

DePaul University

College of Computing and

Digital Media

Casey Bennett, PhD

Oct 30, 2019

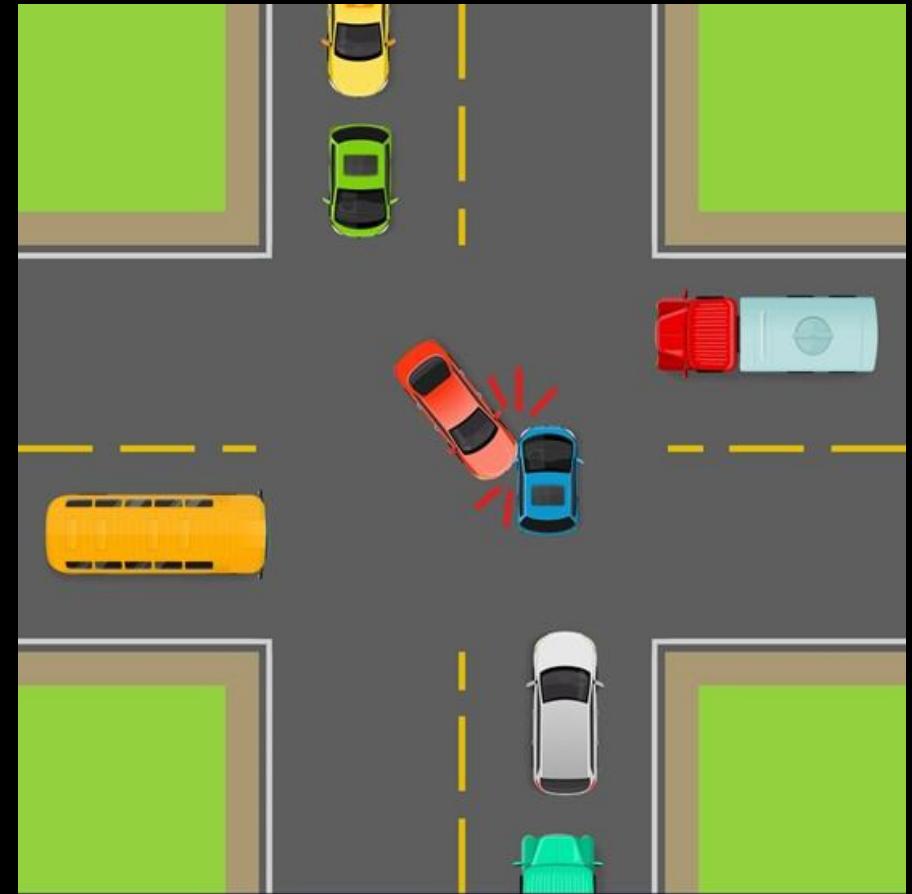
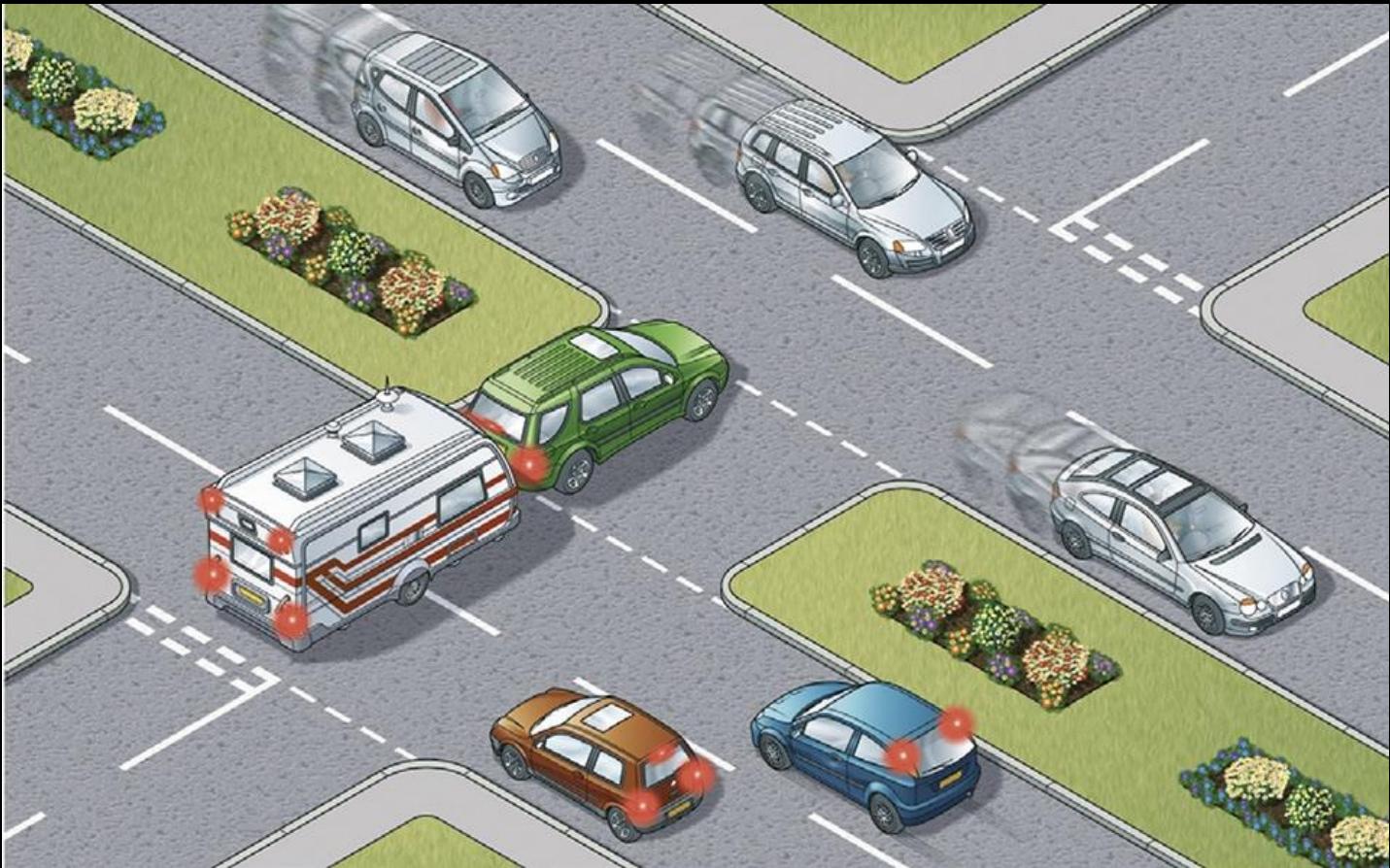
Last Week

- Final Project Grading
- Job Opportunities

Bayesian Networks

<https://pollev.com/caseybennett801>

or text “caseybennett801” to 37607



When driving a car, how do you know when to pull out into traffic?

Probabilities – Anything Could Happen



Bayesian Approach

- We live in a world where we make **observations**
- We form **beliefs** about the world based on those observations
- We use those beliefs to infer **future states**
- We often have to do so when we are **missing** information

Bayes Rule

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$

Bayes Rule

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$

Diagram illustrating Bayes Rule:

- Likelihood**: Points to the term $P(B|A)$.
- Prior Prob**: Points to the term $P(A)$.
- Posterior Prob**: Points to the term $P(A|B)$.
- Marginal Likelihood**: Points to the term $P(B)$.



If I wanted to *raise* the odds of winning at a blackjack table, how would I do it?

From Joint to Conditional

$$P(A,B) = P(A|B)P(B) = P(B,A) = P(B|A)P(A)$$

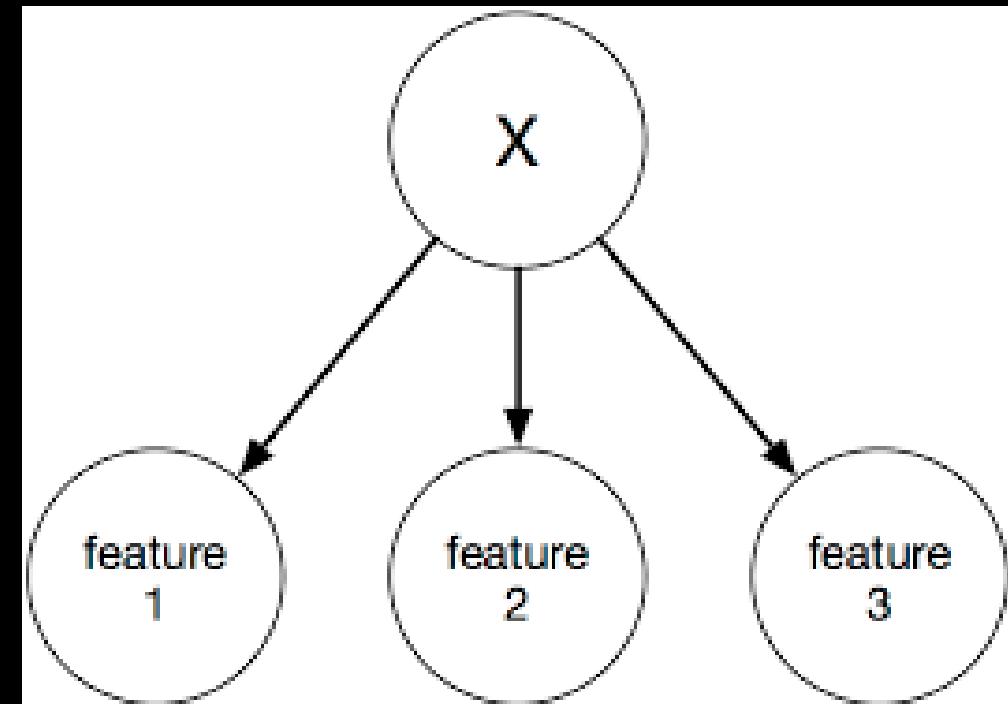
Fundamental Value of Bayes Rule

If I know the co-occurrence of two things, that tells me something about the way world works

