# SHERLOCK — Neural Network Software for Automated Problem Solving

## 1 Introduction

### a) Intended Readership

People who want a logic programming application to perform deduction tasks and those who want to study neural-symbolic systems generate neural networks automatically.

### b) Purpose

The application is designed to provide an interface to use neural-symbolic systems to do deduction. It also provide a function to generate a Tp- or CILP- neural network for a general logic program automatically, which gives an shortcut to make a knowledge refining system.

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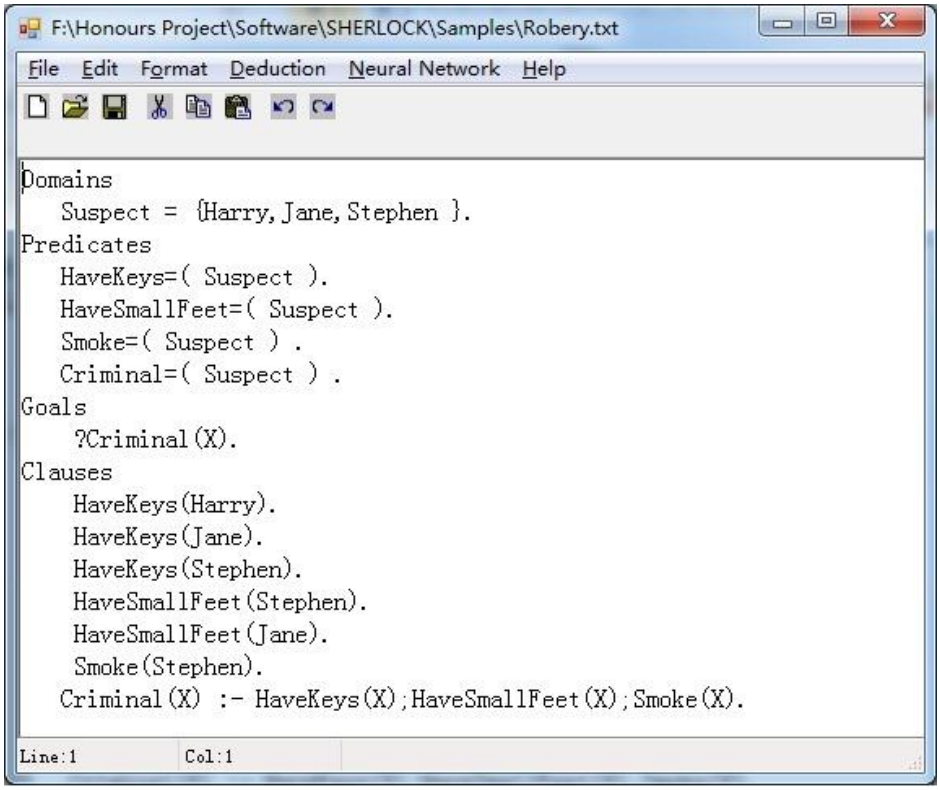
## 2 Overview

### a) Functional Description

The application has a logic programming editor, a function – *Neural Network* which translates a logic program to a Tp- or CILP- neural network and a function *Deduction* w*hich not only translates a logic* program to a Tp- or CILP- neural network, but also perform massively parallel computing and interpret the result to symbolic knowledge.

