# WEKA Introduction

#### WEKA software

#### WEKA homepage

http://www.cs.waikato.ac.nz/ml/weka/



#### WEKA software

- Data mining software written in Java (distributed under the GNU Public License).
- Used for research, education, and applications.
- Comprehensive set of data preprocessing tools, learning algorithms and evaluation methods.
- Graphical user interfaces including data visualization.
- Environment for comparing learning algorithms.
- Book and development versions.

#### ARFF format file

- @relation data-relation-name
- @attribute attribute1 real
  @attribute attribute2 { nominal1, nominal2 }
  @attribute class { class1, class2 }
- @data
  1, nominal1, class1
  2, nominal2, class2
  3, ?, class1
- 4, nominal 1, class 2

#### WEKA GUI Chooser

 The Weka GUI Chooser (class weka.gui.GUIChooser) provides a starting point for launching Weka's main GUI applications and supporting tools. If one prefers a MDI ("multiple document interface") appearance, then this is provided by an alternative launcher called "Main" (class weka.gui.Main).

 The GUI Chooser consists of four buttons one for each of the four major Weka applications—and four menus.

## WEKA GUI Chooser

Weka GUI Chooser	- 0 ×
Program Visualization Tools Help	
	Applications
WEKA	Explorer
The University of Waikato	Experimenter
Waikato Environment for Knowledge Analysis Version 3.6.9	KnowledgeFlow
(c) 1999 - 2013 The University of Waikato Hamilton, New Zealand	Simple CLI

### WEKA Experimenter

- An environment for performing experiments and conducting statistical tests between learning schemes.
- The Weka Experiment Environment enables the user to create, run, modify, and analyse experiments in a more convenient manner than is possible when processing the schemes individually. For example, the user can create an experiment that runs several schemes against a series of datasets and then analyse the results to determine if one of the schemes is (statistically) better than the other schemes.

# WEKA Experimenter

🕝 Weka Experiment Environment				
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Experiment Configuration Mode:	<ul> <li>Simple</li> </ul>	Advanced		
Open	Save	New		
Results Destination				
ARFF file 👻 Filename:		Browse		
Experiment Type	Iteration Control			
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Number of folds:	Oata sets first			
Classification     Cassification	<ul> <li>Algorithms first</li> </ul>			
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	Load options			
	Notes			

#### WEKA Knowledge Flow

- This environment supports essentially the same functions as the Explorer but with a drag-anddrop interface. One advantage is that it supports incremental learning.
- The KnowledgeFlow presents a data-flow inspired interface to WEKA. The user can select WEKA components from a tool bar, place them on a layout canvas and connect them together in order to form a knowledge flow for processing and analyzing data. At present, all of WEKA's classifiers, filters, clusterers, loaders and savers are available in the KnowledgeFlow along with some extra tools.

## WEKA Knowledge Flow

🕝 Wel	ka KnowledgeFlow E	nvironment						-		x
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Status	Log									
Compo		Parameters		Time	Status					
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### WEKA Simple CLI

- Provides a simple command-line interface that allows direct execution of WEKA commands for operating systems that do not provide their own command line interface.
- The Simple CLI provides full access to all Weka classes, i.e., classifiers, filters, clusterers, etc., but without the hassle of the CLASSPATH (it facilitates the one, with which Weka was started).
- It offers a simple Weka shell with separated commandline and output.

## WEKA Simple CLI

#### X 🕝 SimpleCLI Welcome to the WEKA SimpleCLI Enter commands in the textfield at the bottom of the window. Use the up and down arrows to move through previous commands. Command completion for classnames and files is initiated with <Tab>. In order to distinguish between files and classnames, file names must be either absolute or start with '.\' or '~/' (the latter is a shortcut for the home directory). <Alt+BackSpace> is used for deleting the text in the commandline in chunks. > help Command must be one of: java <classname> <args> [ > file] break kill cls history exit help <command>

- An environment for exploring data with WEKA (the rest of this documentation deals with this application in more detail).
- At the very top of the window, just below the title bar, is a row of tabs. When the Explorer is first started only the first tab is active; the others are greyed out. This is because it is necessary to open (and potentially pre-process) a data set before starting to explore the data.

🚱 Weka Explorer	
Preprocess Classify Cluster Associate Select attributes Visualize	
Open file Open URL Open DB Genera	rate Undo Edit Save
Filter Choose None	Apply
Current relation Relation: None Instances: None Attributes: None	Selected attribute Name: None Type: None Missing: None Distinct: None Unique: None
Attributes	
All None Invert Pattern	
	✓ Visualize All
Remove	
Status Welcome to the Weka Explorer	Log 💉 O

#### • The tabs are as follows:

- Preprocess: Choose and modify the data being acted on.
- Classify: Train and test learning schemes that classify or perform regression.
- > Cluster: Learn clusters for the data.
- > Associate: Learn association rules for the data.
- Select attributes: Select the most relevant attributes in the data.
- Visualize: View an interactive 2D plot of the data.

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#### • Selecting a Classifier

At the top of the classify section is the Classifier box. This box has a text field that gives the name of the currently selected classifier, and its options. The Choose button allows you to choose one of the classifiers that are available in WEKA.

#### There are four test modes available:

- > Use training set: The classifier is evaluated on how well it predicts the class of the instances it was trained on.
- Supplied test set: The classifier is evaluated on how well it predicts the class of a set of instances loaded from a file. Clicking the Set... Button brings up a dialog allowing you to choose the file to test on.
- Cross-validation: The classifier is evaluated by cross-validation, using the number of folds that are entered in the Folds text field.
- Percentage split: The classifier is evaluated on how well it predicts a certain percentage of the data which is held out for testing. The amount of data held out depends on the value entered in the % field.
- Once the classifier, test options and class have all been set, the learning process is started by clicking on the Start button. While the classifier is busy being trained, the little bird moves around.

Preprocess       Classify       Cluster       Associate       Select attributes       Visualize         Classifier <ul> <li>Classifiers</li> <liclassifiers< li=""> <li>Classifiers</li> <li>Classifiers</li></liclassifiers<></ul>	📀 Weka Explorer		
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Result list (right-click for options)							
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		0.671	0.037				0.829
	Weighted Avg.		0.287				
	=== Confusion Matrix ===						
a b < classified as							
	324 159   a = True						
	106 2744   b = False						
	•						4
Status							
OK						Log	x 0

- When training is complete, several things happen. The Classifier output area to the right of the display is filled with text describing the results of training and testing. A new entry appears in the Result list box.
- The text in the Classifier output area is split into several sections:
  - Run information: A list of information giving the learning scheme options, relation name, instances, attributes and test mode that were involved in the process.
  - Classifier model (full training set): A textual representation of the classification model that was produced on the full training data.
  - Summary: A list of statistics summarizing how accurately the classifier was able to predict the true class of the instances under the chosen test mode.
  - Detailed Accuracy By Class: A more detailed per-class break down of the classifier's prediction accuracy.
  - Confusion Matrix: Shows how many instances have been assigned to each class. Elements show the number of test examples whose actual class is the row and whose predicted class is the column.

#### WEKA Manual

#### More can be found in WEKA Manual:

http://www.cs.waikato.ac.nz/ml/weka/docu mentation.html