Naïve Bayes

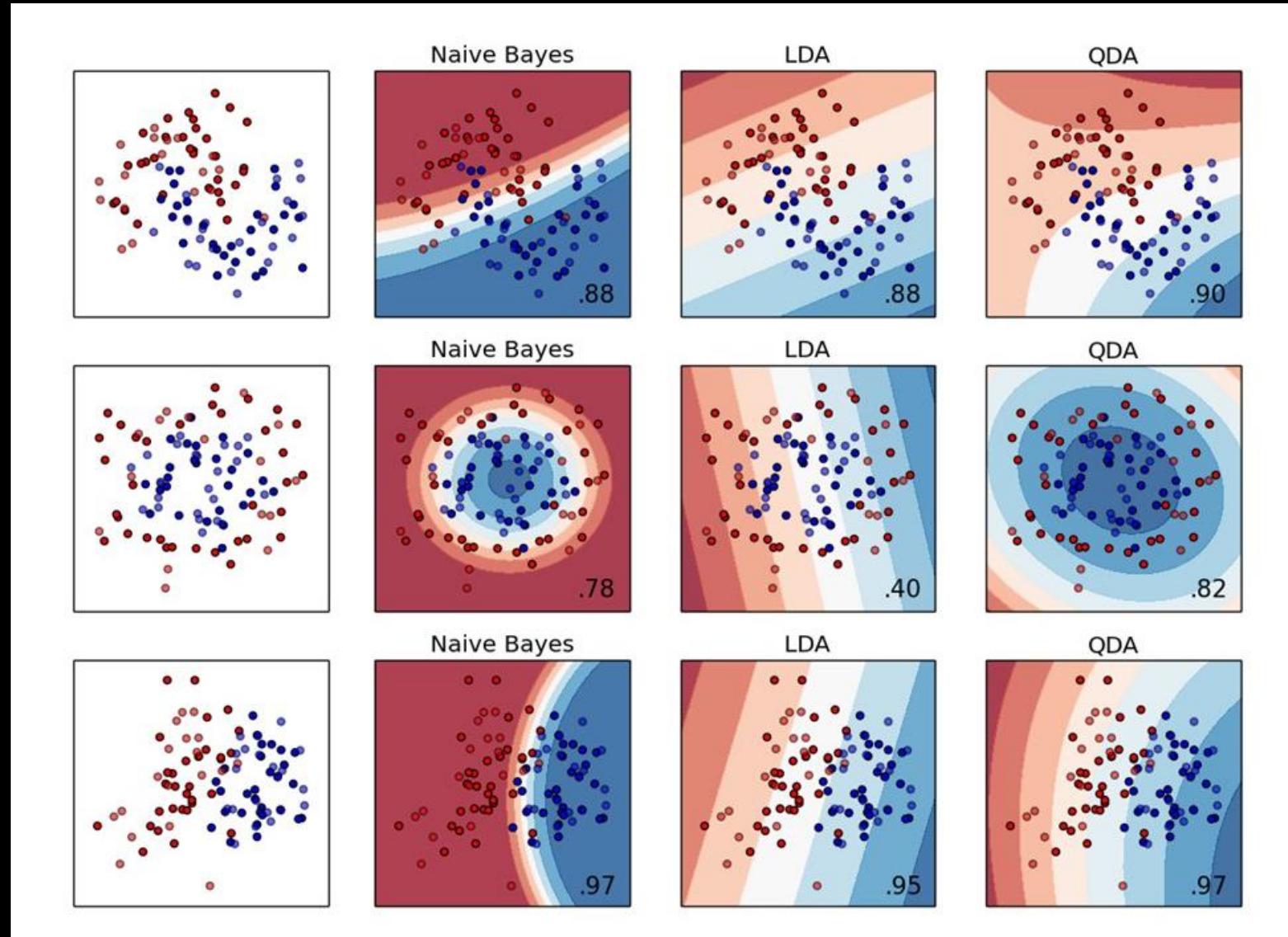
Temp	Humidity	Windy	Play Golf
Hot	High	False	No
Hot	High	True	No
Hot	High	False	Yes
Mild	High	False	Yes
Cool	Normal	False	Yes
Cool	Normal	True	No
Cool	Normal	True	Yes
Mild	High	False	No
Cool	Normal	False	Yes
Mild	Normal	False	Yes
Mild	Normal	True	Yes
Mild	High	True	Yes
Hot	Normal	False	Yes
Mild	High	True	No

Play = Yes (50% prob)



Temp = Hot

Gaussian Naïve Bayes





Let's say I have two friends. Chewie goes everywhere Han does. But if Han does *NOT* go, Chewie may or may not show up

If I throw a surprise birthday party
for Chewie, and invite both of them,
is there a *correlation* whether they
both show up?

