

## **From Pain to Perspective:**

### **Self-reported Chronic Pain and Patient-Providers Sentiment Classification**

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#### *Introduction and Background*

Chronic pain affects an estimated one in five people around the world and accounts for approximately 15-20% of all global physician visits [1]–[3]. Studies have found that rates of chronic pain, and disability due to chronic pain, are even higher for marginalized people [4]–[6] and members of these groups have consistently been found to be provided with insufficient pain management [7], [8]. To better study trends in patient experience with chronic pain, we will develop a system to classify self-reported chronic pain and patient sentiment towards healthcare providers from social media posts.

#### *Cohort Identification*

The dataset for the study will first be refined by training a classification model on a dataset labelled with self-reporting status for chronic pain [9]. RoBERTa [10] has been chosen as the primary classifier for the system due to its performance in a review of pretrained language models for healthcare-related social media text classification [11]. A larger dataset of tweets will be refined to contain only posts from individuals self-reporting chronic pain and this subset will be used for the rest of the analysis.

#### *Annotation*

Annotation serves as a crucial preparatory step for sentiment analysis, focusing on chronic pain patients' sentiments towards healthcare providers. A sample of the dataset will be divided equally between the three authors and annotation will be conducted collaboratively within the group to ensure a comprehensive categorization of social media posts that capture patient emotions and attitudes. All posts will be reviewed by multiple annotators to ensure a reliable and fair representation of patient to provider sentiment. This leverages diverse perspectives to enhance the robustness and precision of sentiment classification.

For each post that is labeled as self-reported chronic pain, each annotator will classify patient sentiments toward health providers into three categories: positive, expressing gratitude or satisfaction; negative, indicating frustration or dissatisfaction; and neutral, for general comments on chronic pain. The annotation result will be evaluated using inter-annotator agreement (IAA) analysis to uphold annotation consistency, ensuring that the dataset adheres to scientific standards.

#### *Sentiment Analysis*

Beyond the self-report disease classification, prior research also indicated that patients with chronic pain and their healthcare providers sometimes have different goals [12]. Patients often seek to be understood as individuals and place emphasis on quality of life, while providers tend to prioritize diagnosis and treatment. Moreover, previous studies have explored patient-provider

interactions under various health concerns ([13]-[14]) and under intercultural communication barrier [15].

Our study, building on this body of research, takes a unique perspective of general chronic pain patients and aims to concentrate on sentiment analysis of patients towards providers. We will train a RoBERTa classifier on annotated data, yielding insights into patient-provider interactions that can enhance communication and care quality, ultimately improving health outcomes for chronic pain patients. For evaluation, we will assess our sentiment classifier's performance on new test data and analyze sentiment classification trends. Additionally, we will compare our findings with other contexts to discern unique challenges or opportunities in chronic pain patient-provider decision-making processes.

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