LiarGameBot: a Lie Detector and a Liar

Geonho Koh
School of Computing, KAIST
ghkoh97@kaist.ac.kr

Hyeonbin Hwang
School of Computing, KAIST
hbin0701@kaist.ac.kr

Abstract

In this NLP project, we introduce you to **LiarGameBot**, which plays and analyzes Liar Game on behalf of human players. Using data from SAT, ACT reading passages, wordassociation.org, and actual game log files, we also propose algorithms for extracting keywords from sentences, evaluating word association scores with syntagmatic and paradigmatic relations, and generating descriptive sentences.

1 Introduction

Liar Game, first introduced in a Korean TV show, has been gradually gaining public attention and expanding its influence even in the online market. However, this game supports a multiplayer environment only, which resulted in low accessibility and a limited user base. Now, to enrich the user experience and complement the diminishing users, we have developed **LiarGameBot**, which can replace human players, and further generate an accurate probabilistic model of the winner in this game. Not only this contribution will be limited to Liar Game, but also with the increased demand of this game, a new dataset of game logs will be a valuable asset for various NLP researches involving word association and human psychology.

2 Data

We will be utilizing the reading passages from SAT and ACT practice tests, and wordassociation.org in calculating the word association score. To verify our model, we would be utilizing our own collected game logs of 30 liar games.

3 Method and Algorithm

Liar Game is a game in which players identify the 'liar' when describing a given word. 'Liar', who does not know the given word, will act as if he knows it, and other players should not provide too specific of a description so that liar cannot predict the given word.

3.1 Game Strategy

LiarGameBot should undertake different strategies depending on the role it is assigned to. When assigned liar, it should infer the given word from the description of other players, and be able to describe in a manner that would help hide its identity. Otherwise, when assigned civilian, it will infer who the liar is through each player's description, and describe in a way that would help prove its identity but preclude the liar from noticing the correct answer.

3.2 Algorithms Required

Extracting keywords or phrases from a descriptive sentence is fundamental for our analysis, with which we calculate the word association score with respect to the list of candidate words. We will use paradigmatic and syntagmatic approaches to evaluate the level of association. Then, we present a new algorithm for generating a short sentence from the extracted keywords. This whole process will be carried out within 30 seconds at most. Furthermore, we introduce three novel concepts: liar score, liar keyword, and civilian keyword. When the bot is assigned to civilian, it will calculate the liar score of every player, which increases when a description is too broad or its association score results negative. Also, with its assigned role, the bot will respectively extract liar and civilian keywords, considering redundancy, vagueness, and the strategies discussed above.

References

Reinhard Rapp. 2002. *The Computation of Word Associations: Comparing Syntagmatic and Paradigmatic Approaches* University of Mainz, FASK.