Arab Region Employees Salary Prediction

IT326 - 1st semester

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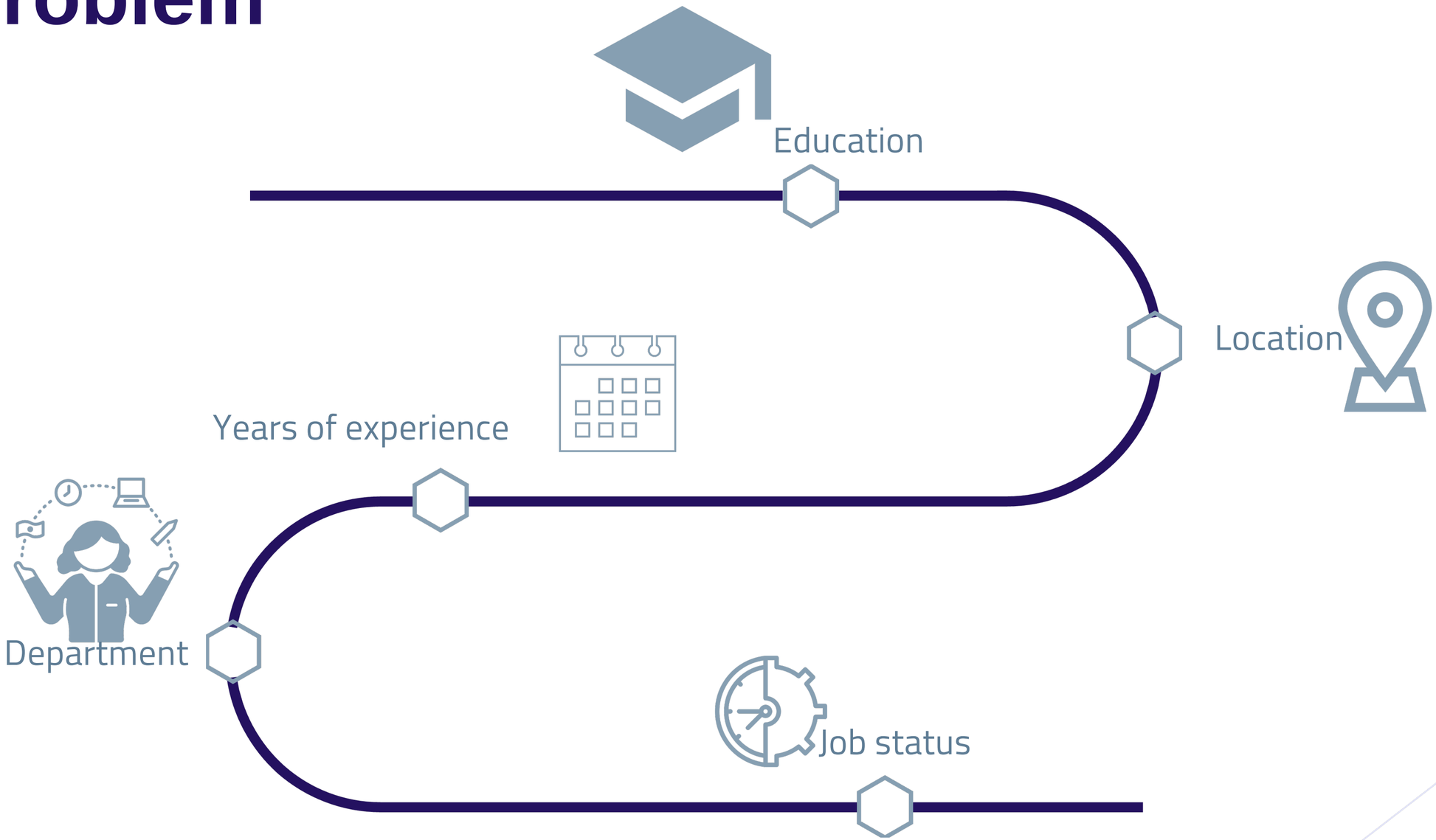
Outline

