

CONCEPT SCORES FOR A PATIENT

SCENAI TECHNOLOGIES

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WALKTHROUGH OF DATA

The following notes are the inputs that were required to obtain the emotional state of the patient through cleaning, analysis, and interpretation of the data. These inputs were fed into a statistical software known as RStudio and was used to generate concept scores of a patient.

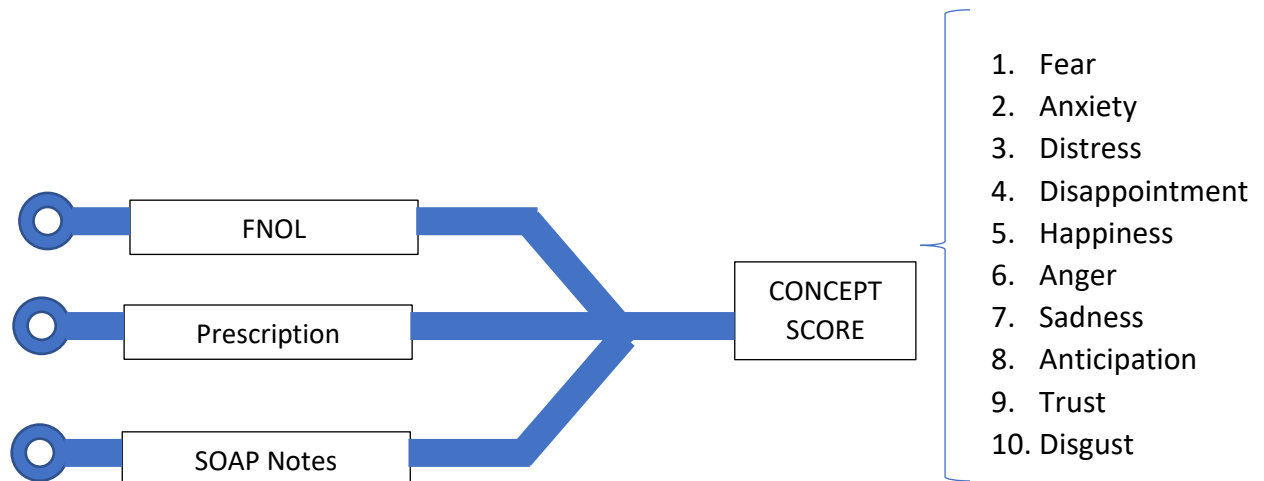
- a. **F.N.O.L -> First Notice of Loss** = Where the patient first reports his injury and pain.
- b. **Doctor's Prescription** = The doctor responds to the patient by prescribing and advising certain things to do.
- c. **SOAP notes** = A detailed report of the patient's casualty for the doctor and nurses to have an overview of the patient. The SOAP structure has the potential to improve performance in extracting existing medications and treatment plans in a system that aims to summarize medication administration throughout a patient visit or determine whether clinical protocols were followed.

S – Subjective = The patient explains to the doctor his injuries/issues and the clinician begins by documenting symptoms to understand the patient's clinical state. The patient also explains to the doctor what the doctor is not aware of.

O – Objective = The clinician records signs, quantifiable data and scientific evidence experienced by the patient. The doctor also explains to the patient what the patient is not aware of.

A – Assessment = The clinician unifies and critically evaluates these prior pieces of information to formulate a working diagnosis.

P – Plan = Reports the care plan to treat the underlying condition.



APPROACH

The approach that was used to come up with the emotional state of the patient was an algorithm known as Natural Language Processing which was used as business experimentation involved to unlock the value of data given and deliver proactive strategies. Using this approach would help us obtain the percentages for emotions such as anger, anticipation, disgust, fear, joy, sadness, surprise and trust.

