Chronic Pain and Language: A Topic Modelling Approach to Personal Pain Descriptions

Proposing a computational method to extract clinically relevant information from spontaneous verbal accounts of chronic pain experiences

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Context:
• Public hospital of São João, Porto, Portugal
• Verbal descriptions of chronic pain experiences, obtained from recorded, transcribed interviews
• 94 patients with chronic pain (rheumatology unit)

Interview:
1. Where does it hurt?
2. How would you describe your pain? How do you feel it? Which sensations does it cause?
3. How has pain intensity evolved in the past month?
4. How would you consider pain to affect your day-to-day, namely, your physical, professional, and social activities and your emotional state?
5. What do you believe to be the cause of your pain?
6. How would you say your pain has evolved, considering the current treatment?
7. How do you expect your pain to develop in the coming months?

Data Collection

Text Pre-processing

• Each document is assigned a distribution of weights over a set of topics, where a topic is a distribution of weights over the shared vocabulary
• Observing the most weighted words of each topic, we can get an idea of the concept(s) it may cover

Most weighted words of each extracted topic

Topic Modelling

• Measure patient similarity given topic weights
• Find groups of similar patients given their descriptions of chronic pain in the modelled topic space

Automatic Grouping

• Provides a novel way to assess and manage chronic pain patients
• New patients can be allocated to one of the groups, which can be used to inform the assessment
• Can be coupled with therapeutics, diagnostics, and demographic data to contextualize each group

Spontaneous descriptions of chronic pain experiences convey clinically valuable information. Part of this information can be extracted and modelled from the transcribed text. Topic modelling revealed which concerns are more important for our population and allowed us to group 94 patients into 7 groups, given how they describe their experience of pain. This grouping, coupled with demographic and clinical data, can be used to enhance the assessment of current and new patients.

To the best of our knowledge, this is the first proposal to computationally analyze and characterize spontaneous accounts of chronic pain experiences.

The language of pain is used to describe experiences of pain. Descriptions that share semantic and syntactic patterns may describe similar characteristics of different experiences of pain. Thus, computationally modelling the language of pain may allow us to assess and compare chronic pain patients given their descriptions of pain.

We propose to characterize descriptions of chronic pain by their latent topics, quantifying the relations between different experiences of pain in that abstract space. It may also be possible to characterize specific types of pain by their associated semantic topics.