01	Problem
02	Data Summarization: Data Information, Graphs
03	Data Preprocessing: Data Cleaning, Data Transformation, Feature selection
04	Data Mining Techniques: Classification and findings , Clustering and findings
05	Results

Problem


Education
Location
Years of experience
Department
Job status

Data Summarization

- Data Information

  our attributes are:

ID | Education | Department | Job status | Location

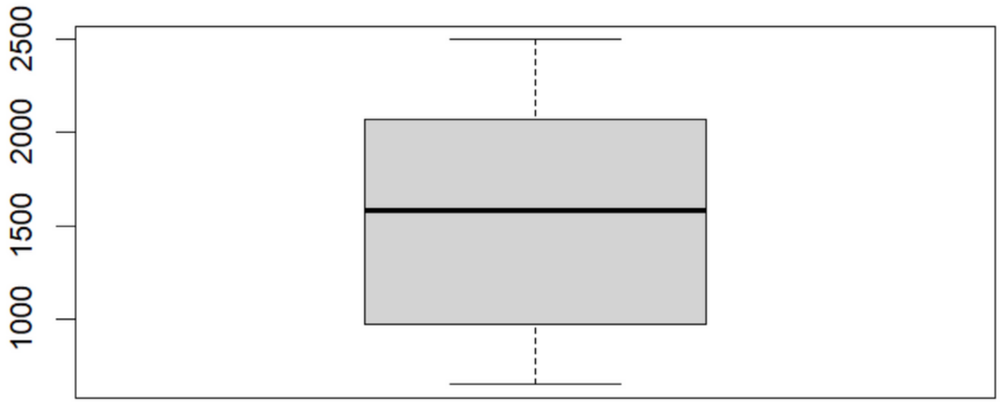
Start date | Years | Salary | Job rate | Permission

