

# Social Relationship Detection using Rules

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## Abstract

Social relationships play a very important role in social network. Social relationship detection has attracted increasing attention, typically, which can help to understand the behavior of human in our daily life. Previous social relationship detection models focused too much on relationships between the same pair and ignore the interplay of different relationships in the same scene. We found that the interaction between the relationships in the same scene plays an important role in the detection of social relations and we can make meaningful use of rules during inference. This paper proposes a novel model named *SRDR* which incorporates rules seamlessly into the deep learning model named *SR* to solve the social relationship detection problem. It formulates inference as an integer linear programming (ILP) problem, with the objective function generated from *SR* and the constraints translated from rules. By incorporating rules, our approach can greatly reduce the solution space and significantly improve the inference accuracy of social relationship detection models. Experimental results on two classic data sets show that our approach significantly outperforms state-of-the-art models in social relationship detection, which justifies the significance of incorporating rules seamlessly into the deep learning model in social relationship detection task.

## 1 Introduction

This part will be written by **liangjinrui**. This part will consist of the following sections:

- The significance of social relation detection
- [Example Figure]
- Analyze the shortcomings of the current model and introduce our model(based ILP)
- Challenges
- Contributions

## 2 Related Work

This part will be written by **liangjinrui** and it will be surveyed by **liangjinrui** and **chenhaicheng** by January 31.

### 2.1 Social Relationship Detection

Introduce social relationship detection including [Guo *et al.*, 2018], [Li *et al.*, 2017], [Wang *et al.*, 2015] and [Wang *et al.*, 2018].

### 2.2 PIPA Dataset and PISC Dataset

Analyze characteristics of datasets.

### 2.3 Rules and ILP

Introduce rules and ILP referring to [Wang *et al.*, 2015]

## 3 SRDR model

This part will be written by **liangjinrui** and **chenhaicheng**.  
[model figure]

[Introduce the total model]

### 3.1 Social Relationship Detection Model

### 3.2 Imposing Rules

### 3.3 Integrating by Integer Linear Programming

## 4 Experiments

This part will be written by **chenhaicheng**.

### 4.1 Experiment Setting

### 4.2 Experiment Results

### 4.3 Experiment Analysis

### 4.4 Ablation Study

### 4.5 Case Study

## 5 Conclusion

This part will be written by **liangjinrui**.

## References

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