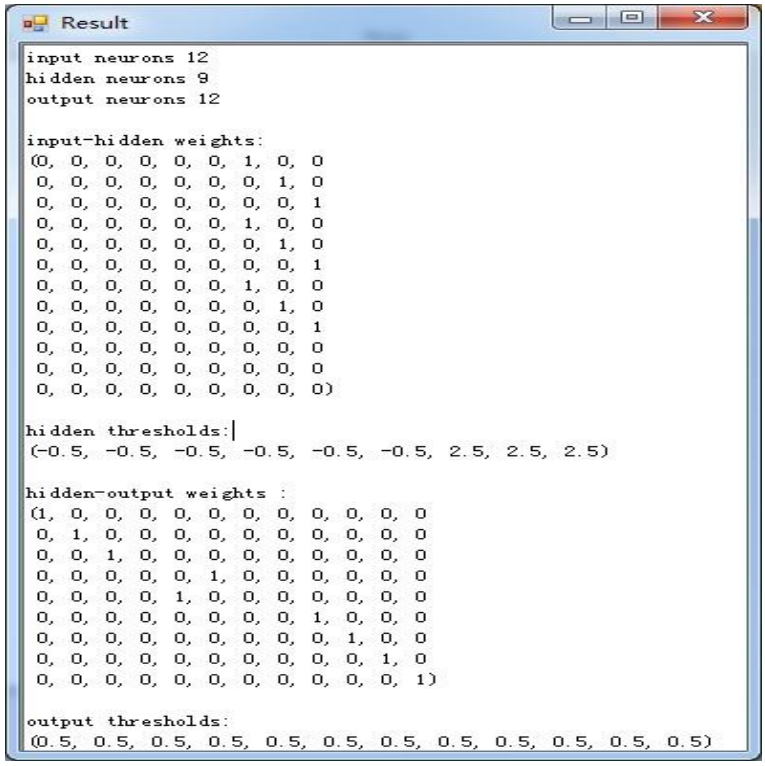
*i. Logic Programming Editor*



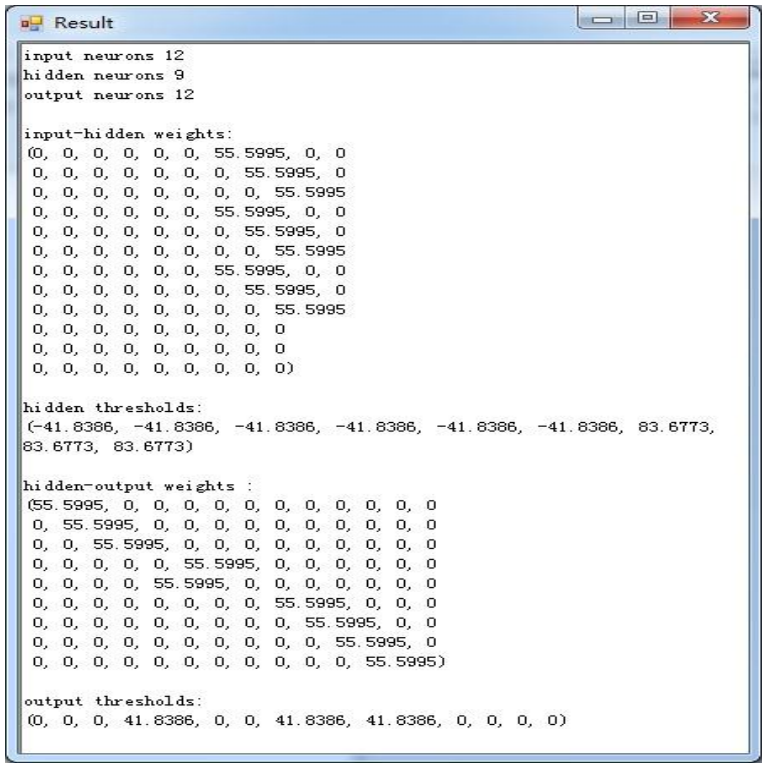

The syntax in a regular form is as follows:

- Key words: [a-zA-Z] [a-zA-Z]*
- Domains: [a-zA-Z] [a-zA-Z]*={[a-zA-Z] [a-zA-Z]* [,[a-zA-Z] [a-zA-Z]*]}.
- Predicates: [a-zA-Z] [a-zA-Z]*=([a-zA-Z] [a-zA-Z]* [,[a-zA-Z] [a-zA-Z]*]).
- Goals: ?[a-zA-Z] [a-zA-Z]*=([[a-zA-Z] [a-zA-Z]* |[A-Z] ] [,[[a-zA-Z] [a-zA-Z]* |[A-Z] ]).
- Clauses are divided into Facts and Rules
  Rules:
  [a-zA-Z] [a-zA-Z]*=([[a-zA-Z] [a-zA-Z]* |[A-Z] ] [,[[a-zA-Z] [a-zA-Z]* |[A-Z] ]).
  Facts: [a-zA-Z] [a-zA-Z]*([a-zA-Z] [a-zA-Z]* [,[a-zA-Z] [a-zA-Z]*]).