link of the dataset: https://www.kaggle.com/datasets/qusaybtoush1990/employes

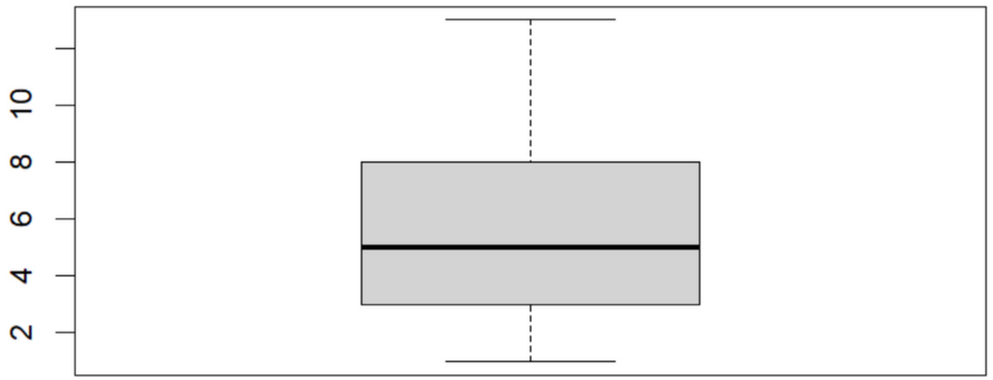
Data Summarization

- Data Graphs

Box plot for salary



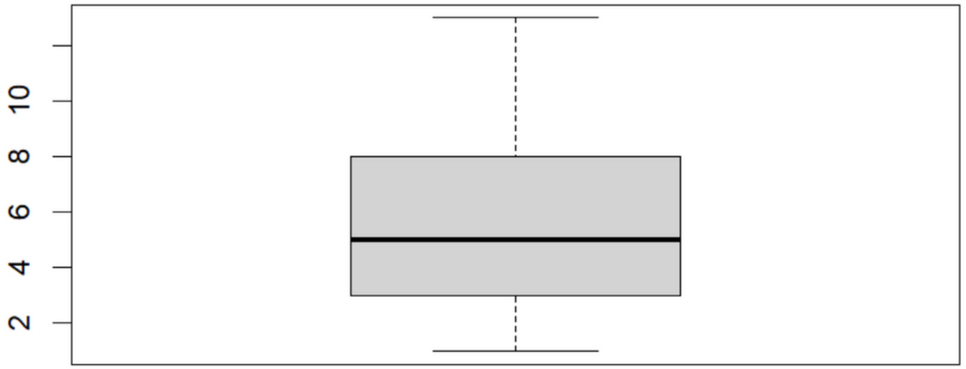
Box plot for years



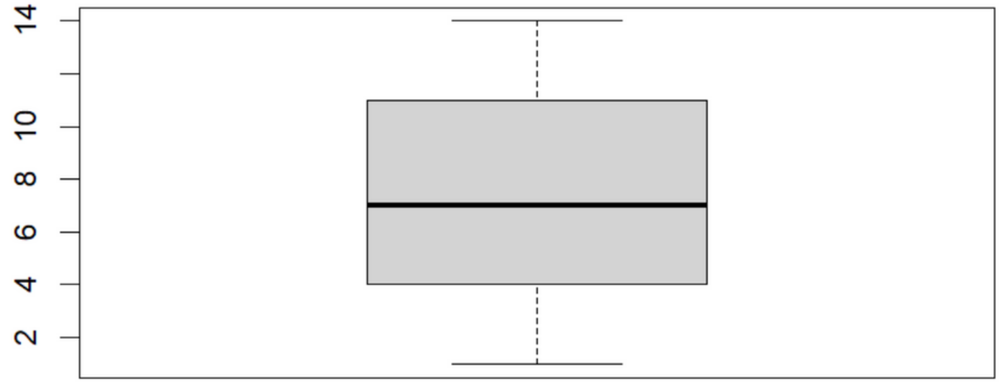
Data Summarization

- Data Graphs

Box plot for job rate



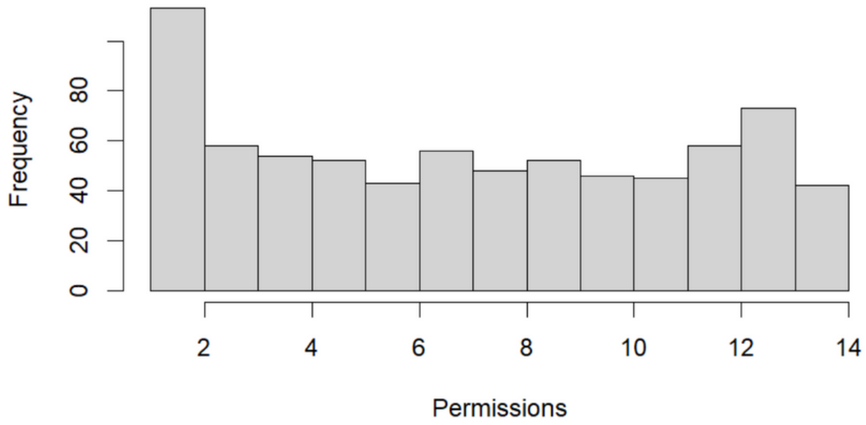
Box plot for permissions