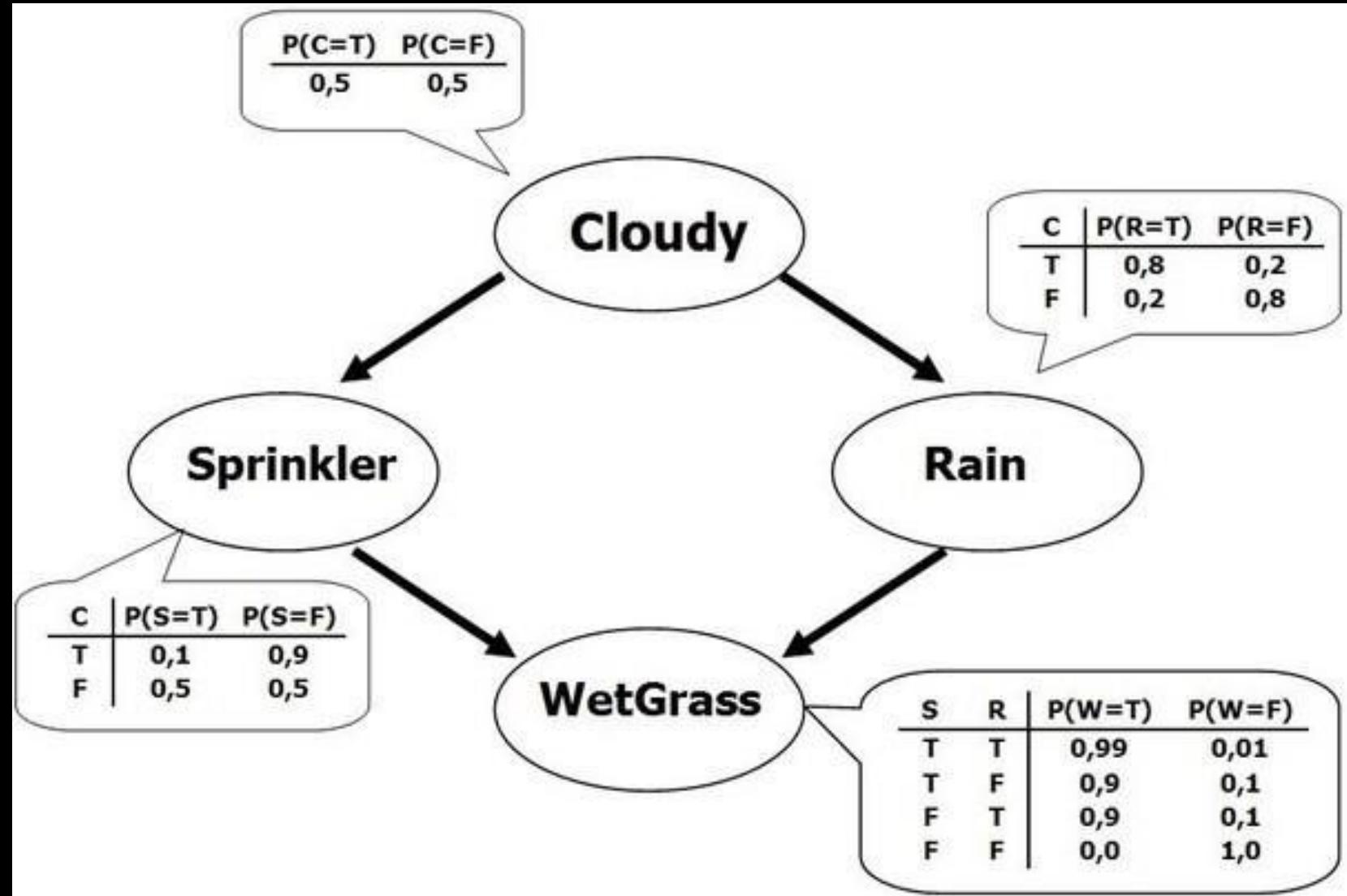
Linear Dependence

\neq

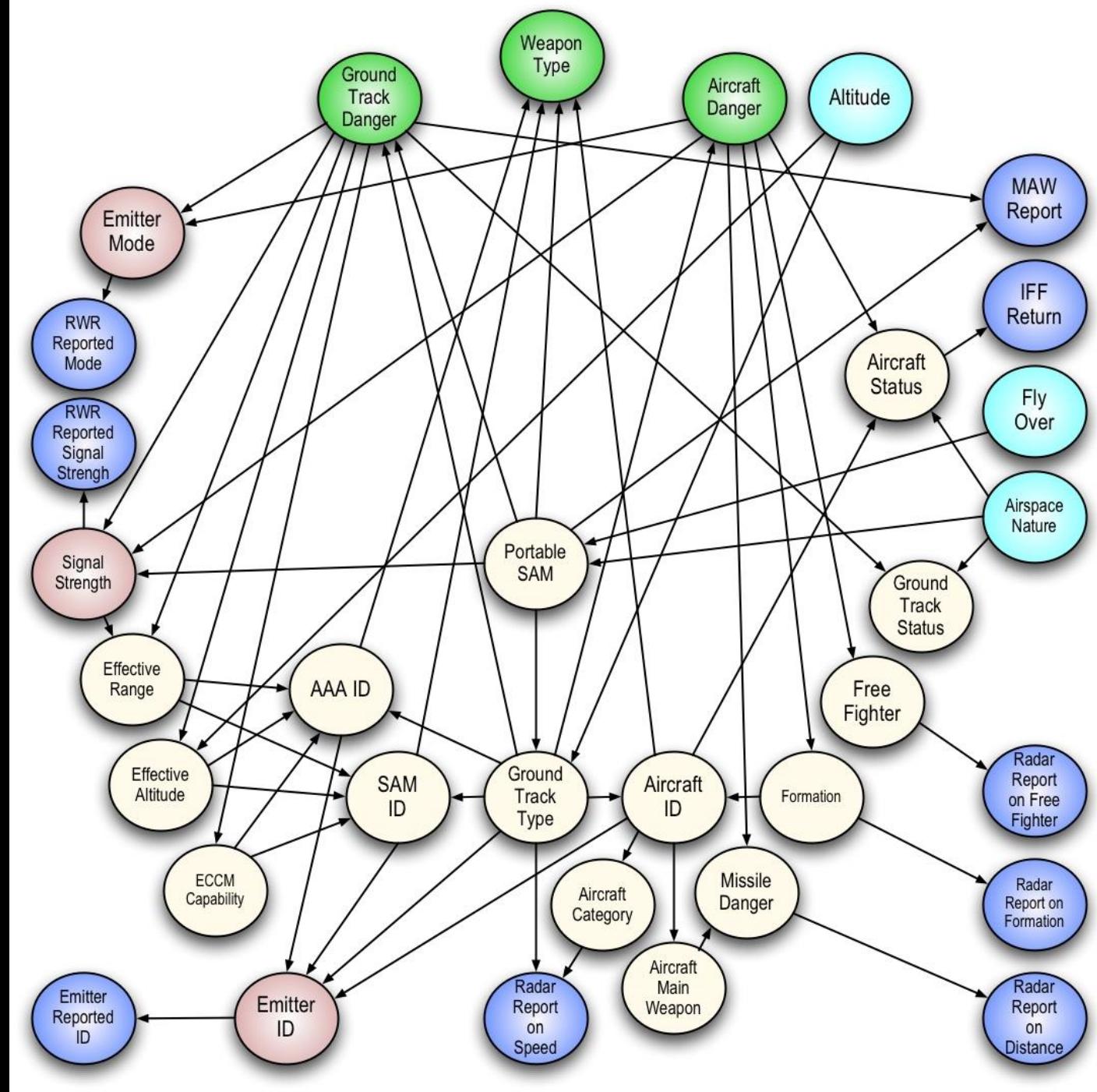
Conditional Dependence

Bayesian Network

Is the grass
wet?



Get a lot
more
complex

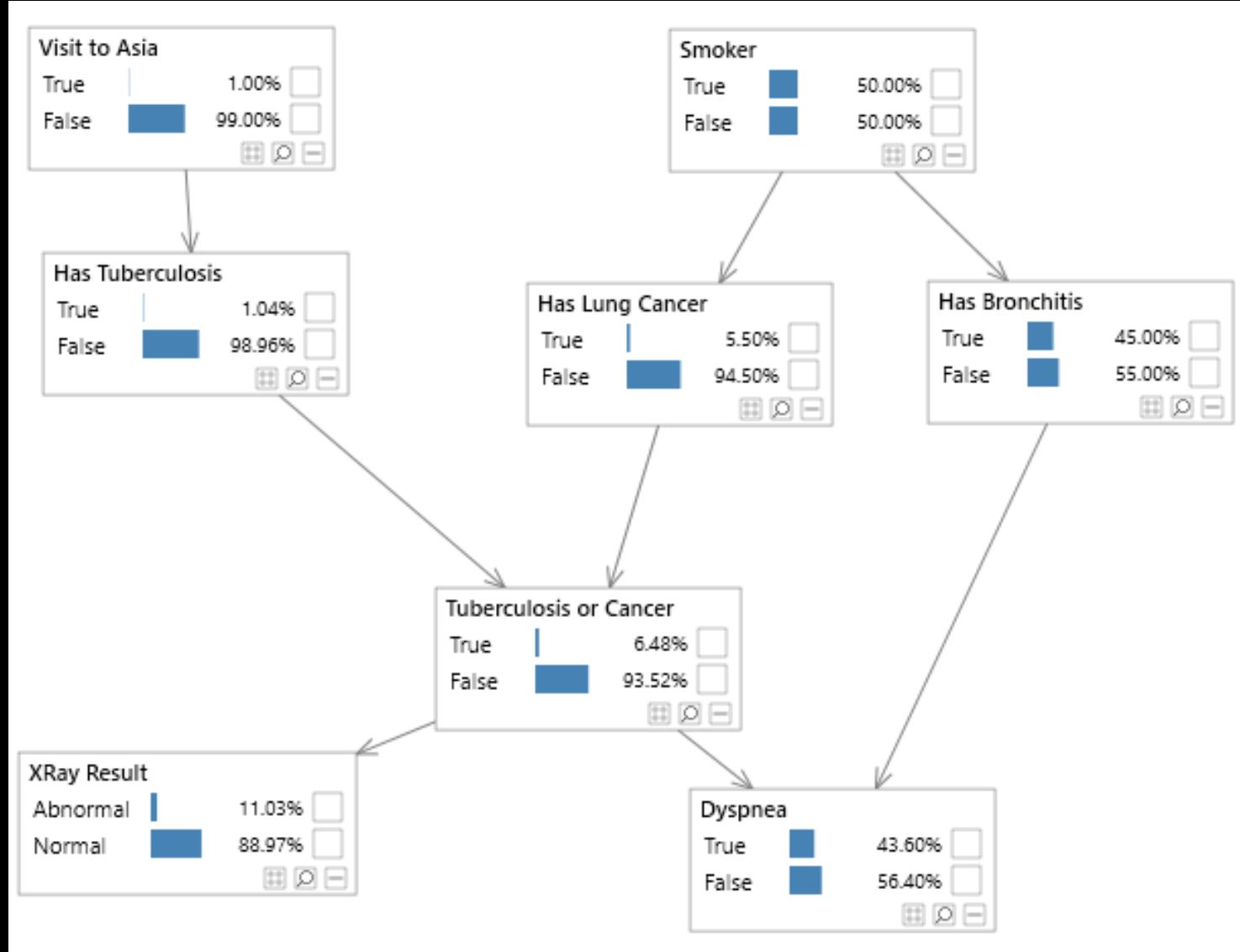




Who do you think is better at
Bayesian reasoning: pigeons or
humans? Why?

- People tend to over-value short term rewards over long term rewards
- We also tend to discount long term costs/risks
- Something in our human brains that makes us *risk takers*

Bayesian Network



Code Implementation

- Outside of Naïve Bayes, there isn't anything in Scikit or Spark
- There is in WEKA though
- There are also multiple implementations of Bayesian Networks via other Python libraries:
 - BayesPy
 - Pomegranate
 - pgmPy
 - Bayes Server

Terms to Know

- Nodes, Edges >> Graph Theory
- Probabilistic Graphical Models
- DAGs = Directed Acyclic Graph
- Dirichlet Distributions
- Markov Blanket

More Terms to Know

- Query Node = Target
- Inference >> Prediction

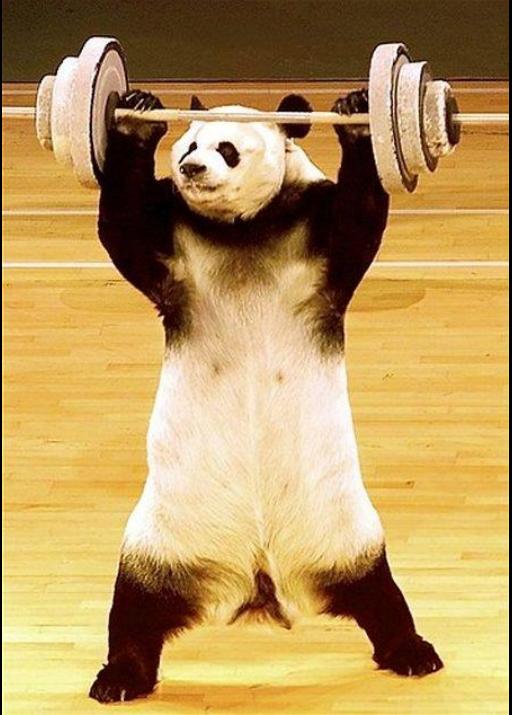
Types of Learning in Bayes Nets

- **Parameter Learning** – learning the conditional probabilities for each node, i.e. the relationship among features as they relate to the target (EM Algorithm)
- **Structural Learning** – learning the network structure, i.e. how the nodes are connected (if at all)

Structural Learning

- **Manual** – often done with the help of domain experts
- **Automated** – multiple approaches for this, e.g. K2, TAN

What if I wanted to understand how
the probability of thing A today
affected the probability of thing B
tomorrow?

