Placeholder

Sam Tadey

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# Summary

The Distance Visualizer is a tool that can be used to visualize distances between states. This document is a user guide illustrating how to use the belief revision tool. The tool actions must be used in a specific order to yield results. The general order of actions is:

1. Define a vocabulary
2. Generate a Trust Graph
   1. Modify the trust graph with reports
3. Specify beliefs
4. Specify a sentence to revise by
5. Revision

## Tool Layout

When the tool is loaded, the default display is shown by the image below.

Graphical user interface, application

Description automatically generated

3.

4.

2.

1.

Each piece small description here

Complete numbering

# User Guide

The Distance Visualizer is a simple tool to use to visualize belief revision with trust. There are several steps needed to execute the software effectively. Each step will be discussed in detail with examples and technical description.

## Define a Vocabulary

A propositional vocabulary must be defined for many of the following components to work. Defining a vocabulary must be done in the **Propositional Vocabulary** text field and follow a specific format. Each vocabulary member must be a character letter. To separate each character, use a comma. Use the image below for propositional vocabulary input guidance.

Graphical user interface, text, application

Description automatically generated

## Generate a Trust Graph

Generating a basic Trust Graph requires only a vocabulary as a dependency. Once that has been defined, selecting the **Generate Trust Graph** action will generate a graph in the **Trust Graph** pane. The **Generate Trust Graph** action can be found in the **Actions** pane.

Graphical user interface, text, application

Description automatically generated

After the **Generate Trust Graph** action has been executed the trust graph will be generated.

Table

Description automatically generated

## Update the Trust Graph

There are two ways to modify trust values in the **Trust Graph**. Values can be changed manually one-by-one or automated through the **Add Reports** action.

### Manual Update

Each white **Trust Graph** grid item can be modified manually by selecting that item and changing the value through keyboard input. If an invalid value is inputted, the grid item value will be reverted to the value before the change, and an error message will appear in the **Errors** pane.

### Add Reports

Adding Reports is another method of updating trust values between a set of states. The **Formula** field will be filled in by a valid propositional formula. The variables used in the formula must match those defined in the **Propositional Vocabulary** field. The **Result** field must be a one-character input of either a **0** or **1**.

Graphical user interface

Description automatically generated

When satisfied with report input, the **Add Reports** action will apply the reports to the **Trust Graph**, updating values to account for the new information.

Table

Description automatically generated

## Specify Initial Beliefs

Initial Beliefs of an agent are represented by a Ranking Function. There are two ways to specify an initial belief state. The first is by inputting a propositional formula. The second is by loading a file with specific state/ranking values.

### Hamming Ranking

To define a belief state manually through the tool, ensure the **Hamming Ranking** option is selected in the drop-down menu. This selection will allow text input under the **Belief** header. The possible states that satisfy the propositional formula are given a rank of 0, the lowest and most likely belief value. All other states not defined by the formula are then given a rank based on the hamming distance to any one satisfied state.

Shape

Description automatically generated with medium confidence

For example, the ranking function defined by the input (**a | b)** would be:

010,011,100,101,110,111 = 0

000,001 = 1

000 and 001 are given a rank 1 because the minimum hamming distance to any of the satisfied states is 1.

### File Ranking

An initial belief state can be easily defined through file input.

DEFINE INPUT FILE FORMAT

Graphical user interface, application

Description automatically generated

## Specify Sentence to Revise By

The last step before revision is to specify a sentence to revise by. The **Sentences** text field takes a propositional formula as an input. Just as with other fields, ensure that you are using variables defined in the **Propositional Vocabulary** field.

Shape, square

Description automatically generated

## Revise

When all the steps have been taken, the last thing to do is execute the **Revise** action.

Graphical user interface, text, application

Description automatically generated

After the **Revise** action has been run, the resulting states to revise by will be displayed in the **Results** text field. They have been converted into propositional variables for readability.

A picture containing shape

Description automatically generated

Each line corresponds to an output state. So the first two lines could be read like this:

Eg. 100 or 111

## Results

After following these steps, the tool should look something like the next image. The **Revise** action does not signify the end of belief revision, and new beliefs, sentences, and trust values can be introduced to generate differing outputs.

Graphical user interface

Description automatically generated with medium confidence