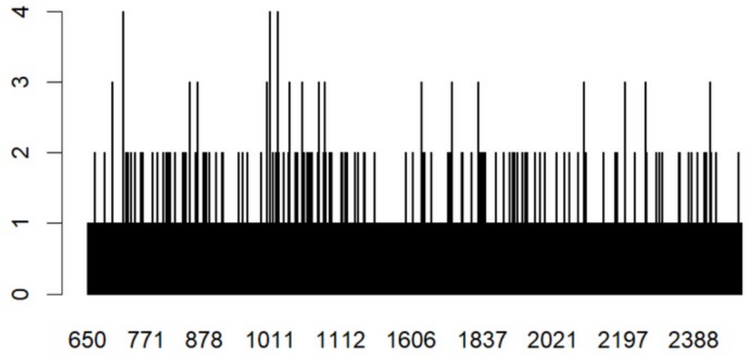
Data Summarization

- Data Graphs

Histogram of permissions



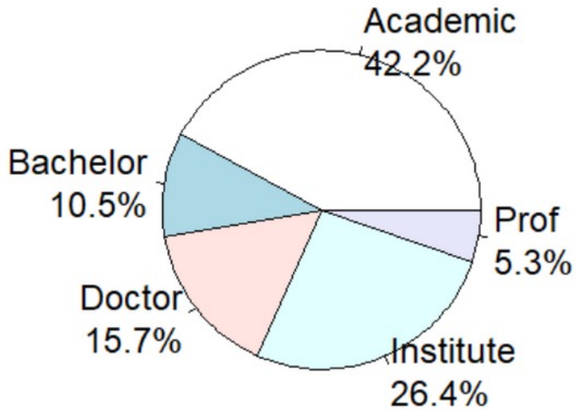
Bar Chart for salary



Data Summarization

- Data Graphs

Pie chart for Education



Data Preprocessing

We used three Preprocessing techniques:

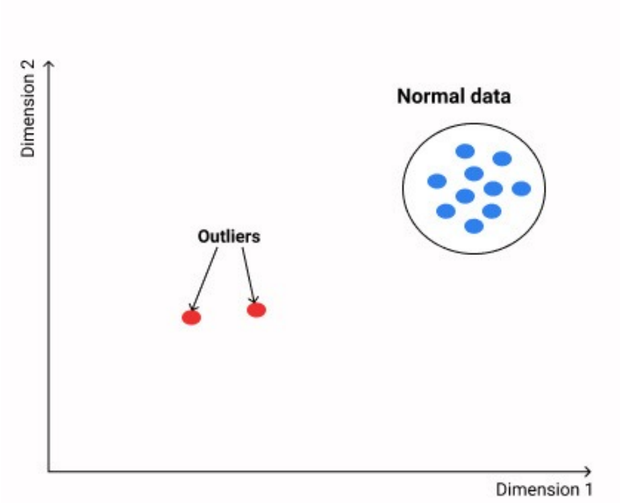
- Data cleaning
- Data transformation
- Feature selection