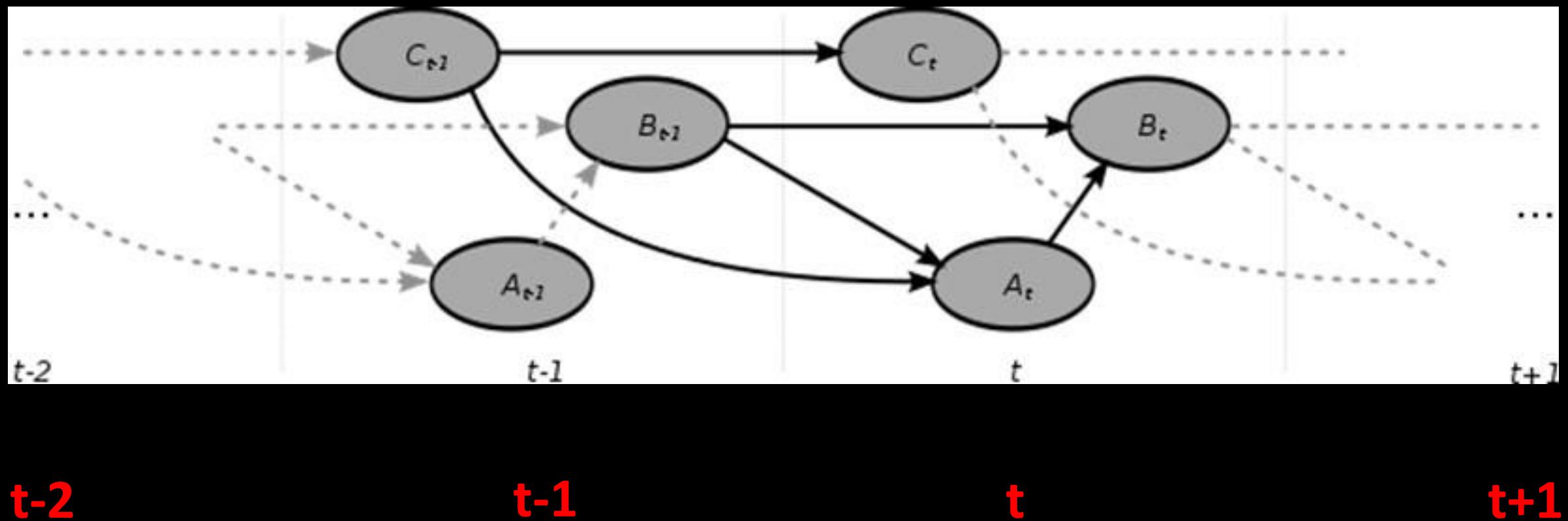


If I go to the gym today, I may be sore tomorrow, then I probably won't go to the gym tomorrow.



How could I figure out how often to go to the gym each week?

Dynamic Bayesian Network (DBNs)



Special Topic: WEKA

Weka

- Tutorials:

<http://www.CaseyBennett.com/teaching.html>

- Knime:

- <https://www.knime.com/>

KNIME

File Edit View Node Help

100% □ 0: KP_Pima □ Node Description □

Filter □

EXAMPLES (guest@publicserver.knime) □ LOCAL (Local Workspace) □ KP_Pima □

Favorite Nodes □ Personal favorite nodes □ Most frequently used nodes □ Last used nodes □

Node Repository □

Time Series □ R □ Reporting □ Weka □ Weka (3.6) □ Classification Algorithms □ bayes □ AODE (3.6) □ AODEsr (3.6) □ BayesNet (3.6) □ BayesianLogisticRegression □ ComplementNaiveBayes □ DMNBtext (3.6) □ HNB (3.6) □ NaiveBayes (3.6) □ NaiveBayesMultinomial □ NaiveBayesMultinomial □ NaiveBayesSimple (3.6) □ NaiveBayesUpdateable □ WAODE (3.6)

CSV Reader → Number To String → Partitioning → BayesNet (3.6) (Node 6) → Weka Predictor (3.6) (Node 5)

Node 1 → Node 2 → Node 3 → Node 6 → Node 5

BayesNet (3.6) (3.6)

Bayes Network learning using various search algorithms and quality measures. Base class for a Bayes Network classifier. Provides datastructures (network structure, conditional probability distributions, etc.) and facilities common to Bayes Network learning algorithms like K2 and B. For more information see: <http://www.cs.waikato.ac.nz/ml/weka/> (based on WEKA 3.6)

For further options, click the 'More' - button in the dialog.

All weka dialogs have

Outline □

Console □ KNIME Console

Log file is located at: H:\Knime_workspace_I400\.metadata\knime\knime.log

WARN 6) No target column specified. Target column was set to Class

WARN Scorer No columns selected yet.

ERROR Scorer Could not save model

WARN 6) No target column specified. Target column was set to Class

```

graph LR
    CSV[CSV Reader] --> N1[Number To String]
    N1 --> N2[Partitioning]
    N2 --> N6[BayesNet 3.6]
    N6 --> N5[Weka Predictor 3.6]
  
```



9:42 AM

2/13/2014

KNIME

File Edit View Node Help

100%

KNIME Explorer X *0: KP_Pima X Node Description X

Filter

EXAMPLES (guest@publicserver.knime.com) LOCAL (Local Workspace) KP_Pima

Favorite Nodes X Personal favorite nodes Most frequently used nodes Last used nodes

Node Repository Mining Bayes Clustering Rule Induction Neural Network Decision Tree Misc Classifiers Ensemble Learning Item Sets / Association Rules MDS PCA SVM Scoring Enrichment Plotter Entropy Scorer Numeric Scorer ROC Curve Scorer Meta Chemistry Meta

Dialog - 0:8 - ROC Curve

File Standard Settings Flow Variables Memory Policy

Class column S Class Positive class value 1

Columns containing the positive class probabilities

Exclude Select Include

Column(s): Search Select all search hits

Times Pregnant Blood Glucose Blood Pressure Skin Fold Thickness 2-Hour Insulin BMI Family History Age 0

add > add all >> << remove << remove all

D 1

OK Apply Cancel ?

No curves defined
No columns selected yet.
Could not save model
No curves defined
failed to apply settings: No class probability column(s) selected

BayesNet (3.6)

```

graph LR
    N1[CSV Reader] --> N2[Number To String]
    N2 --> N3[Partitioning]
    N3 --> N6[Node 6]
    N3 --> N5[Node 5]
    N6 --> N7[Scorer]
    N5 --> N7
    N5 --> N8[ROC Curve]
  
```

ROCKurve

This node draws ROC curves for two-class classification problems. The input table must contain a column with the real class values (including all class values as possible values) and a second column with the probabilities that an item (=row) will be classified as being from the selected class. Therefore only learners/predictors that output class probabilities can be used.

In order to create a ROC curve for a model, the input table is first sorted by the class probabilities for the positive class i.e. rows for which the

10:05 AM 2/13/2014

KNIME

File Edit View Node Help

100%

KNIME Explorer □ *0: KP_Pima □ Node Description □

Filter

EXAMPLES (guest@publicserver.knime.com) LOCAL (Local Workspace) KP_Pima

Favorite Nodes □ Personal favorite nodes Most frequently used nodes Last used nodes

Node Repository □ Mining Bayes Clustering Rule Induction Neural Network Decision Tree Misc Classifiers Ensemble Learning Item Sets / Association Rules MDS PCA SVM Scoring Enrichment Plotter Entropy Scorer Numeric Scorer ROC Curve Scorer Meta Chemistry Meta

CSV Reader → Number To String → Partitioning → BayesNet (3.6) → Node 6 → Weka Predictor (3.6) → Node 5 → Node 7 → Scorer → ROC Curve

Weka Predictor (3.6) dialog:

- File tab:
 - Options tab: About, Bayes Network learning using various search algorithms and quality measures.
 - Flow Variables tab: Not visible.
 - Memory Policy tab: Not visible.
- About tab:
 - BIFFFile: []
 - debug: False
 - estimator: Choose SimpleEstimator -A 0.5
 - searchAlgorithm: Choose K2 -P 2 -S BAYES
 - useADTree: False
 - Select target column: Class
- Preliminary Attribute check:
 - Times Pregnant: ok
 - Blood Glucose: ok
 - Blood Pressure: ok
 - Skin Fold Thickness: ok
 - 2-Hour Insulin: ok
 - BMI: ok
 - Family History: ok
 - Age: ok
 - Class: ok
- (based on WEKA 3.6)
- For further options, click the 'More' - button in the dialog.
- All weka dialogs have

BayesNet (3.6) description:

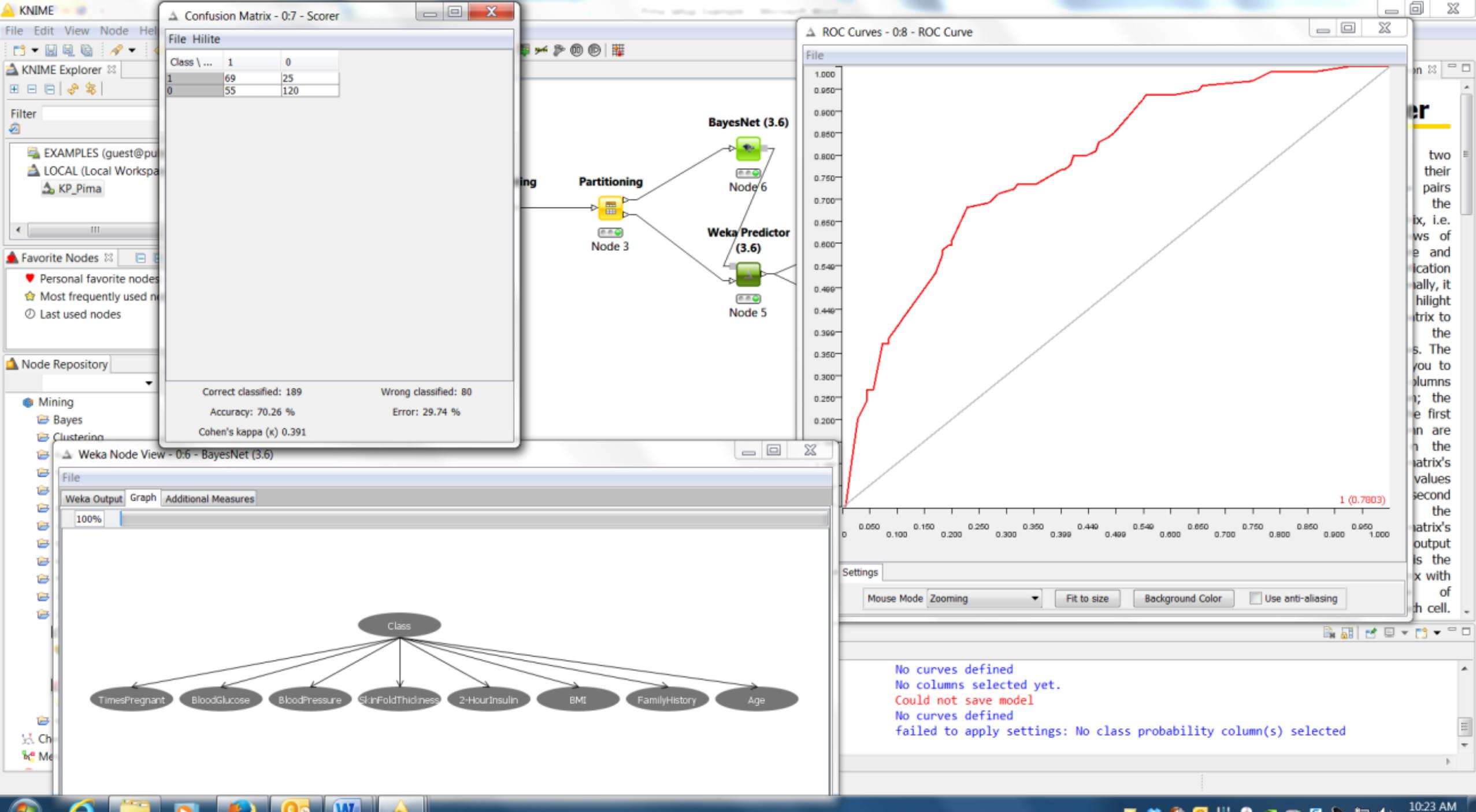
Bayes Network learning using various search algorithms and quality measures. Base class for a Bayes Network classifier. Provides datastructures (network structure, conditional probability distributions, etc.) and facilities common to Bayes Network learning algorithms like K2 and B. For more information see: <http://www.cs.waikato.ac.nz/ml/weka/> (based on WEKA 3.6)

For further options, click the 'More' - button in the dialog.

All weka dialogs have

column(s) selected

10:43 AM 2/13/2014



KNIME

File Edit View Node Help

KNIME Explorer □ *0: KP_Pima □ Node Description □

Filter EXAMPLERS (guest@publicserver.knime) LOCAL (Local Workspace) KP_Pima

CSV Reader → Number To String → Partitioning → AttributeSelectedClassifier (3.6) (Node 9) → Weka.Predictor (3.6) (Node 5) → Scorer (Node 7) → ROC Curve

Dialog - 0:9 - AttributeSelectedClassifier (3.6)

File Options Flow Variables Memory Policy

About: Dimensionality of training and test data is reduced by attribute selection before being passed on to a classifier.

classifier: Choose BayesNet -D -Q weka.classifiers.bayes.net.search.local.K2

debug: False

evaluator: Choose CfsSubsetEval

search: Choose BestFirst -D 1 -N 5

Select target column: Class

Preliminary Attribute check:

- Times Pregnant: ok
- Blood Glucose: ok
- Blood Pressure: ok
- Skin Fold Thickness: ok
- 2-Hour Insulin: ok
- BMI: ok
- Family History: ok
- Age: ok
- Class: ok

OK Apply Cancel ?

weka.gui.GenericObjectEditor

weka.classifiers.bayes.BayesNet

About: Bayes Network learning using various search algorithms and quality measures.

BIFFile:

debug: False

estimator: Choose SimpleEstimator -A 0.5

searchAlgorithm: Choose K2 -P 2 -S BAYES

useADTree: False

Open... Save... OK Cancel

weka.gui.GenericObjectEditor

weka.classifiers.bayes.net.search.local.K2

About: This Bayes Network learning algorithm uses a hill climbing algorithm restricted by an order on the variables.

InitAsNaiveBayes: True

markovBlanketClassifier: False

maxNrOfParents: 2

randomOrder: False

scoreType: BAYES

Open... Save... OK Cancel

FilteredClassifier (3.6)
Grading (3.6)
GridSearch (3.6)
LogitBoost (3.6)
MetaCost (3.6)
MultiBoostAB (3.6)
MultiClassClassifier (3.6)

Outline □

KNIME Console

```

WARN 6) No target column specified. Target column was set to Class
WARN Decision Tree Learner Guessing target column: "Class".
WARN 6) No target column specified. Target column was set to Class
WARN 6) No target column specified. Target column was set to Class
WARN 6) No target column specified. Target column was set to Class
  
```

11:38 AM 2/13/2014

KNIME

File Edit View Node Help

100% 0: KP_Pima Node Description

KNIME Explorer EXAMPLERS (guest@publicserver.knime.com) LOCAL (Local Workspace) KP_Pima

Filter

Favorite Nodes Personal favorite Most frequent Last used nodes

Node Repository Reporting Weka Weka (3.6) Classifiers bayes functions lazy meta learners neural networks Adaboost AdaBoost Attributor Bagging Classification via regression CostSensitiveClassifier (3.6) Dagging (3.6) Decorate (3.6) END (3.6)

Diagram

```

graph LR
    N1[CSV Reader] --> N2[Number To String]
    N2 --> N3[Partitioning]
    N3 --> N4[AttributeSelectedClassifier 3.6]
    N3 --> N5[Weka Predictor 3.6]
    N4 --> N6[Scorer]
    N5 --> N7[Scorer]
    N5 --> N8[ROC Curve]
    
```

Dialog - 0:9 - AttributeSelectedClassifier (3.6)

File Options Flow Variables Memory Policy

About Dimensionality of training and test data is reduced by attribute selection before being passed on to a classifier.

More Capabilities

classifier Choose J48 -C 0.25 -M 2

debug False

evaluator Choose ChiSquaredAttributeEval

search Choose Ranker -T 3.841 -N -1

Select target column S Class

OK Apply Cancel ?

Preliminary Attribute check

- Times Pregnant: ok
- Blood Glucose: ok
- Blood Pressure: ok
- Skin Fold Thickness: ok
- 2-Hour Insulin: ok
- BMI: ok
- Family History: ok
- Age: ok
- Class: ok

weka.gui.GenericObjectEditor

weka.attributeSelection.Ranker

About Ranker More

Ranks attributes by their individual evaluations.

generateRanking True

numToSelect -1

startSet

threshold 3.841

Open... Save... OK Cancel

Decision Tree Learner

WARN Guessing target column: "Class".

WARN No target column specified. Target column was set to Class

WARN No target column specified. Target column was set to Class

WARN No target column specified. Target column was set to Class

WARN No target column specified. Target column was set to Class

WARN No target column specified. Target column was set to Class

Windows Taskbar: e-mail, Firefox, Word, KNIME logo, 11:46 AM, 2/13/2014

AttributeSelectedClassifier (3.6)

Dimensionality of training and test data is reduced by attribute selection before being passed on to a classifier.
(based on WEKA 3.6)

For further options, click the 'More' -button in the dialog.

All weka dialogs have a panel where you can specify classifier-specific parameters.

Dialog Options

Class column Choose the column that contains the



KNIME Explorer □ EXTERNAL (knime-guest@http://public-server.knime.com) □ LOCAL (Local Workspace)

2: Spark_test □ 4: ParoCollar_HealthStatusPredict □ *0: ParoCollar_AttitudeChangePredict

Dialog - 0:11 - AttributeSelectedClassifier (3.7)

File

Options Additional Options Flow Variables Memory Policy

About
Dimensionality of training and test data is reduced by attribute selection before being passed on to a classifier.

classifier: Choose LibSVM -S 3 -K 2 -D 3 -G 0.0 -R 0.0 -N 0.5 -M 40.0 -C 1.0 -E 0.001

debug: False

evaluator: Choose ReliefAttributeEval -M 1 -D 1 -K 10

search: Choose GeneticSearch -Z 20 -G 20 -C 0.6 -M 0.033 -R 20 -S 1

Select target column: Class

Command line options (press 'Apply' to update)
-E 0.001 -P 0.1 -model "C:\Program Files\KNIME" -seed 1

Preliminary Attribute check

- Sentiment_delta: ok
- NARS_delta: ok
- Class: ok
- OQ-45 BL: ok
- WHOQOL BL: ok
- PHQ9 BL: ok
- UCLA BL: ok
- Active Time: ok
- Total Calories Burned: ok
- Sleep awakenings: ok
- Activity Cnt: ok
- Activity Pct: ok
- Activity_Srt Cnt: ok
- Activity_Srt Pct: ok
- Morning: ok
- Afternoon: ok
- Evening: ok
- OverNight: ok

OK Apply Cancel ?

