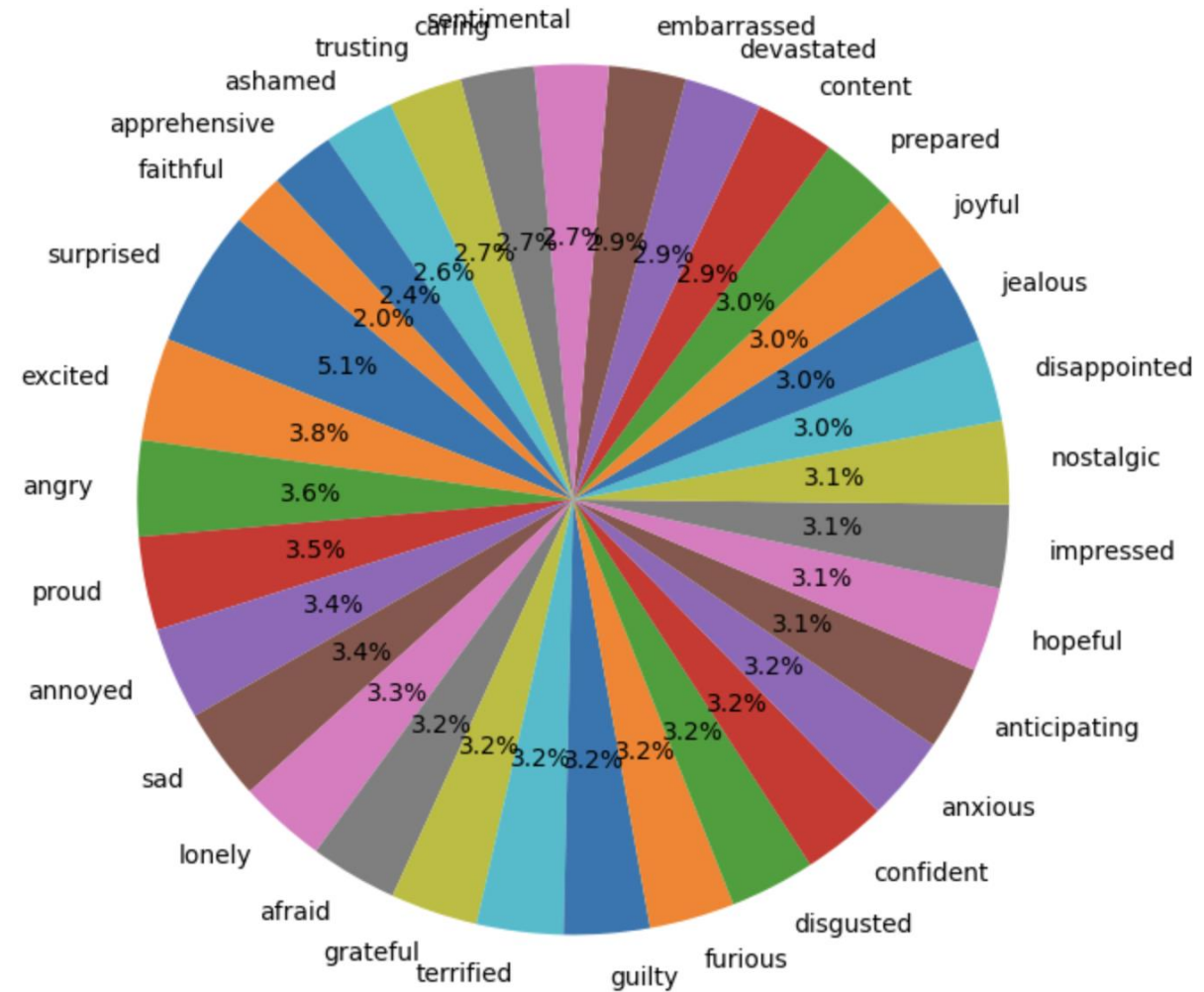


Data - 2

Emotion Group Distribution

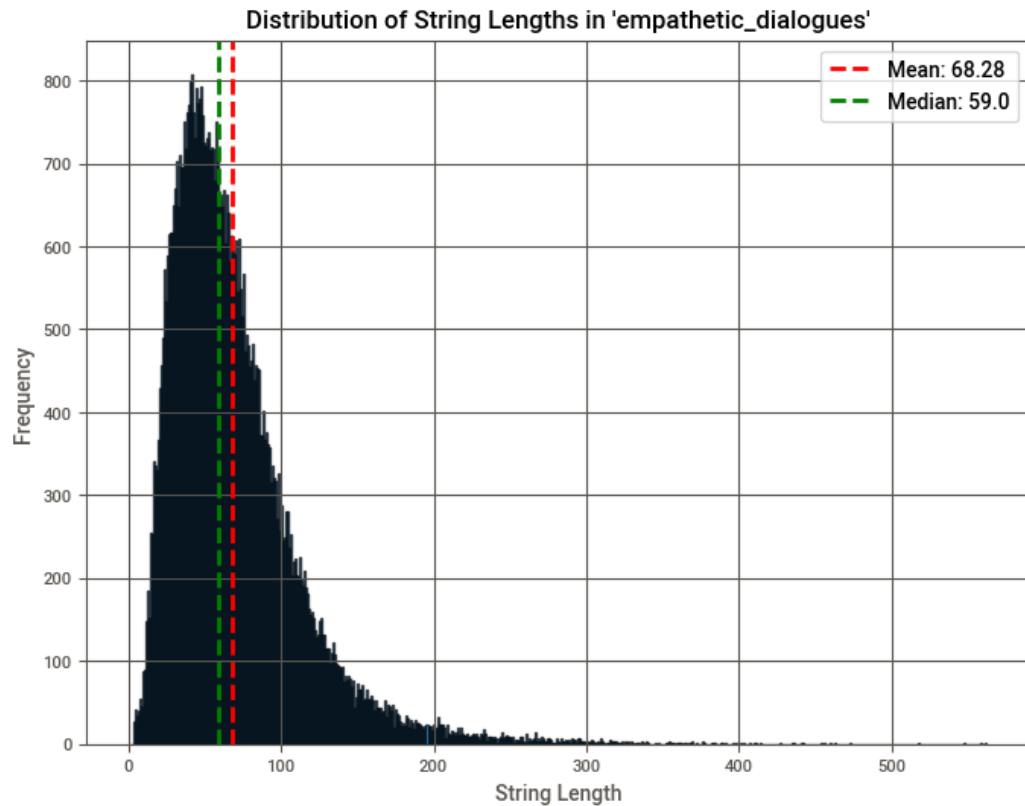


Distribution of Emotions

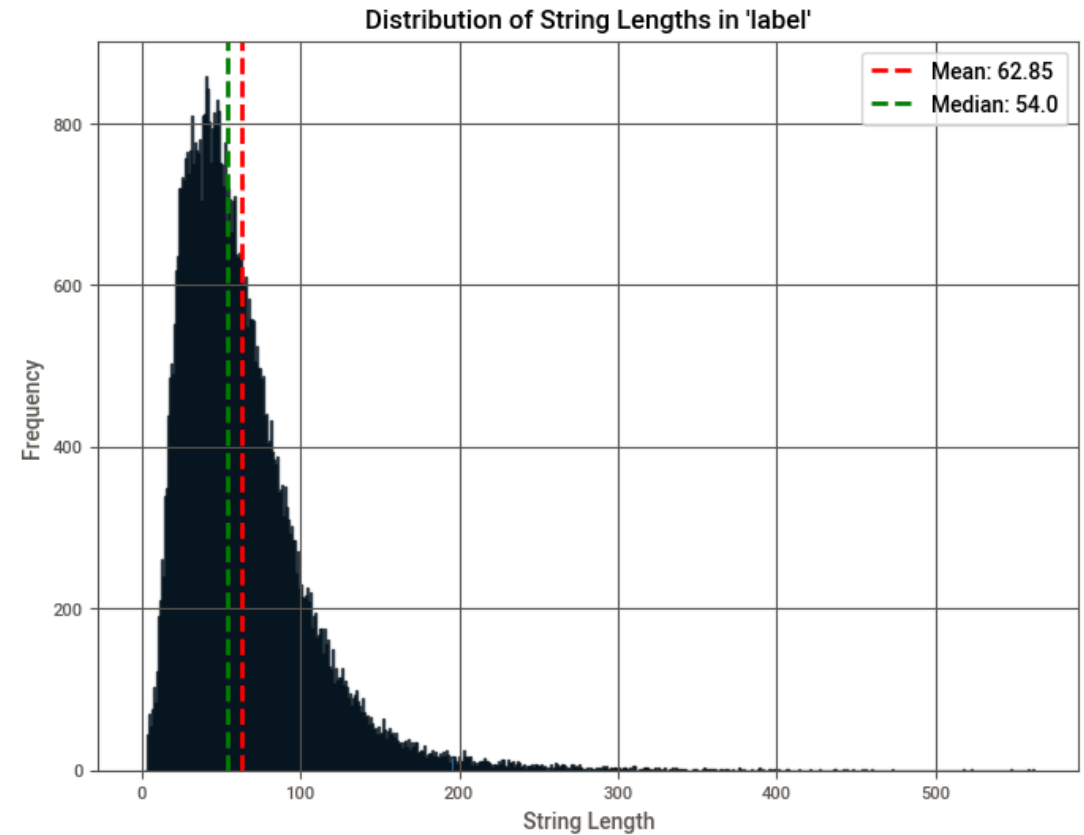




Data - 2



Customer String Length



Advisor String Length



Model



- Use NanoGPT, a lightweight GPT implementation: 85,000 parameters
- Trained from scratch on the Empathetic Dialogues dataset
- We will try to change the structure of the model after we have the basic one

MLP DEMO

Empathetic Dialogue Chatbot

S

I am a empathetic intelligent assistant providing support to you

Ask a health question...





Evaluation

Quantitative Metrics

- BLEU Score (Bilingual Evaluation Understudy)
 - AVG BLEU: average of BLEU-1,-2,-3,-4.
 - PPL: perplexity

Qualitative Assessments

- Human evaluations for:
 - Empathy
 - Coherence of responses

User Input:

I've been feeling really lonely these days.

Reference Response:

"I'm sorry to hear that. Loneliness can be tough. Do you want to talk about it?"

Bad Interaction:

"That's interesting. Tell me more about your hobbies."





Good Interaction:

"I'm sorry to hear that. Loneliness can feel overwhelming sometimes. I'm here if you want to talk."



Next Steps

- Preprocess the dataset
- Implement Evaluation Metrics
- Understand the Model (Nano-GPT)
- Discover if we need to pretrain our model on another dialogue dataset

Author ▾ Label ▾ Assignee ▾ Sort ▾			
🕒	Understand the Model (nanoGPT)		💬 1
	model weekly-goal		
	#15 opened 3 days ago by sofiagermer		
🕒	Implement Evaluation Metrics		💬 5
	model weekly-goal		
	#14 opened 3 days ago by sofiagermer		
🕒	Preprocess Dataset & Load		
	model weekly-goal		
	#13 opened 3 days ago by sofiagermer		
🕒	Initial Talk 13.11.2024		💬 3
	documentation		
	#7 opened last week by CallMeL		

References

- **Kiran, B. R., Thomas, D., & Parakkal, M. (2020).** [A survey on deep learning techniques for video anomaly detection.](#) *Computer Vision and Image Understanding*, 187, 102748.
- **Rashkin, H., Smith, E. M., Li, M., & Boureau, Y.-L. (2018).** [Towards Empathetic Open-domain Conversation Models: a New Benchmark and Dataset.](#) *arXiv preprint arXiv:1811.00207*.
- Facebook AI Empathetic Dialogues Dataset: <https://arxiv.org/abs/1811.00207>
- Kaggle Dataset: <https://www.kaggle.com/datasets/atharvjairath/empathetic-dialogues-facebook-ai>
- NanoGPT Repository: <https://github.com/karpathy/nanoGPT>