Data Preprocessing

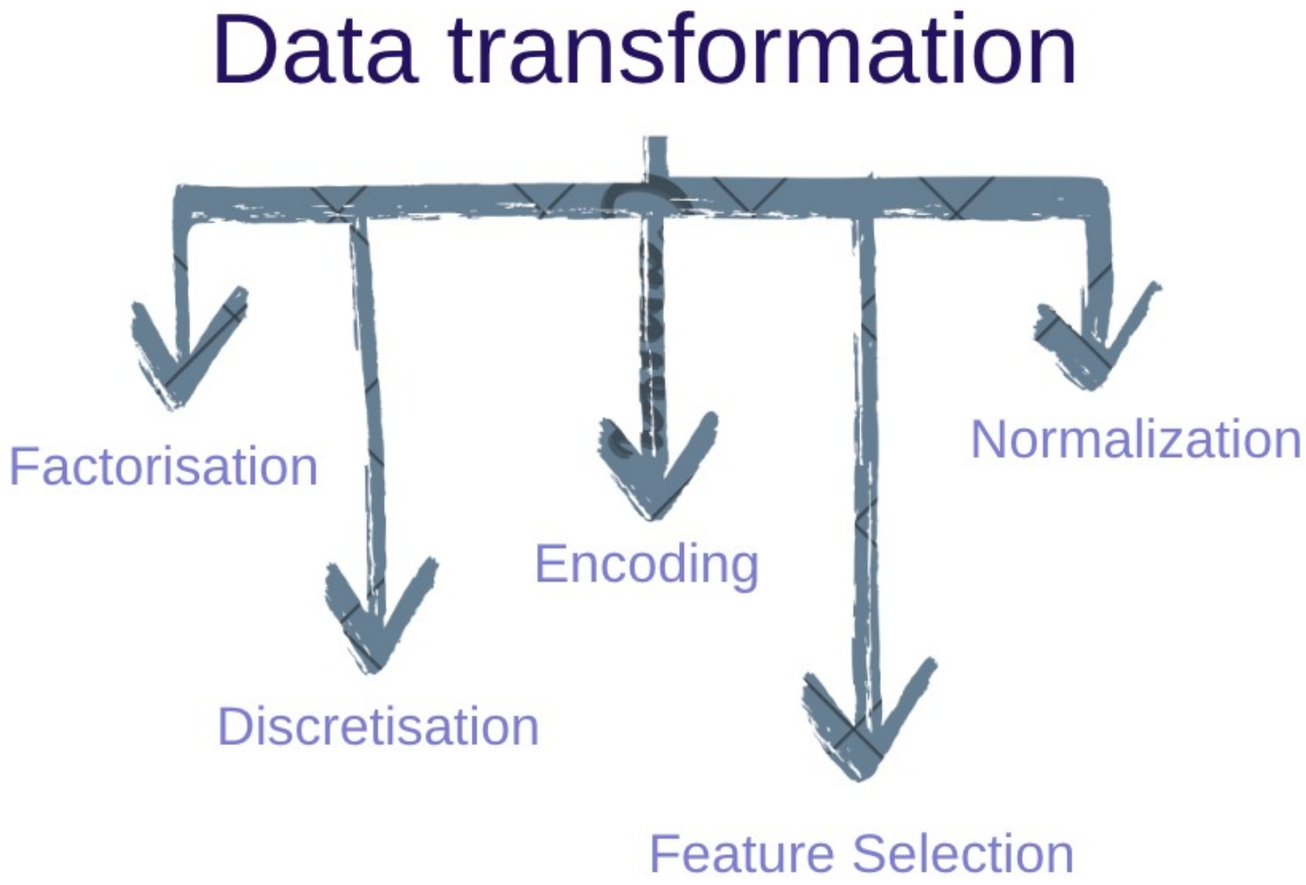
- Data cleaning

missing or null values

outliers



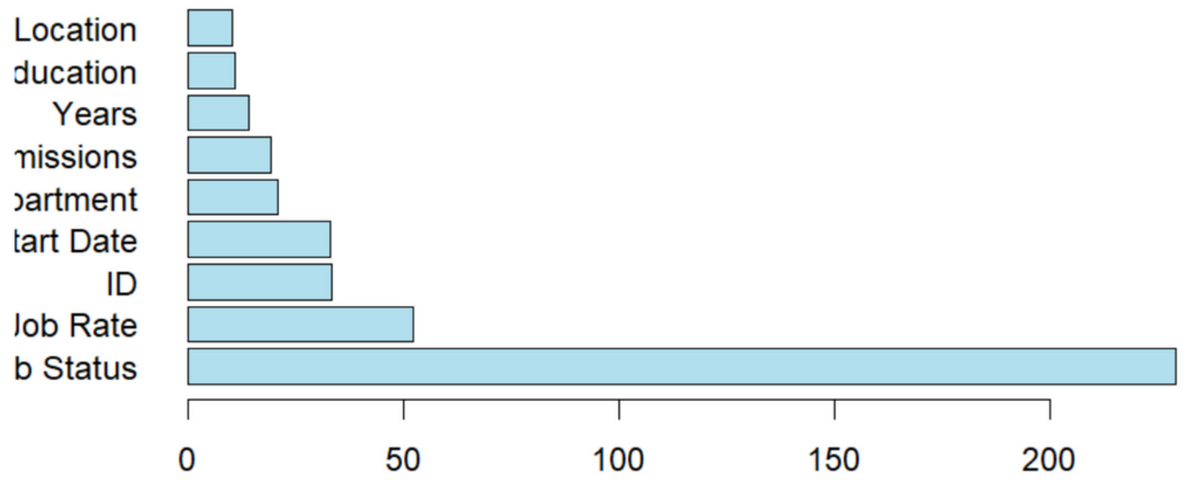
Data Preprocessing