Value Counter □ **Node 46** □ **Σi**

CSV Reader □ **Column Filter** □ **Column Rename** □ **Column Filter** □ **Row Filter** □ **Normalizer** □ **Numeric Binner** □ **CAIM Binner** □ **Scorer** □ **Numeric Scorer** □ **Scorer** □ **Numeric Scorer** □ **ROC Curve** □

Node 49 □ **Node 5** □ **Node 48** □ **Node 6** □ **Node 50** □ **Node 51** □ **Node 10** □ **Node 52** □

rkflowRunnable Status: Error: Unable to load factory class "org.knime.ext.weka.kr...

rkflowRunnable Status: Error: Cross Validation 3:53:46

rkflowRunnable Status: Error: Unable to load factory class "org.knime.ext.weka.kr...

rkflowRunnable Status: Error: Cross Validation 3:53:50

rkflowRunnable Status: Error: Unable to load factory class "org.knime.ext.weka.kr...

rkflowRunnable Status: Error: Unable to load factory class "org.knime.ext.weka.kr...

rkflowRunnable Status: Error: Cross Validation 3:53:52

rkflowRunnable Status: Error: Unable to load factory class "org.knime.ext.weka.kr...

AttributeSelecte (3.7)

Dimensionality of training and test data is reduced by attribute selection before being passed on to a classifier
(based on WEKA 3.7)

For further options, click the 'More' - button in the dialog.

All weka dialogs have a panel where you can specify classifier-specific parameters.

Dialog Options

Options



KNIME Explorer ▾ EXTERNAL (knime-guest@http://public-server.knime.com) ▾ LOCAL (Local Workspace)

0: Spark_test ▾ 4: ParoCollar_HealthStatusPredict ▾ *2: ParoCollar_AttitudeChangePredict

CSV Reader → **Column Filter** → **Column Rename** → **Column Filter** → **Row Filter** → **Normalizer** → **Numeric Binner** → **Value Counter** → **Σi** → **Node 46**

Dialog - 2:11 - AttributeSelectedClassifier (3.7)

File

Options Additional Options Flow Variables Memory Policy

About

Dimensionality of training and test data is reduced by attribute selection before being passed on to a classifier.

More Capabilities

classifier Choose **LibSVM -S 3 -K 2 -D 3 -G 0.0 -R 0.0 -N 0.5 -M 40.0 -C 1.0 -E 0.001**

debug weka

evaluator

search

Select target Class

Command line -E 0.00

Preliminary Attribute check

- Sentiment_delta: ok
- NARS_delta: ok
- Class: ok
- OQ-45 BL: ok
- WHOQOL BL: ok
- PHQ9 BL: ok
- UCLA BL: ok
- Active Time: ok
- Total Calories Burned: ok
- Sleep awakenings: ok
- Activity Cnt: ok
- Activity Pct: ok
- Activity_Srt Cnt: ok
- Activity_Srt Pct: ok
- Morning: ok
- Afternoon: ok
- Evening: ok
- OverNight: ok

IME" -seed 1

OK Apply Cancel ?

Scorer → **Node 49** → **Node 5** → **Normalizer** → **Node 48** → **Value Counter** → **Σi** → **Node 46**

CAIM Binner → **Node 6**

Numeric Scorer → **Node 50**

Scorer → **Node 51** → **Numeric Scorer** → **Node 52** → **ROC Curve**

Welcome to KNIME Analytics Platform v3.6.1.v201809030900 ***
Copyright by KNIME AG, Zurich, Switzerland ***

located at: C:\Users\Casey\Dropbox\Knime\Knime_workspace6\.metadata\knime\knime.log
Tue 24/09/2018 2:44 Sort column 'P (Class=Bin1)_prob' does not exist

AttributeSelecte (3.7)

Dimensionality of training and test data is reduced by attribute selection before being passed on to a classifier (based on WEKA 3.7)

For further options, click the 'More' - button in the dialog.

All weka dialogs have a panel where you can specify classifier-specific parameters.

Dialog Options

Options



KNIME Explorer

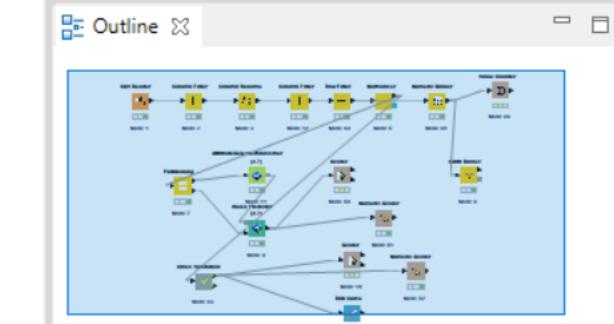
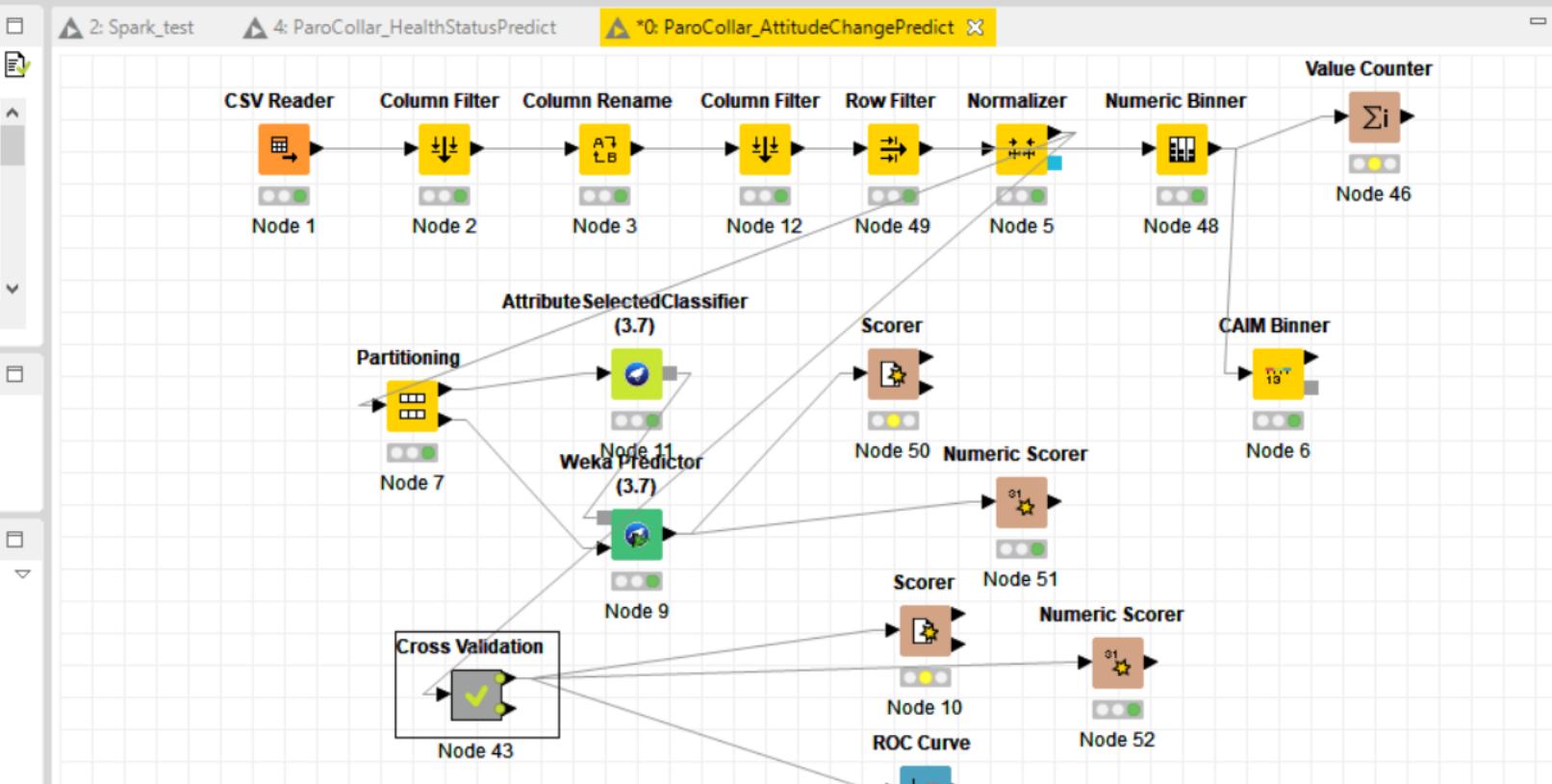
- EXAMPLES (knime-guest@http://public-server.knime.com)
- LOCAL (Local Workspace)
 - CAIM_Sample_Size
 - CDOI
 - CDOI_TransModel
 - CDOI_TransModel_Apply
 - CDOI_TransModel_ApplyStatic

Favorite Nodes

- Personal favorite nodes
- Most frequently used nodes
- Last used nodes

Node Repository

- IO
- Manipulation
- Views
- Analytics
- Database
- Other Data Types
- Structured Data
- Scripting
- Tools & Services
- KNIME Labs
- Workflow Control
- Social Media
- Reporting



Console

KNIME Console

```

ERROR LoadWorkflowRunnable
  
```

Status:

```

Status: Error: Unable to load factory class "org.knime.ext.weka.kr
Status: Error: Cross Validation 3:53:46
Status: Error: Unable to load factory class "org.knime.ext.weka.kr
Status: Error: Cross Validation 3:53:50
Status: Error: Unable to load factory class "org.knime.ext.weka.kr
Status: Error: Unable to load factory class "org.knime.ext.weka.kr
Status: Error: Cross Validation 3:53:52
Status: Error: Unable to load factory class "org.knime.ext.weka.kr
  
