Reformulating Constraint Models Using Input Data

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Motivation

Building Identification (BID) Problem

[Michalowski and Knoblock, AAAI05]

- Web application to identify buildings throughout the world
- Global addressing characteristics with local customizations
- Creating individual addressing models for each city in the world = BAD!!

Problem

- Problem classes within a domain contain slight variations
 - Domain is defined by general constraints
 - Classes introduce specific constraints
- How to generate constraint models given a problem instance?
 - Without creating models for all possible scenarios

Solution

Problem Instance

Input information

f (features of instance)

Generic model

$$\boldsymbol{\mathcal{C}_{\boldsymbol{\mathcal{B}}}} = \{ \ \boldsymbol{C}_1, \boldsymbol{C}_2, \dots, \boldsymbol{C}_i \}$$

Constraint Library

User-defined (& learned) constraints

$$C_{L} = \{C_{11}, C_{12}, \dots, C_{1Z}\}$$

Inference Engine

Inference rules

$$R_{\uparrow} = \{R_1, R_2, \dots, R_z\}$$

$$R_k: \ \Phi(\overrightarrow{\textbf{\textit{F}}}) \to C_j \in \textbf{\textit{C}}_{\textbf{\textit{L}}}$$

Refined model: $C_{new} = C_B \cup C_I$

Thank you!

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