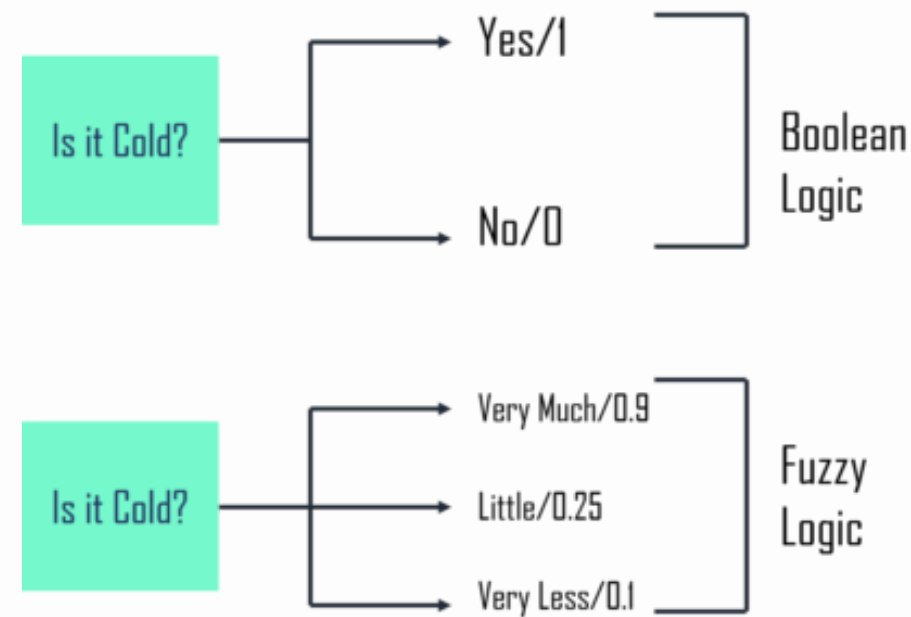
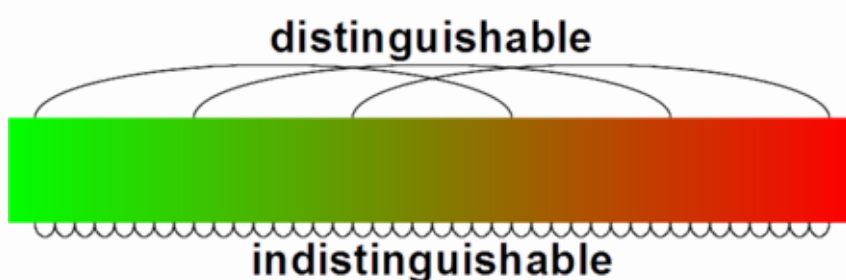