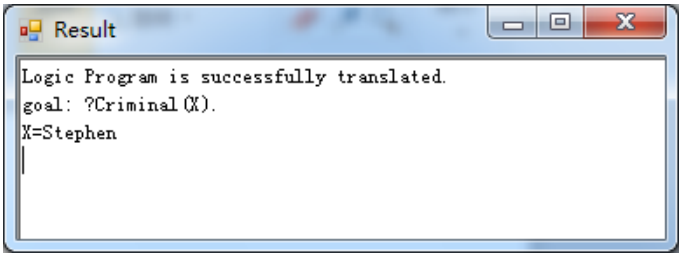
ii. Tp- neural network




iii. CILP- neural network




iv. Deduction result




### b) Cautions and Warnings

a) This program supports basic logic deduction. It does not support list.
b) ";" means AND， which is different from Prolog.

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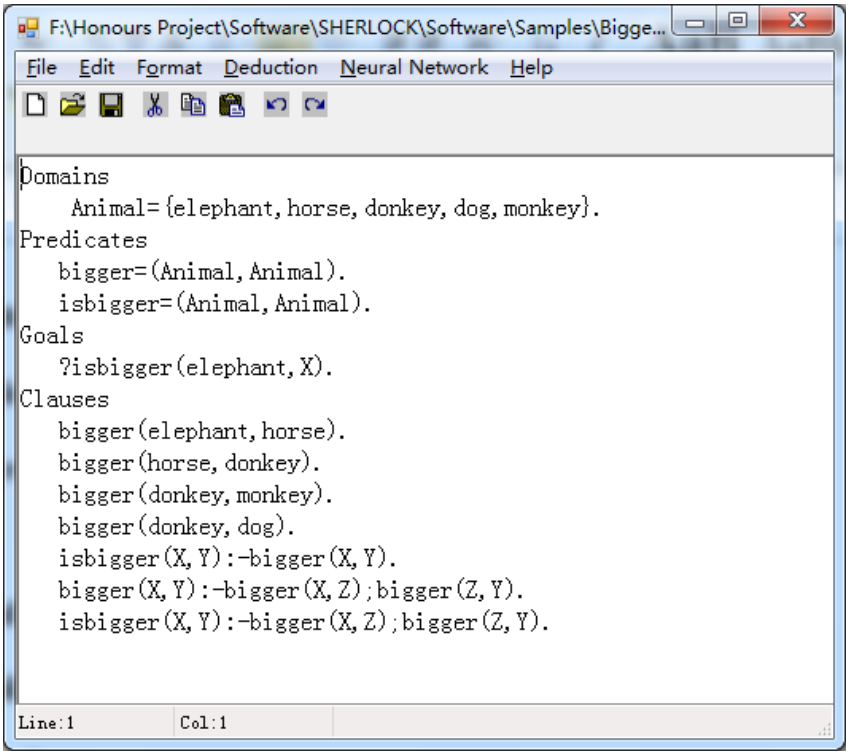
# 3 Instruction Sections