```

Cross Validation

Description: Provides a skeleton of nodes necessary for cross validation

Contained nodes:

- X-Aggregator:** Node that aggregates the result for cross validation.
- X-Partitioner:** Data partitioner for use in a cross-validation flow
- Weka Predictor (3.7):**



KNIME Explorer

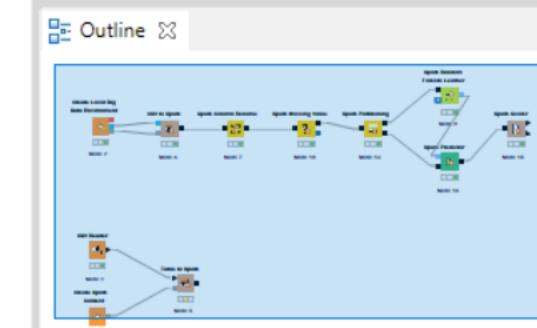
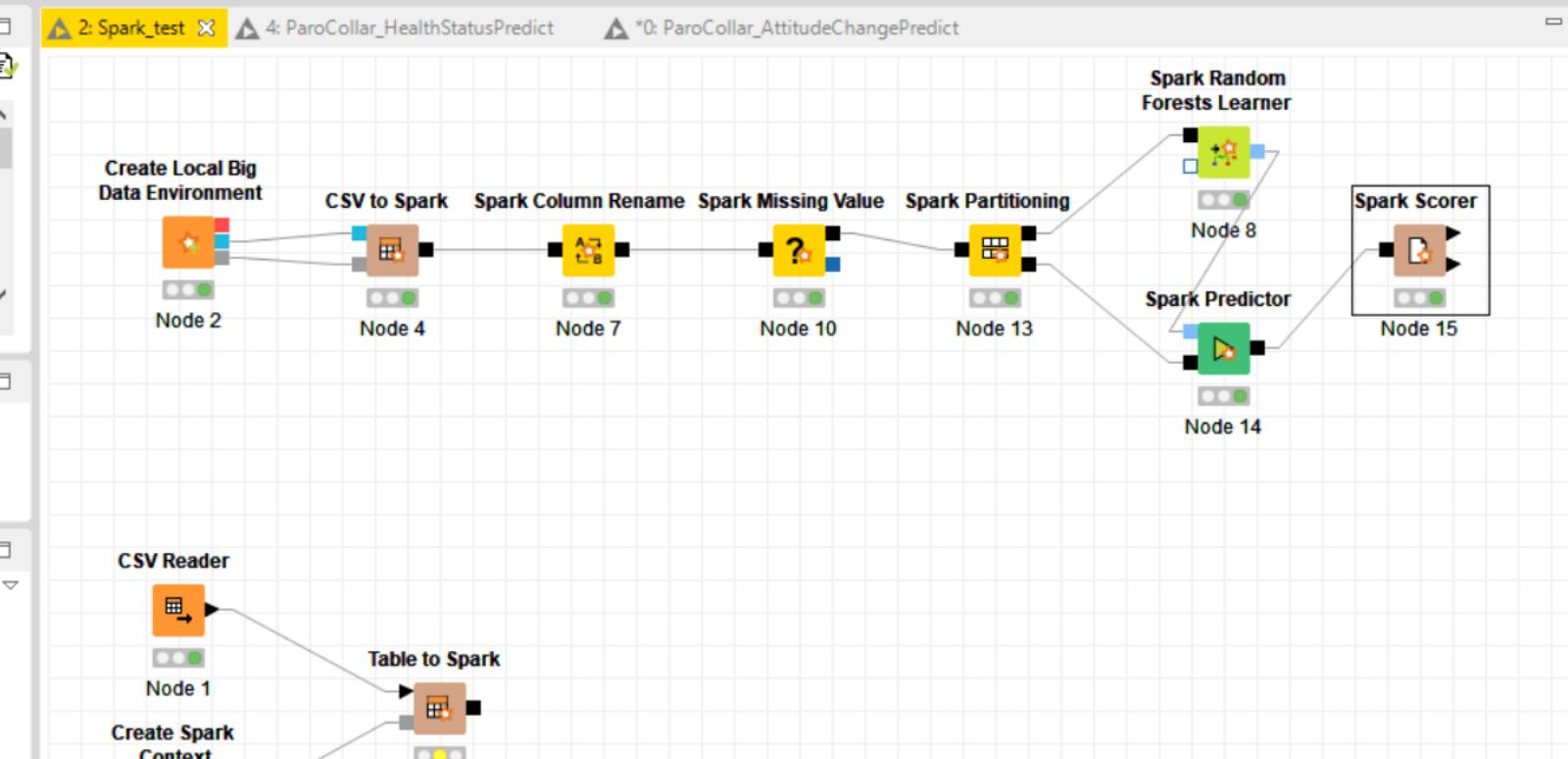
- > EXAMPLES (knime-guest@http://public-server.knime.com)
- > LOCAL (Local Workspace)
 - CAIM_Sample_Size
 - CDOI
 - CDOI_TransModel
 - CDOI_TransModel_Apply
 - CDOI_TransModel_ApplyStatic

Favorite Nodes

- Personal favorite nodes
- Most frequently used nodes
- Last used nodes

Node Repository

- > IO
- > Manipulation
- > Views
- > Analytics
- > Database
- > Other Data Types
- > Structured Data
- > Scripting
- > Tools & Services
- > KNIME Labs
- > Workflow Control
- > Social Media
- > Reporting



Console

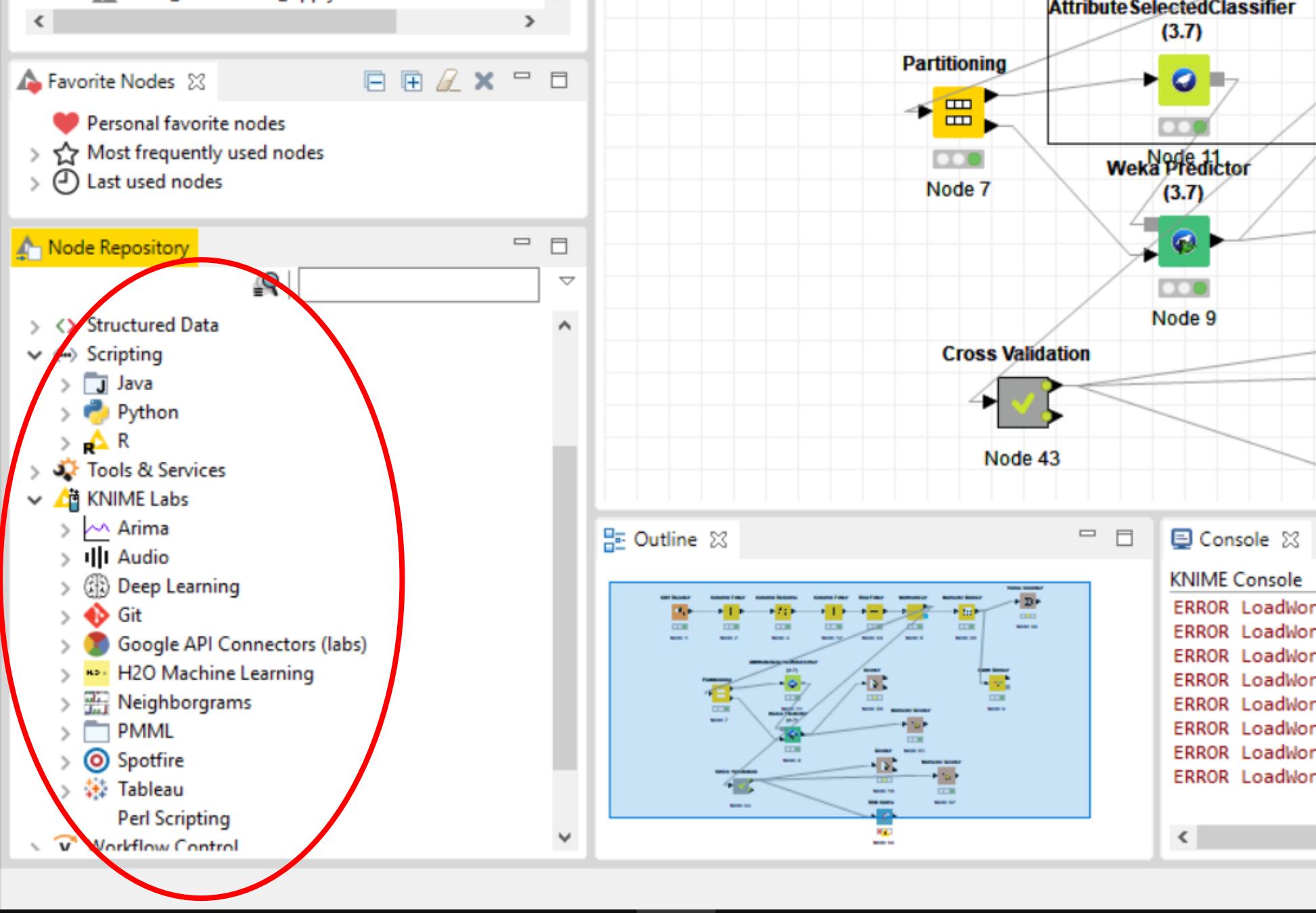
KNIME Console

```

ERROR LoadWorkflowRunnable
Status: Error: Unable to load factory class "org.knime.ext.weka.kr
Status: Error: Cross Validation 3:53:46
Status: Error: Unable to load factory class "org.knime.ext.weka.kr
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Status: Error: Unable to load factory class "org.knime.ext.weka.kr
Status: Error: Cross Validation 3:53:52
Status: Error: Unable to load factory class "org.knime.ext.weka.kr
  
```

Spark Scorer

Compares two columns by their attribute value pairs and shows the confusion matrix, i.e. how many rows of which attribute and their classification match. The dialog allows you to select two columns for comparison; the values from the first selected column are represented in the confusion matrix's rows and the values from the second column by the confusion matrix's columns. The output of the node is the confusion matrix with the number of matches in each cell.