# Taking on Loki's Wager: Applying Fuzzy Logic for assessing Semantic Category in Sentiment Analysis

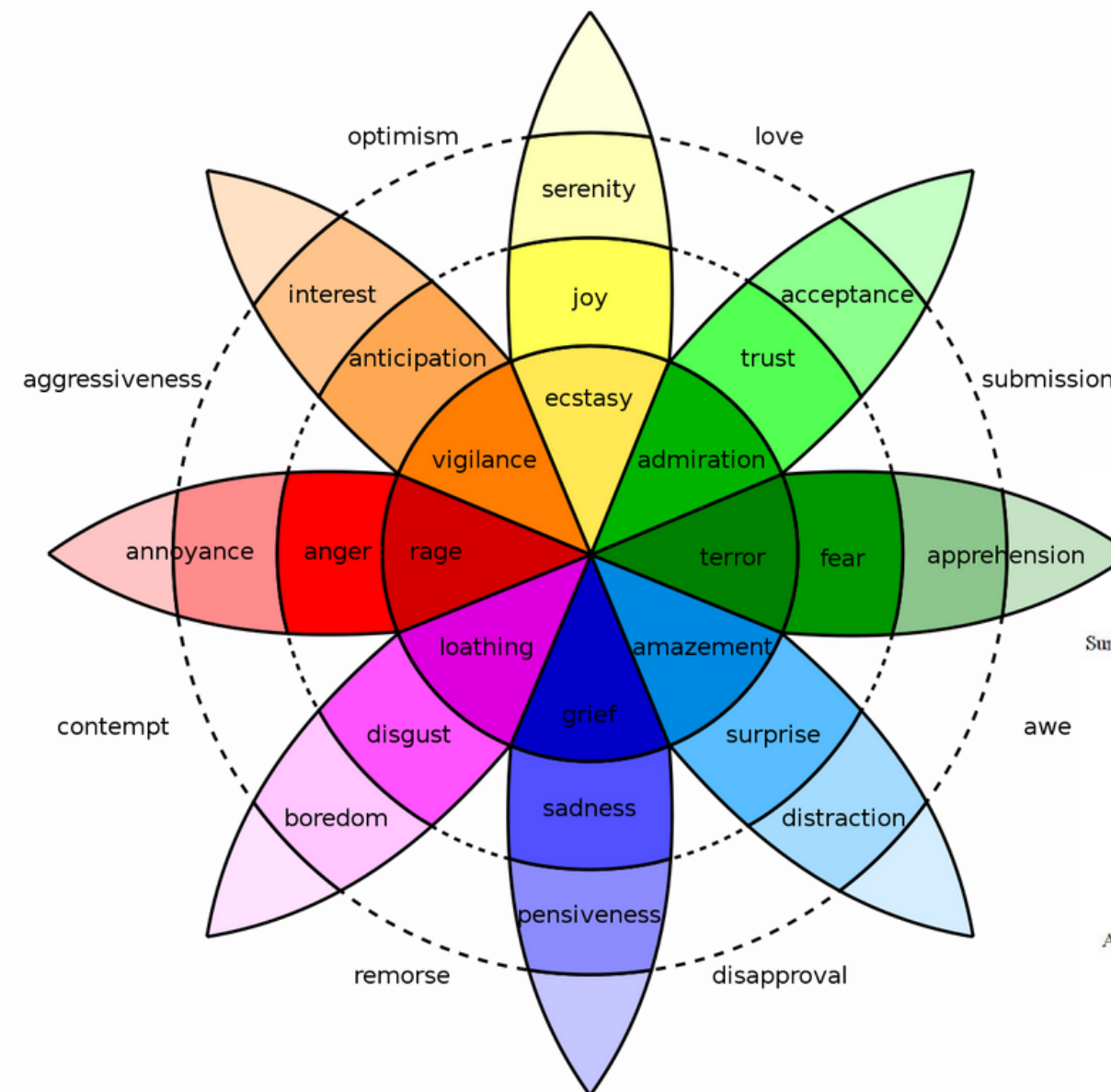


Human emotion and behaviour cannot always be boxed into a value of yes or no. In this sense, fuzzy logic is an ideal tool to apply to problems in its discussion. While classical logic allows for only two values, true or false, 1 or 0, the Boolean values; Fuzzy logic allows us to extend this to describe variables (such as word meanings) that are at best vague by **determining the extent to which they belong or don't belong to a predefined class** (a value between 0 and 1).



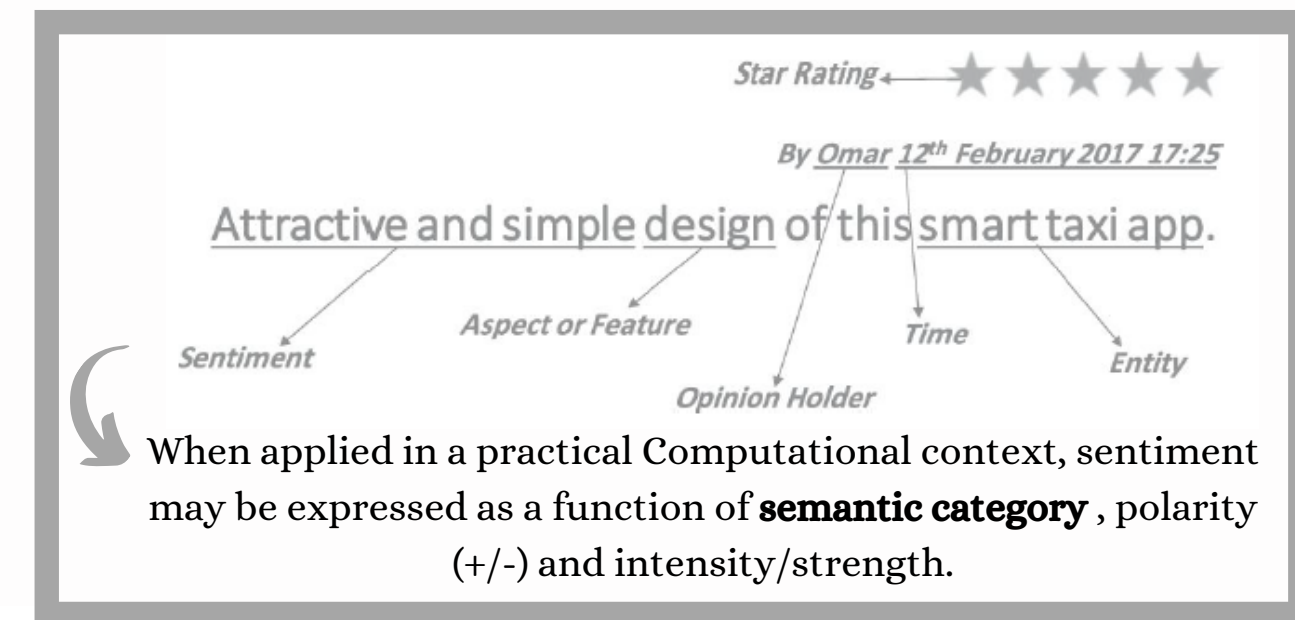
The necessity to apply fuzzy controllers to assess intervals or linguistic values as inputs is given by many applications where **precise values of input data are difficult or impossible to estimate** (Loki's Wager).