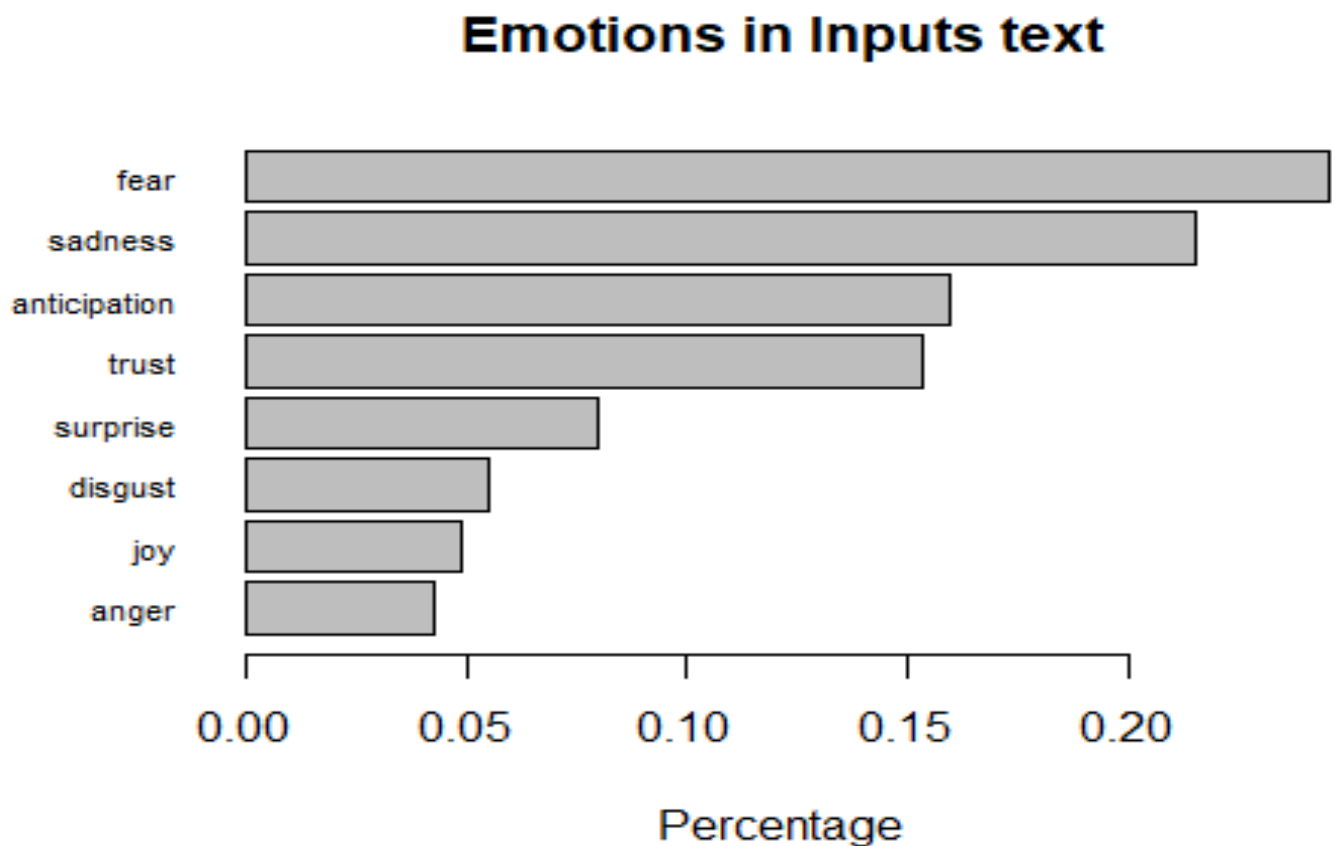
TECHNIQUES

Following were the techniques used under Natural Language Processing to come up with a final proposal on generating concept scores of a patient –

- The “syuzhet” and “pander” libraries were imported as packages in RStudio which contain different functions allowing us to perform sentiment analysis on the data.
- First, we classified the dataset into words to treat each word as an input to use different sentiment extraction methods.
- Then we got different sentiment values for each word. This method iterates over a vector of strings and returns sentiment values based on user-supplied method.
- The return value is a numeric vector of sentiment values i.e. one value for each input sentence.
- Later we performed sentence tokenization which parses a string into a vector of sentences.

- Obtaining all of these values, we plotted different graphs such as line charts, histogram and the like.
- We then used functions which gets emotions and valence from the sentiment dictionary to calculate the presence of eight different emotions and their corresponding valence. The columns under the sentiment dictionary include one for each emotion type as well as a positive or negative valence.
- Following this, we classified the data based on their emotional valence into different variables i.e. the sentences are characterized into anger, joy and so on.
- Then we made a tabular column of all the emotions and their relevant valences to get a clear understanding.
- Finally, we made a bar-plot from the table obtained which gives us the emotions in the data with their percentages.

OUTCOME



INFERENCES

anger	anticipation	disgust	fear	joy	sadness	surprise	trust
0	1	0	1	1	1	1	1
0	0	0	0	0	1	0	0
0	1	0	1	1	1	1	1
0	0	0	1	0	2	0	0

The above picture is a snapshot of the table representing each emotion. This gives us an overview of the emotional valence of each word in the dataset. If we find the sum of each of this – that would give us a total representation of each emotion. The graphs helped us get a visual representation of the emotional state of the patient over time. The other graphs tell us that how the patient's emotional state has changed over time. They are just similar graphs but different types of ways it can be expressed.

The bar-chart tells us that from the patient's record, the patient has –

- 30 – 40% of fear
- 25% of sadness
- 15 – 20% of anticipation
- 15% of trust
- 10% of surprise
- And 5% of disgust, joy, and anger.

CONCLUSION

From the above notes, we can conclude that it is possible to extract structured event and entity information from the unstructured text which can leverage the knowledge of clinical report structure to improve performance. NLP was used only because it entails the use of computers to identify, encode and extract information from naturally written or spoken language in a structured form. It also helps us to structure free-text as features for decision support, assist in tracking of quality measures and guideline adherence, answer clinical questions and provide access to knowledge trapped in free-text resources. This was an NLP application which was used to structure and interpret information described in clinical reports.
