

Appendix A:

Resources

All experiments in this dissertation were performed using the Con-x backprop simulator, which I wrote. There are two versions: a slow, fully programmable, Scheme version, and a fast, less flexible C++ version. Both are available via the Internet at:

<http://www.cs.indiana.edu/hyplan/blank/thesis/>

There you will also find code to create the networks and the datasets to duplicate the exact experiments from this dissertation. A sample Con-x script is shown below.

```
/* *****  
gridfont.cx: Con-x BackProp Simulator  
*****  
*/  
  
set session e01 /* set DAT, ERR, WTS, OUT filenames */  
layer input 153  
layer context 153  

```

```
connect input hidden      /* connect input layer to hidden      */
connect context hidden   /* connect context layer to hidden   */
connect hidden output    /* connect hidden layer to output    */

set winner_take_all 0    /* turn winner take all off          */
set stoperr 0.99        /* stop at correct                    */
set momentum 0.9        /* set weight momentum               */
set epsilon 0.1         /* set learning rate                 */
set bepsilon 0.1        /* set learning rate of biases       */
set maxepoch 1000
set reportrate 1
set maxrand 0.003
set round_off 1         /* changes round of display only     */

set subcycle 2

copyprior context 0 A file 153 I 153
copyprior output 0 T file 153 I 306

copyafter input 0 A file 459 I 153
copyafter context 0 A hidden 0 A 153
copyafter output 0 T file 612 I 306
```


Appendix C:

Family Tree Relations

The following lists the relations used in the final family tree experiment. All six families were isomorphic.

11 Relations:

wife, husband, son, daughter, mother, father, brother, sister, parent-in-law, child-in-law, and sibling-in-law.

6 People:

Bello, Matope, Neema, Hadiya, Kissa, and Kwaku.

22 facts:

Bello is the son of Matope.
Bello is the son of Neema.
Hadiya is the daughter of Matope.
Hadiya is the daughter of Neema.
Matope is the father of Bello.
Matope is the father of Hadiya.
Neema is the mother of Bello.

Neema is the mother of Hadiya.
Bello is the brother of Hadiya.
Hadiya is the sister of Bello.
Kissa is the wife of Bello.
Neema is the wife of Matope.
Matope is the husband of Neema.
Bello is the husband of Kissa.
Hadiya is the wife of Kwaku.
Kwaku is the husband of Hadiya.
Matope is the parent-in-law of Kissa.
Kissa is the child-in-law of Matope.
Neema is the parent-in-law of Kwaku.
Kwaku is the child-in-law of Neema.
Kissa is the sibling-in-law of Kwaku.
Kwaku is the sibling-in-law of Kissa.

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