

# Twitter Sentiment Analysis Of Epidural Vs Non-Epidural Analgesia During Parturition

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## Introduction

To date, there have not been any studies that explore sentiment surrounding healthcare interventions, though there have been calls for this in the past.<sup>1</sup> This study aims to bridge the existing gap in the field by developing a sentiment analysis methodology tailored to healthcare interventions and subsequently applying this approach to assess the sentiment of tweets related to epidural analgesia during childbirth in comparison to non-epidural childbirth.

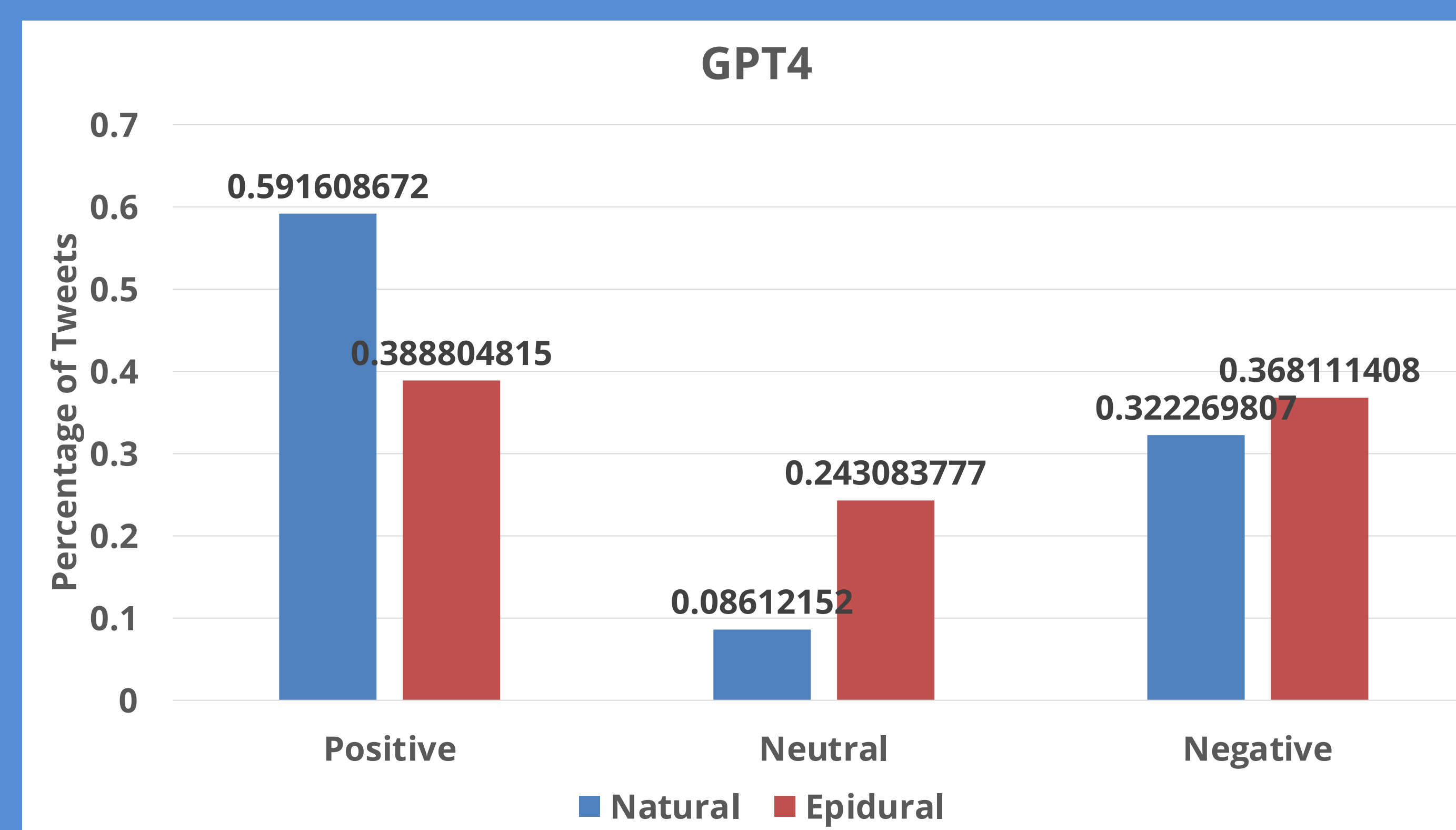
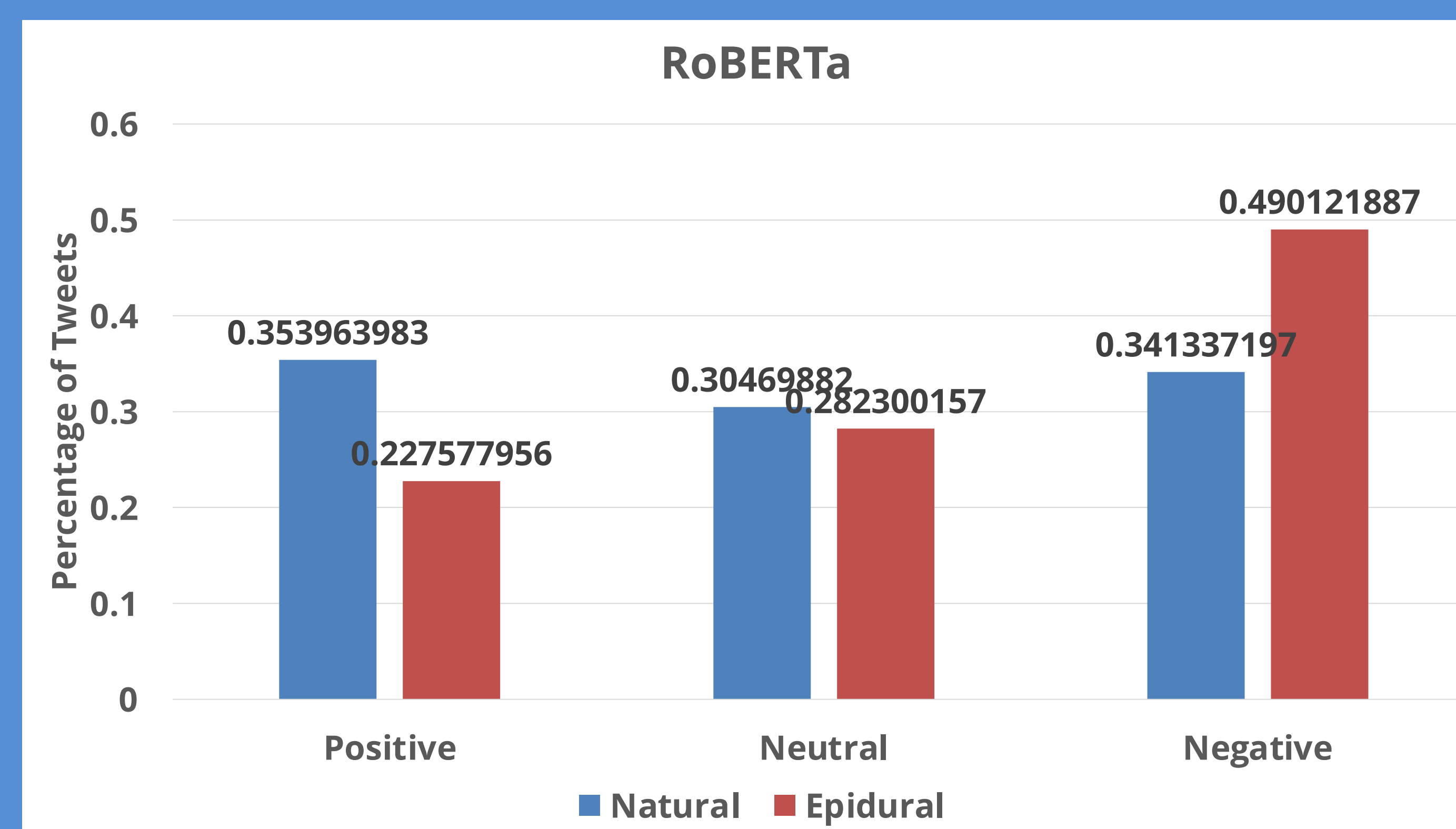
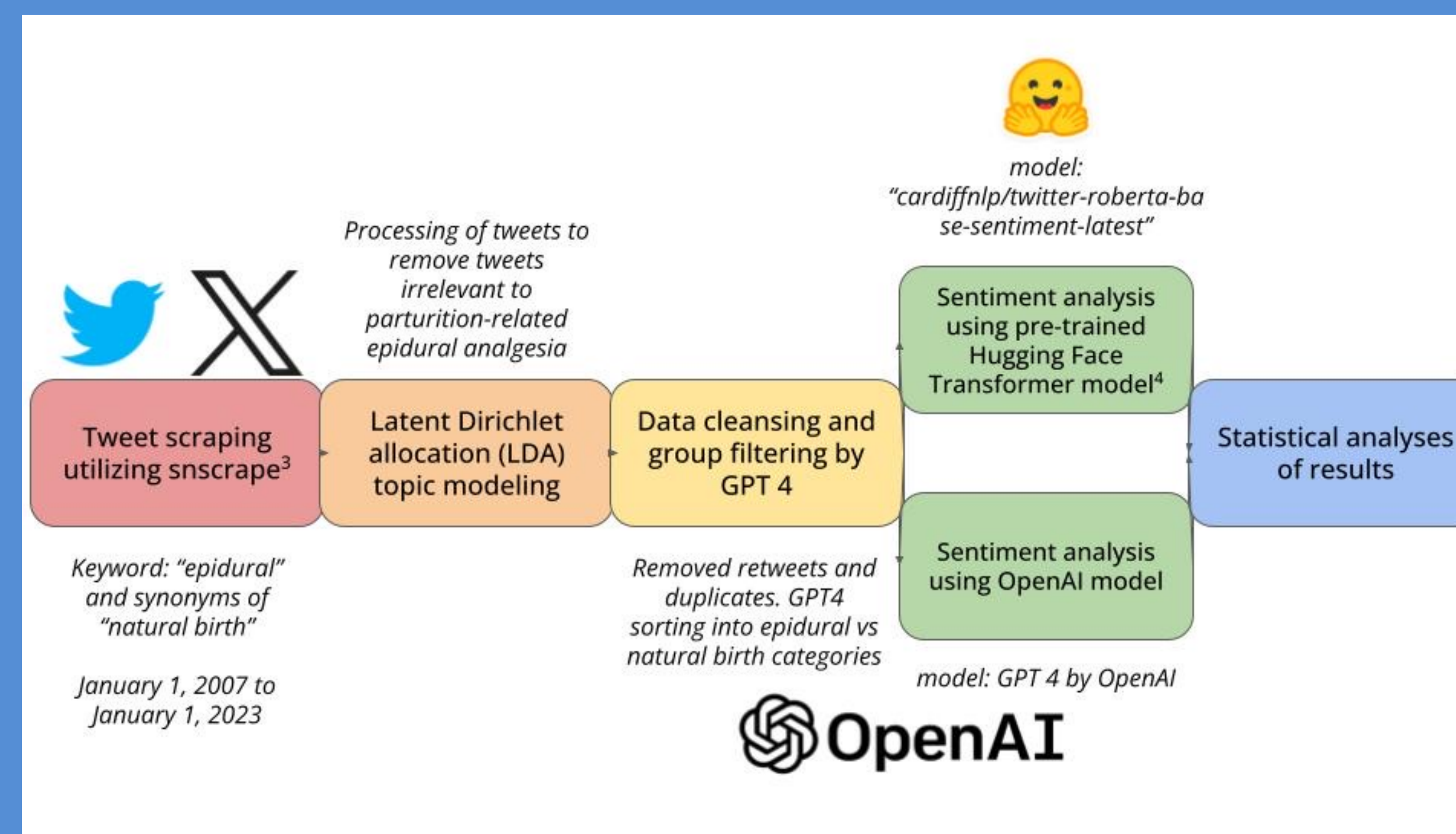
## Methods