Data Preprocessing

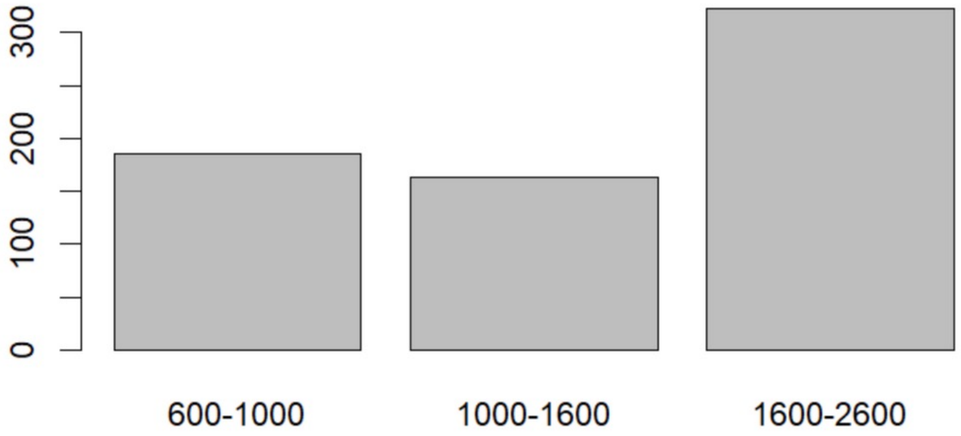
- Feature selection

  assist in showing the most relevant features, leading to simpler and more interpretable models.