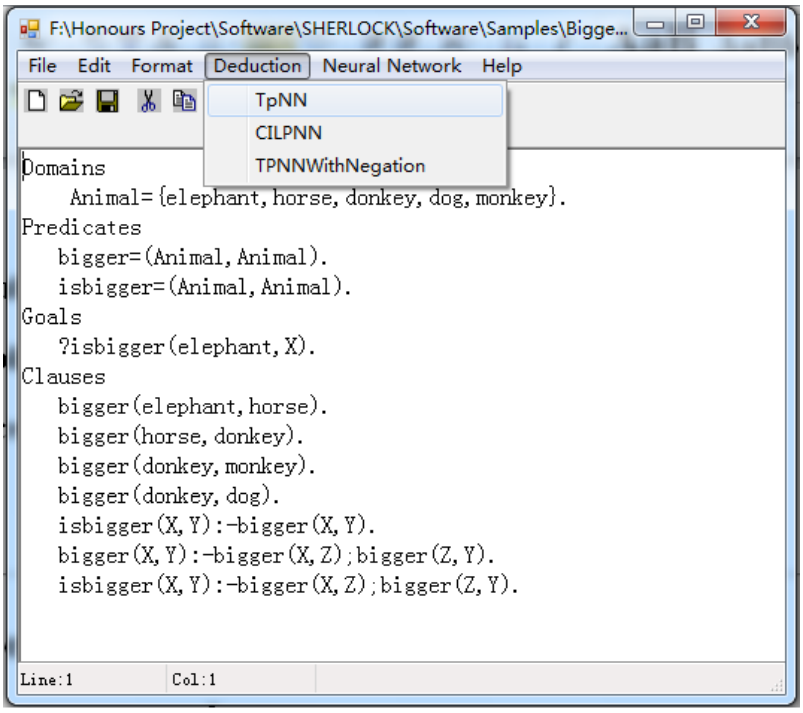
## Logic Deduction

### a) Procedures

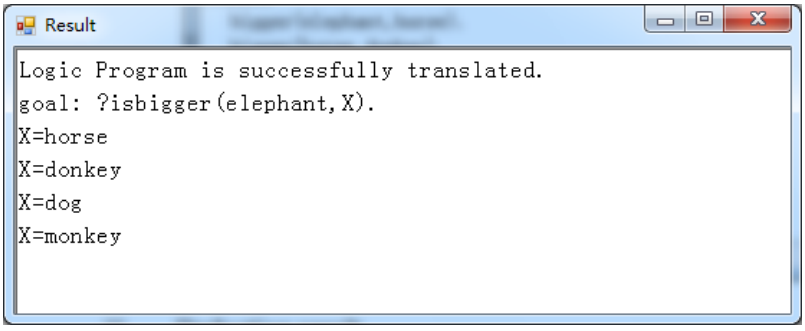
i. Type in a logic program in the editor