The objective of this study is to develop a model that can take in the content of a microblog (such as a tweet on Twitter) that contains opinions (or sentiments), and determine the prevalent emotions behind the tweet. This information can then be used for sentiment analysis



Emotions intensify as they move from the outside to the center of the Plutchik wheel, which is also indicated by the color, **representing emotions as gradients expressed as an extent of belonging to a class**. For example, anger at its least level of intensity is annoyance. At its highest level of intensity, anger becomes rage. Assigning a numerical value, this may mean an anger value between 0 and 1.

The emotions with no color represent an emotion that is a mix of the 2 primary emotions. For example, anticipation and joy combine to be optimism. However, such an **emotion is almost never a perfect 50-50 belonging to each class**



When applied in a practical Computational context, sentiment may be expressed as a function of **semantic category**, polarity (+/-) and intensity/strength.

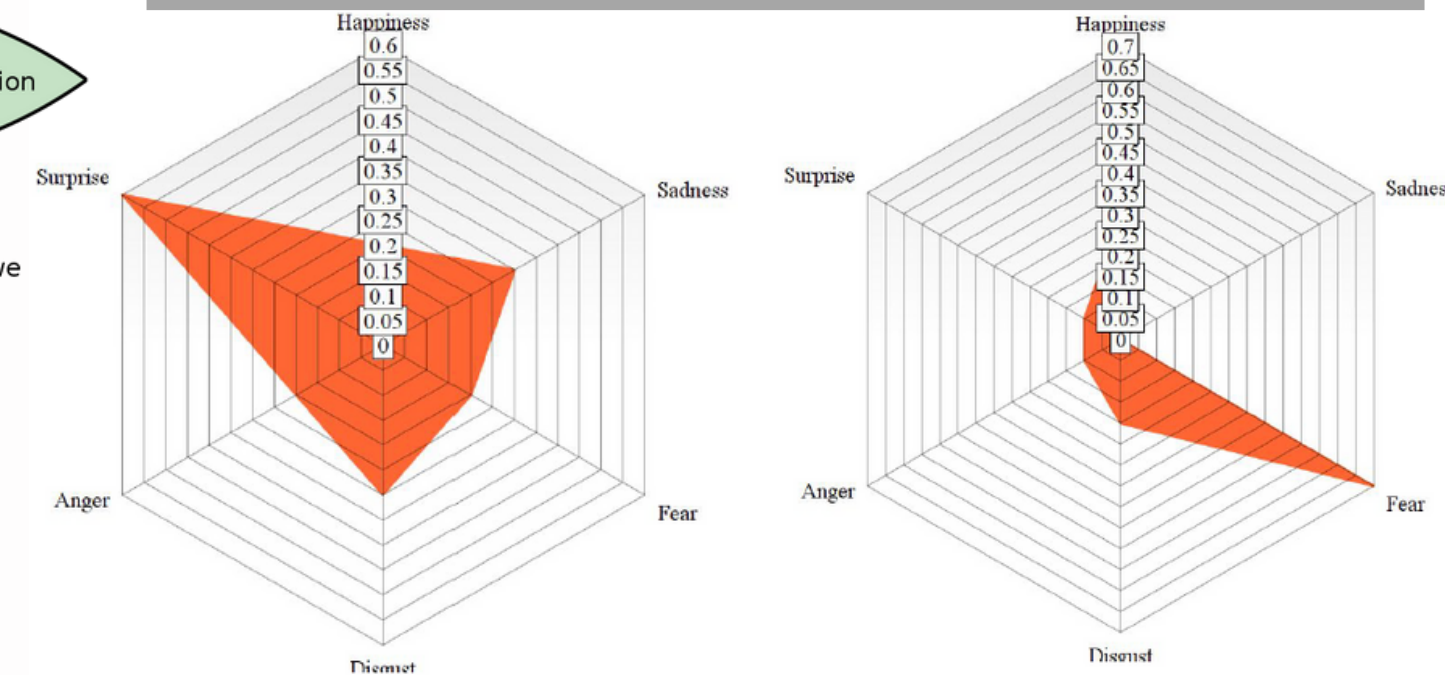


Fig 1.2 A Fuzzy Description of "Disbelief" Fig 1.1 A Fuzzy Description of "Nervous"

The proposed model expands on existing implementations of the Mamdani system by **incorporating uncertainty about the membership functions** of fuzzy sets associated with linguistic terms. It also establishes algorithms for the creation of a dictionary for rule based parsing that compares words with their WordNet senses and assigns probabilistic values for semantic orientation based on the distribution of their contextual occurrences.