Outline of methodology (**Figure 1**)

1. The Python platform was used in addition to sncraspe to collect Twitter data.<sup>2</sup>
2. The data was pre-processed and filtered using Latent Dirichlet Allocation.<sup>3</sup>
3. Further data-cleansing was performed and filtering into epidural vs natural birth was performed by OpenAI Generative Pre-Trained Transformer 4 (GPT4) API<sup>4</sup>.
4. Sentiment analysis by HuggingFace's Transformer model "twitter-roberta-base-sentiment-latest" (RoBERTa)<sup>5</sup> and GPT4 were performed.
5. Data Analysis

## Results

- Using SNS Scrape a total of 717,000 tweets were collected from a timeframe of January 1, 2007 to January 1, 2023.
- We generated multiple LDA models and selected the best model based on coherence score (0.502) and perplexity score (-7.800).
- Additionally, to remove epidural tweets unrelated to labor epidurals, we manually removed any tweets that had lexical matched keywords of "surgery," "stimulator," "steroid," and "block." After LDA and manual filtering, we were left with 431,524 tweets that pertained to topics involving epidural analgesia for labor and natural/unmedicated birth.
- The data was further cleansed to a total of 392,944 tweets.
- 18.6% (73,000 tweets) of the total dataset went through further grouping analysis by GPT4 and sentiment values were assigned by both RoBERTa and GPT4 models.
- Sentiment results for RoBERTa displayed in (**Figure 2**) and GPT4 in (**Figure 3**). Chi-square analyses all revealed statistically significant differences in sentiment proportions/models ( $p \lll .0001$ )
- \*Pending further human validation for comparing models



## Discussion

This study established a methodology for healthcare intervention sentiment analysis using social media data, focusing on epidural and non-epidural-assisted parturition.

Results varied based on the model used. RoBERTa indicated a relatively equal distribution of sentiment for natural birth and a higher distribution of negative sentiment for epidural use. GPT4 showed comparatively high positive sentiment scores for natural birth and proportionately equal scores for positive and negative epidural sentiment.

## Conclusion

This methodology may help anesthesiology providers evaluate their interventions and gather a unique understanding of patient perspectives and specific concerns.

## References

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