ii. Choose one type neural network to perform massively parallel deduction




iii. Deduction result

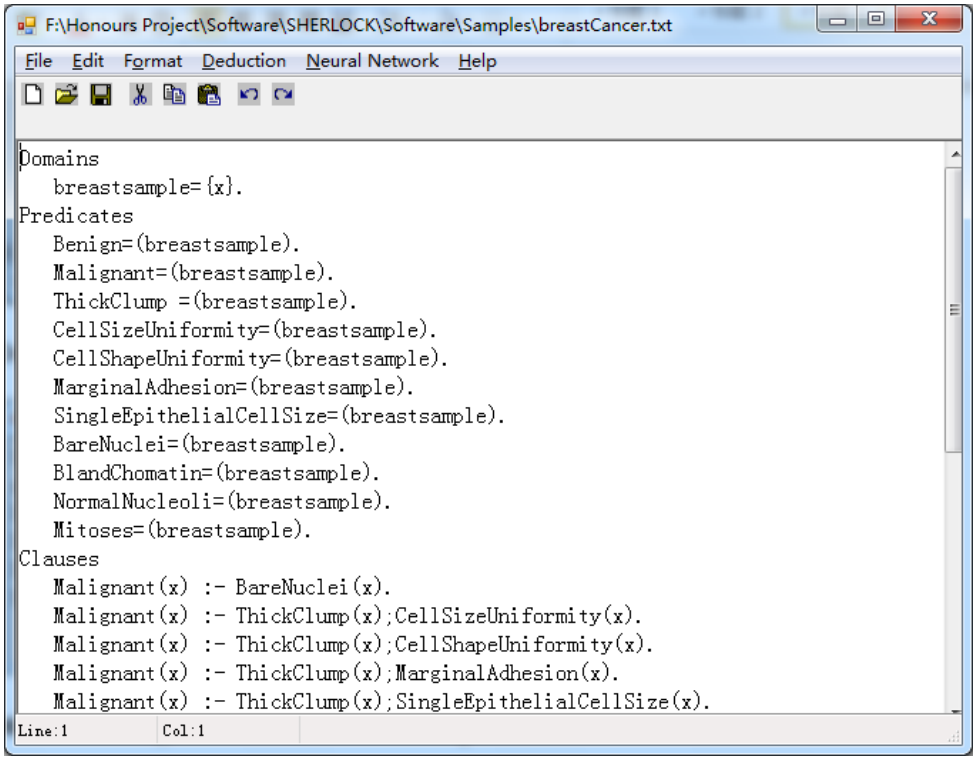



### b) Troubleshooting: Probable errors and possible causes

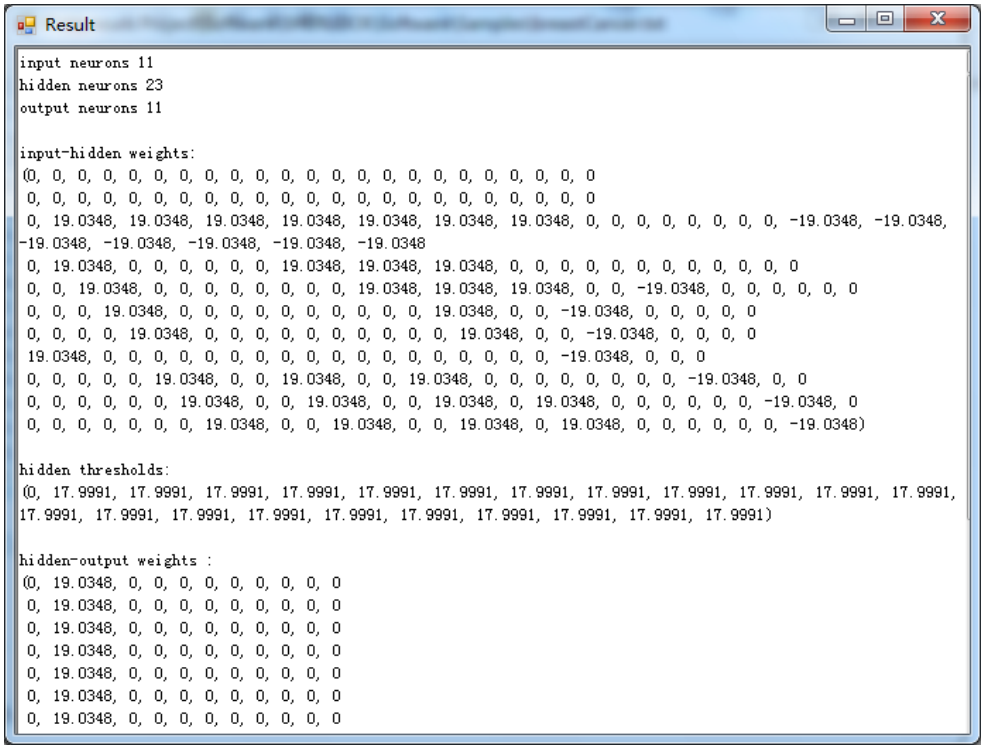
## Neural-symbolic Network Generation

### a) Procedures

i. Present coarse knowledge in a logic programming way, which does not contain a section – *Goals.*




ii. Choose “CILP” under “Neural Network”.



iii. Copy the CILP neural network to Matlab to build a patternnet and train the CILP netwok and the coarse knowledge will be refined.