Project 04 - Bayes Network

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CSCI 544 - Machine Learning

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1 Program usage

In the **src** folder, simply type
           python bayes_network.py
which results in the output

```
FOLD 1
--------------------------------------------------------
Node : Storms    Parent of Storms : []
Node : BusTourGroup    Parent of BusTourGroup : []
Node : Lightning  Parent of Lightning : ['Storms']
Node : Campfire    Parent of Campfire : ['BusTourGroup', 'Storms']
Node : Thunder   Parent of Thunder : ['Lightning']

FOLD 2
--------------------------------------------------------
Node : Storms    Parent of Storms : []
Node : BusTourGroup    Parent of BusTourGroup : []
Node : Lightning  Parent of Lightning : ['Storms']
Node : Campfire    Parent of Campfire : ['BusTourGroup', 'Storms']
Node : Thunder   Parent of Thunder : ['Lightning']

FOLD 3
--------------------------------------------------------
Node : Storms    Parent of Storms : []
Node : BusTourGroup    Parent of BusTourGroup : []
Node : Lightning  Parent of Lightning : ['Storms']
Node : Campfire    Parent of Campfire : ['BusTourGroup', 'Storms']
Node : Thunder   Parent of Thunder : ['Lightning']

FOLD 4
--------------------------------------------------------
Node : Storms    Parent of Storms : []
Node : BusTourGroup    Parent of BusTourGroup : []
Node : Lightning  Parent of Lightning : ['Storms']
Node : Campfire    Parent of Campfire : ['BusTourGroup', 'Storms']
Node : Thunder   Parent of Thunder : ['Lightning']

FOLD 5
--------------------------------------------------------
Node : Storms    Parent of Storms : []
Node : BusTourGroup    Parent of BusTourGroup : []
Node : Lightning  Parent of Lightning : ['Storms']
Node : Campfire    Parent of Campfire : ['BusTourGroup', 'Storms']
Node : Thunder   Parent of Thunder : ['Lightning']

FOLD 6
--------------------------------------------------------
Node : Storms    Parent of Storms : []
Node : BusTourGroup    Parent of BusTourGroup : []
Node : Lightning  Parent of Lightning : ['Storms']
Node : Campfire    Parent of Campfire : ['BusTourGroup', 'Storms']
Node : Thunder   Parent of Thunder : ['Lightning']

FOLD 7
--------------------------------------------------------
Node : Storms    Parent of Storms : []
Node : BusTourGroup    Parent of BusTourGroup : []
Node : Lightning  Parent of Lightning : ['Storms']
Node : Campfire    Parent of Campfire : ['BusTourGroup', 'Storms']
Node : Thunder   Parent of Thunder : ['Lightning']

FOLD 8
--------------------------------------------------------
Node : Storms    Parent of Storms : []
Node : BusTourGroup    Parent of BusTourGroup : []
```

```
Node : Lightning  Parent of Lightning : ['Storms']
Node : Campfire    Parent of Campfire : ['BusTourGroup', 'Storms']
Node : Thunder   Parent of Thunder : ['Lightning']

FOLD 9
--------------------------------------------------------
Node : Storms    Parent of Storms : []
Node : BusTourGroup    Parent of BusTourGroup : []
Node : Lightning  Parent of Lightning : ['Storms']
Node : Campfire    Parent of Campfire : ['BusTourGroup', 'Storms']
Node : Thunder   Parent of Thunder : ['Lightning']

FOLD 10
--------------------------------------------------------
Node : Storms    Parent of Storms : []
Node : BusTourGroup    Parent of BusTourGroup : []
Node : Lightning  Parent of Lightning : ['Storms']
Node : Campfire    Parent of Campfire : ['BusTourGroup', 'Storms']
Node : Thunder   Parent of Thunder : ['Lightning']

percent correct: 99.3%
```

This shows the parents of each node of the resulting DAG derived from 10-fold cross-validation on the forest fire data included in the **data** directory. The final accuracy is reported on the last line.
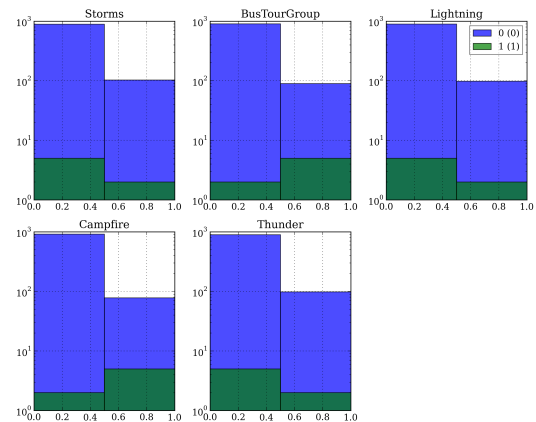
2 Data

Figure 1: The data for the project, separated by dimension. Note that there are far more negative (0) entries than positive (1) in all dimensions.