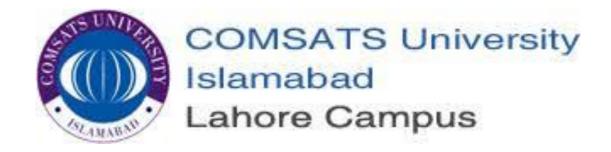
ASSIGNMENT: #2 MACHINE LEARNING

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Task no 1&2:

Hand-crafted features & ML experiments in WEKA:

Hand-crafted features can be manually engineered from the raw data. These features are designed to capture important data characteristics that might help the classifier make more accurate predictions.

Here is a table that summarizes the classifier output:

Feature:

- Name of length
- First letter of name
- Last letter of the name
- Total no of vowels in a name

classifier	Test Mode	Classifier Output		
Tree.j48	Split 80 %	Correctly Classified Instances	14	87.5 %
		Incorrectly Classified Instances	2	12.5 %
Tree	split 80 %	Correctly Classified Instances	13	81.25 %
RandomForest		Incorrectly Classified Instances	3	18.75 %
Tree	Split 80%	Correctly Classified Instances	14	87.5 %
REPTree		Incorrectly Classified Instances	2	12.5 %
Tree.REPTree	Training	Correctly Classified Instances	73	91.25 %
	data	Incorrectly Classified Instances	7	8.75 %
Lazy.IBK	Training	Correctly Classified Instances	76	95 %
	data	Incorrectly Classified Instances	4	5 %
Tree.	Training	Correctly Classified Instances	76	95 %
RamdomForest	data	Incorrectly Classified Instances	4	5 %
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Feature:

- First letter of name
- Last letter of the name
- Total no of vowels in a name
- Total length of name
- Total no of consonant
- Name length even or odd
- Total no of A's
- Length is up to 4 or not
- Start with a vowel or not

classifier	Test Mode	Classifier Output		
Tree	Split 66%	Correctly Classified Instances	25	92.592 %
RandomForest		Incorrectly Classified Instances	2	7.4074 %
Tree	Training dara	Correctly Classified Instances	79	98.75 %
RandomForest		Incorrectly Classified Instances	1	1.25 %
Lazy.IBK	Training data	Correctly Classified Instances	79	98.75 %
		Incorrectly Classified Instances	1	1.25 %
Lazy.IBK	Split 66%	Correctly Classified Instances	25	92.592 %
		Incorrectly Classified Instances	2	7.4074 %
Tree j48	Split 66%	Correctly Classified Instances	26	81.75 %
		Incorrectly Classified Instances	6	18.25 %

Task no 3:

Write a paragraph about your experience of working with the standard ML pipeline in your own words.

Step 1: Data preparation

Firstly, I made an ARFF file, which are text file that describes data set, including attributes and instances.

Step 2: Build a classifier

Once the data is ready, next I select the classifier and build the model.

Weka provides some classifiers like decision tree (j48, Random forest) and lazy (IBK).

Step 3: Evaluating the model

It describes the performance of your model:

- Train data split
- Cross-validation
- Training data

Conclusion:

I faced from the analysis is that **Random Forest** consistently outperformed the other classifiers, achieving the highest accuracy (92%) in the test. This indicates that Random Forest is better suited for this particular dataset, likely due to its ability to handle feature variability and avoid overfitting compared to simpler models like J48 and REPTree.