Personal favorite nodes

Most frequently used nodes

Last used nodes

Node Repository

Scripting

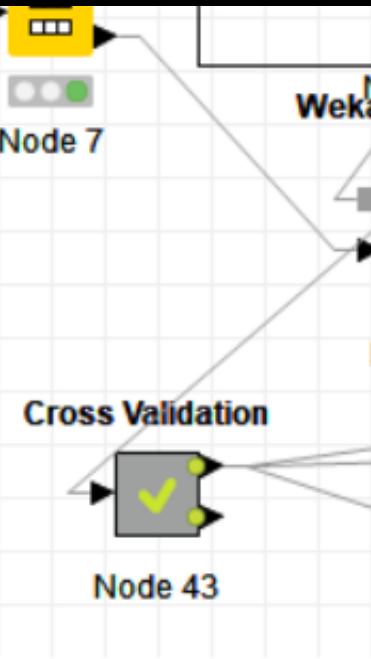
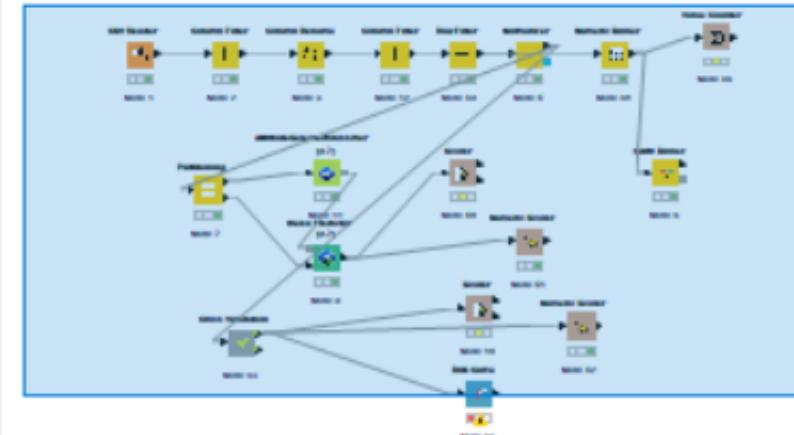
- Java
- Python
- R

Tools & Services

KNIME Labs

- Arima
- Audio
- Deep Learning
 - Keras
 - Python
 - TensorFlow
 - DL Network Executor
- Git
- Google API Connectors (labs)
- H2O Machine Learning
- Neighborgrams
- PMML
- Snifffire

Outline





KNIME Explorer

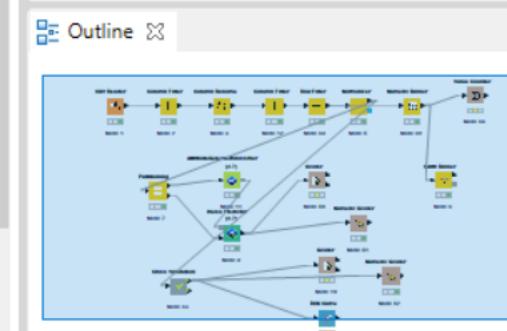
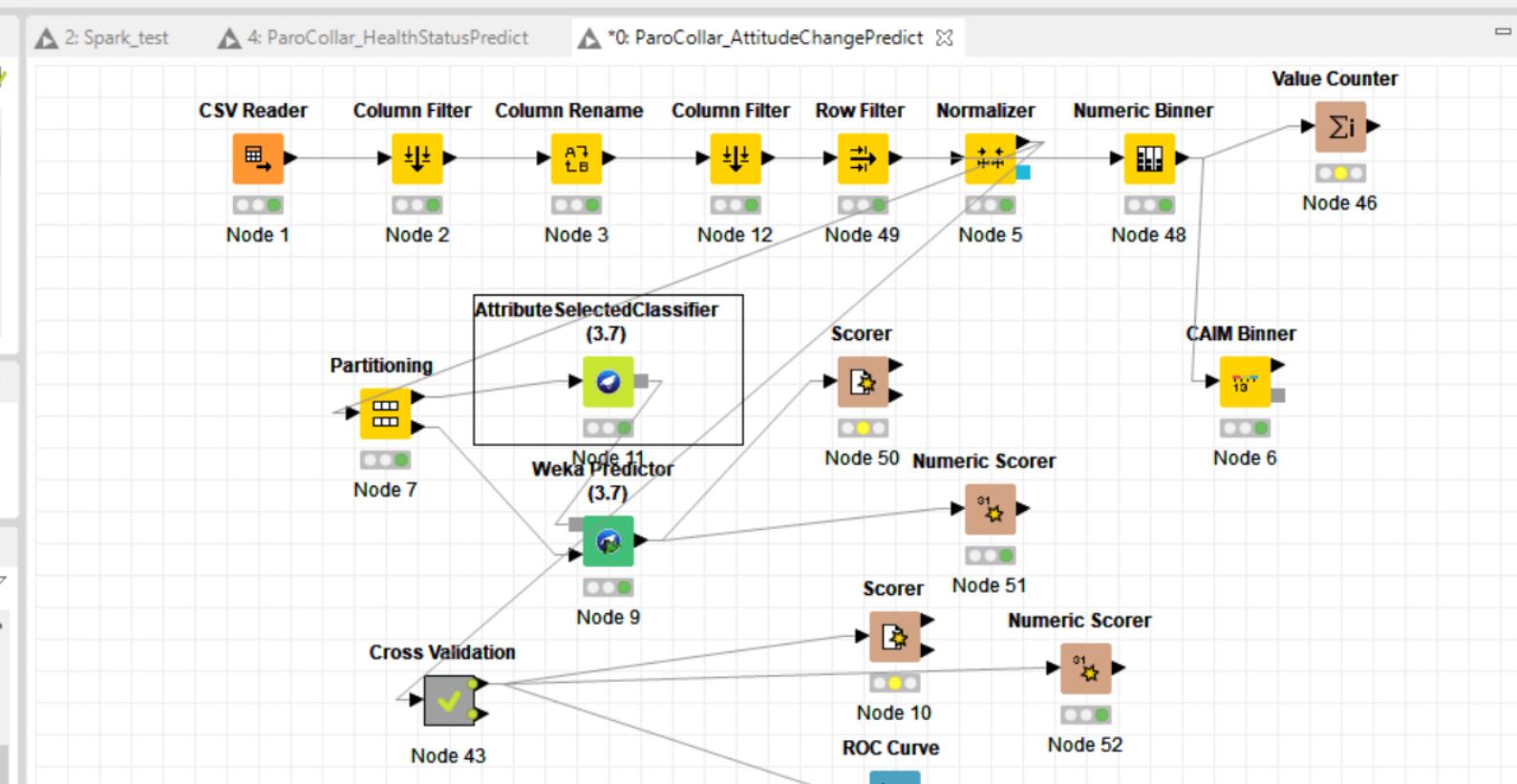
- EXAMPLES (knime-guest@http://public-server.knime.com)
- LOCAL (Local Workspace)
 - CAIM_Sample_Size
 - CDOI
 - CDOI_TransModel
 - CDOI_TransModel_Apply
 - CDOI_TransModel_ApplyStatic

Favorite Nodes

- Personal favorite nodes
- Most frequently used nodes
- Last used nodes

Node Repository

- Scripting
 - Java
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 - R
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 - Neighborhoods
 - PMML
 - Spatfire



Console

KNIME Console

```

ERROR LoadWorkflowRunnable
Status: Error: Unable to load factory class "org.knime.ext.weka.kr
Status: Error: Cross Validation 3:53:46
Status: Error: Unable to load factory class "org.knime.ext.weka.kr
Status: Error: Cross Validation 3:53:50
Status: Error: Unable to load factory class "org.knime.ext.weka.kr
Status: Error: Unable to load factory class "org.knime.ext.weka.kr
Status: Error: Cross Validation 3:53:52
Status: Error: Unable to load factory class "org.knime.ext.weka.kr
  
```

Node Description

AttributeSelectedClassifier (3.7)

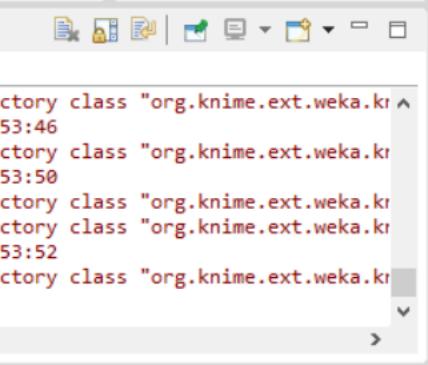
Dimensionality of training and test data is reduced by attribute selection before being passed on to a classifier
(based on WEKA 3.7)

For further options, click the 'More' - button in the dialog.

All weka dialogs have a panel where you can specify classifier-specific parameters.

Dialog Options

Options



For next week

- 1) Paper Review #2 due this week
- 2) HW4 due next week
- 3) Presentation schedule