

Emotion Recognition from Text Using Situational Information and a Personalized Emotion Model

Yong-soo Seol¹, Han-woo Kim¹, and Dong-joo Kim²

¹ Department of Computer Science and Engineering, Hanyang University,
1271 Sa3-dong, Sangnok-gu, Ansan, Kyeonggi-do, 425-791, Korea
{iamtbn, kimhw}@hanyang.ac.kr

² Department of Computer Engineering, Anyang University,
708-113 Anyang5-dong, Manan-gu, Anyang, Kyeonggi-do, 430-714, Korea
djkim@anyang.ac.kr

Abstract. To understand the other person's emotion, we should know the situations in which the person is surrounded and the personality of the person. We attempt to novel approaches to utilize situational information and personality of emotional subject. We propose the method extracting situational information, and the personalized emotion model for reflecting personality of emotional subject. In addition, To reflect personality of emotional subject, we propose personalized emotion model using KBANN(Knowledge-based Artificial Neural Network). Experimental results show that the proposed system can recognize emotions more accurately and intelligently than previous text-based emotion recognition systems.

Keywords: emotion, recognition, situation, personality, text

1 Introduction

To recognize human emotion, it must be considered surrounding situation and personalized judgments about the situation [1]. To reflect surrounding situational information, we extract situational information from natural language text, and construct the situation model. For this we use emotion lexicon dictionary and dependency parser. One more thing to consider is that created emotions may be different for each person even if the same situation is given. To realize this idea, we propose personalized emotion model that is built for each emotional subject.

2 Situation Model and Personalized Emotion Model

We selected nine emotions (anger, fear, sadness, happiness, disgust, surprise, love, gratitude, and anxiety) as target for recognition. We assume that emotion recognition process is "To recognize a given situation from text, and to find emotions by matching the situation with emotion creation rules that consider personalized emotion

model". To implement this idea, given situation and personalized emotion model should be defined and modelled. We extract the situation information from natural language text, and use it as input data for emotion recognition

We extract the situation knowledge from natural language text in English. We define the situation knowledge as entity-relationship structure, and call it as the situation model. We use to weighted graph data structure to represent the strength of relations. Following figure illustrates an example of the simple situation model.

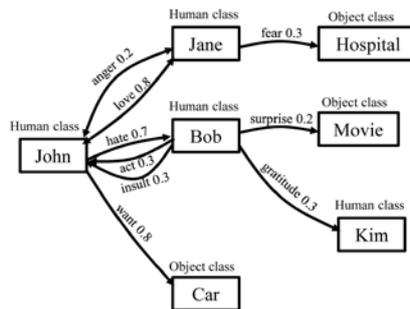


Fig. 1. An example of situation model

Each class (node) can be subdivided into human classes and object classes. A human class indicates human that own emotion. An object class indicates the objects that can relate to the human. Each class is connected by the relation. The relation only can be expressed as predefined emotional language vocabulary. Every natural language sentence is mapped to emotional lexicon through emotional lexicon dictionary.

We parse input text by the Stanford dependency parser [2]. In the result of dependency parsing, most sentences have nominal subject dependency (has *nsubj* tag in parsing result of the Stanford dependency parser) except special exception (omitting subject, etc). In the nominal subject dependency relation, the governor could be a main verb and the determiner could be a subject. In the case that the main verb is the copular verb (has *cop* tag), the subject and the main verb could be found in copula dependency. The object could be found by the dependency including the main verb. It can be the target object of the relation. The relation name is assigned as the mapped word with the main verb in the emotion lexicon dictionary.

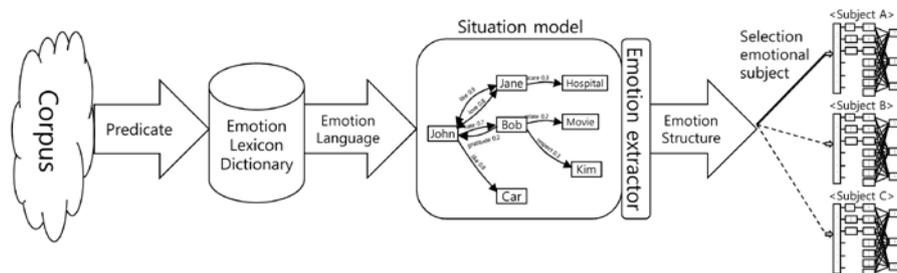


Fig. 2. Overview of the proposed emotion recognition system

The personalized emotion model is built in training phase for this. We employ the KBANN (Knowledge Based Artificial Neural Network) [3] as data structure for emotion model. When domain-knowledge exists, the KBANN can expect better performance though having sparse training data. We use domain-knowledge such as emotion creation rule and it is difficult to get abundant training data. For these reasons, the KBANN is very useful for our emotion recognition system.

3 Experiment and Discussion

We implemented keyword-based emotion recognition system using simple keyword-spotting algorithm as baseline. Fig. 3 shows that the accuracy of emotion recognition in the case of having emotional keyword and in the case of having no emotional keyword.

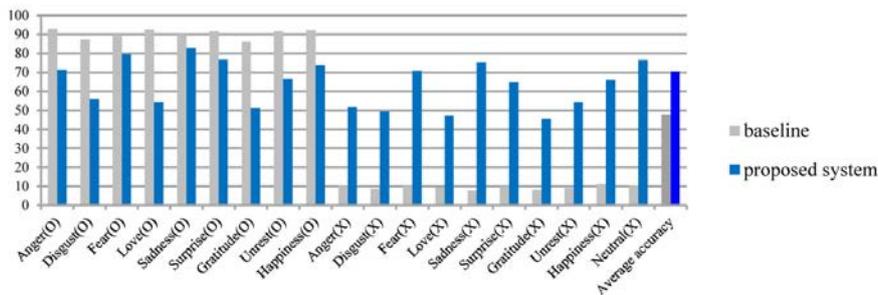


Fig. 3. Accuracy of emotion recognition with an emotional keyword (O) and without an emotional keyword (X)

Though proposed system can do human-like intelligent emotion recognition, which traditional text-based emotion recognition system cannot, included characteristic of keyword-spotting algorithm and improve the recognition accuracy. Like these, we attempt novel approaches considering the characteristic of emotion. As a result, we showed that intelligent emotion recognition considering surrounding situation and personality of emotional subject is possible.

References

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