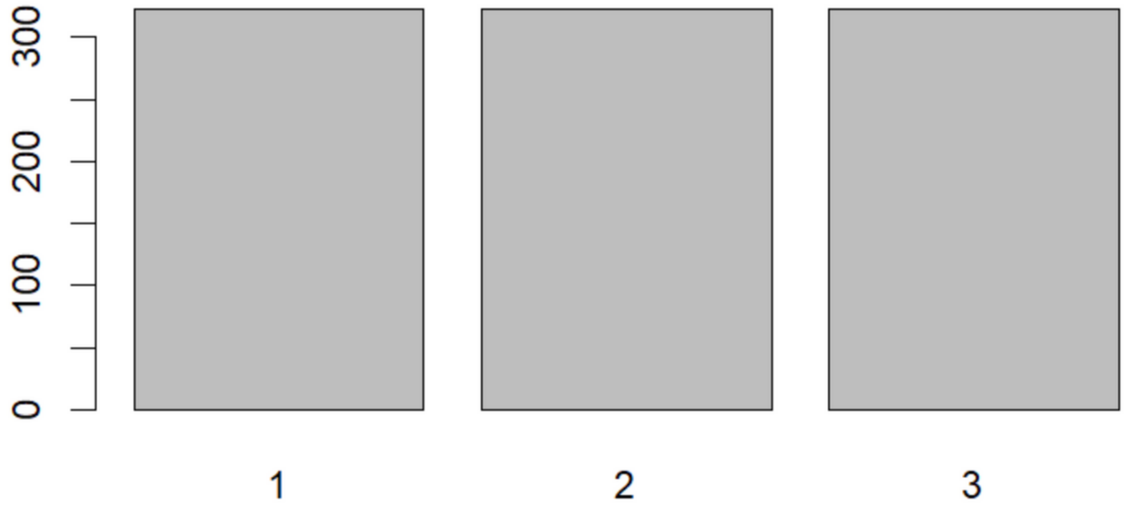


Imbalance

Before



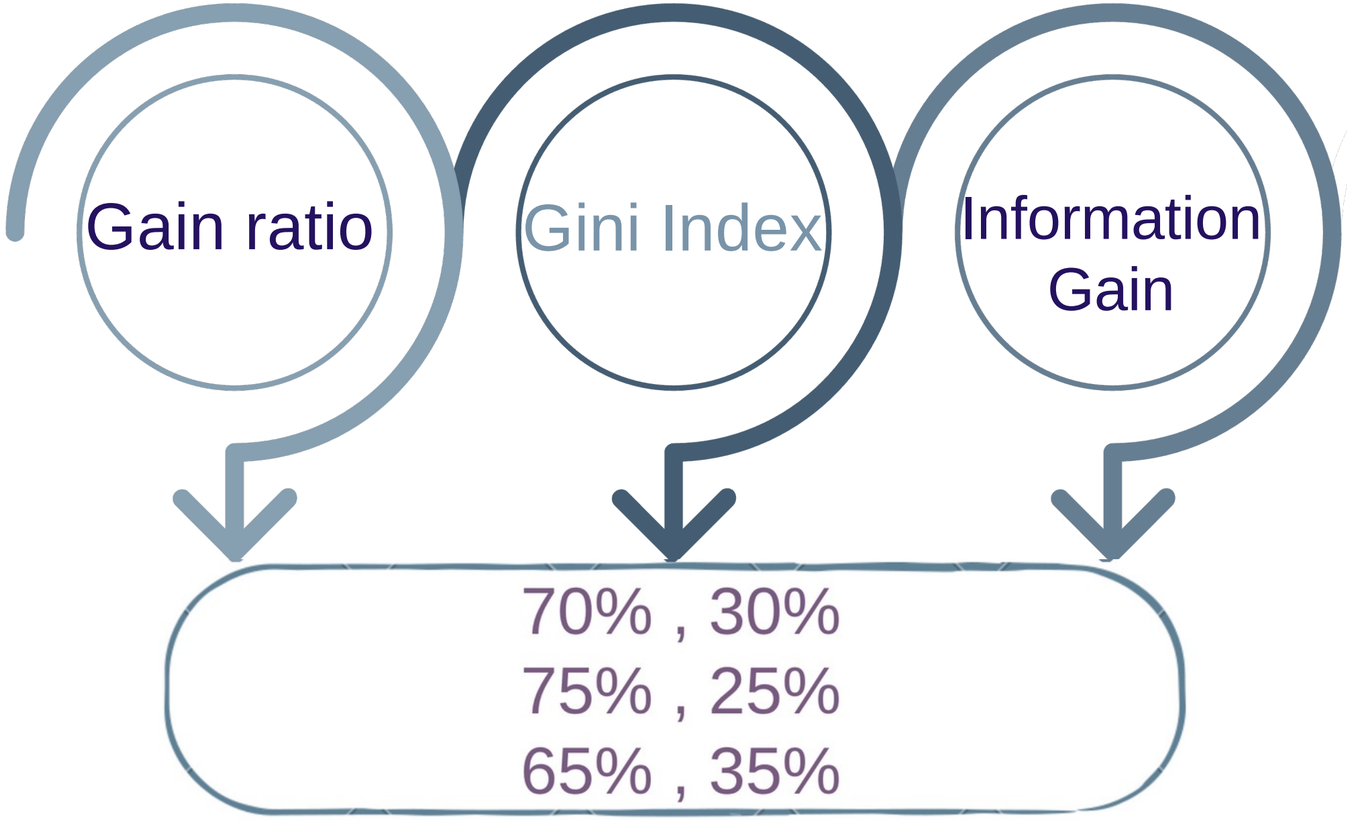
After



Data Mining Techniques

Classification

Algorithms:



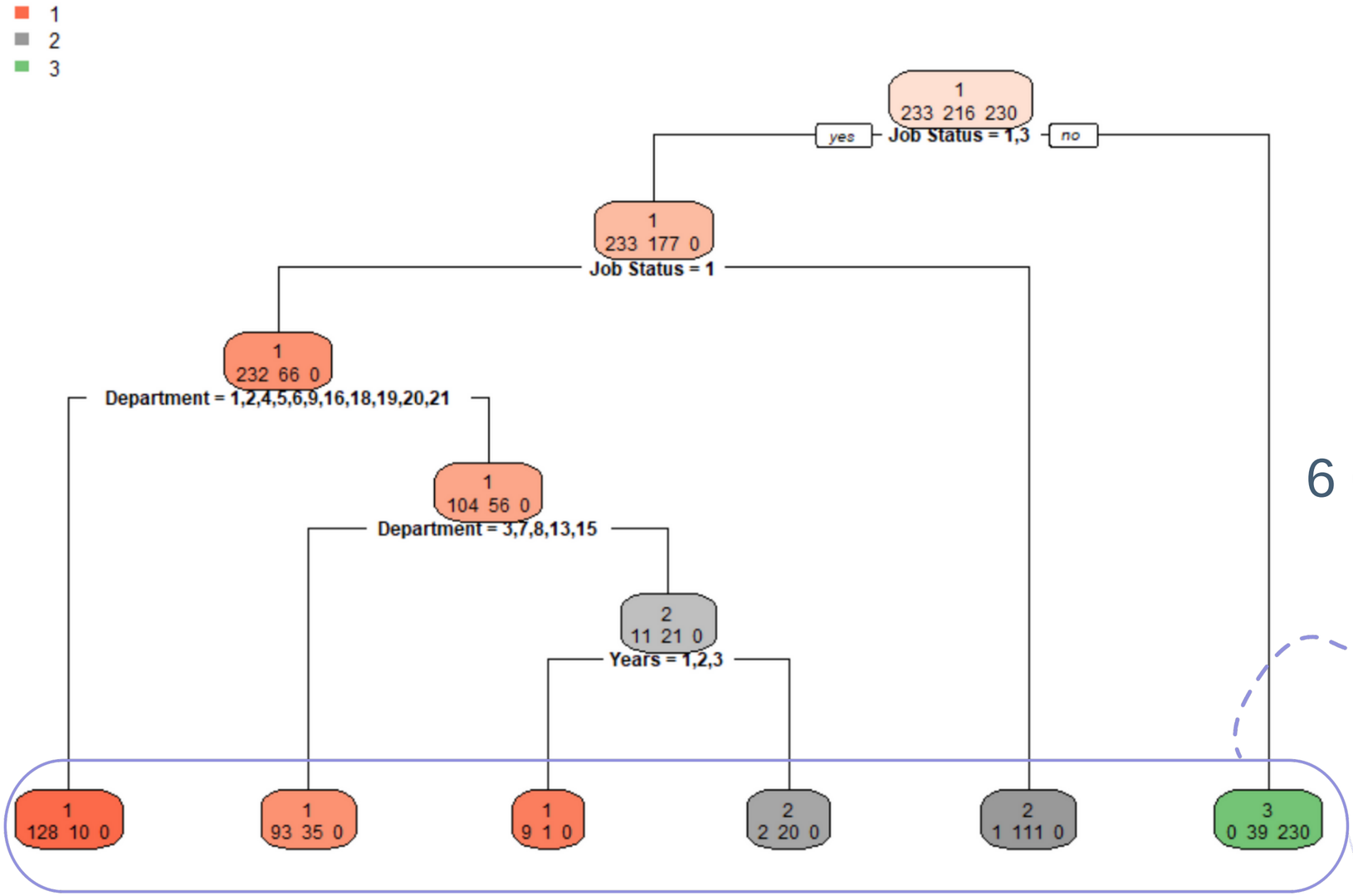
Findings

Classification:

	70% training set 30% testing set			75% training set 25% testing set			65% training set 35% testing set		
	IG	IG Ratio	Gini Index	IG	IG Ratio	Gini Index	IG	IG Ratio	Gini Index
Accuracy	84%	86%	84%	83%	85%	83%	81%	82%	81%
Precision	94%	98%	94%	93%	87%	93%	88%	87%	88%
Sensitivity	69%	67%	69%	69%	73%	69%	70%	65%	70%
Specificity	95%	99%	95%	94%	91%	94%	90%	92%	90%

Findings

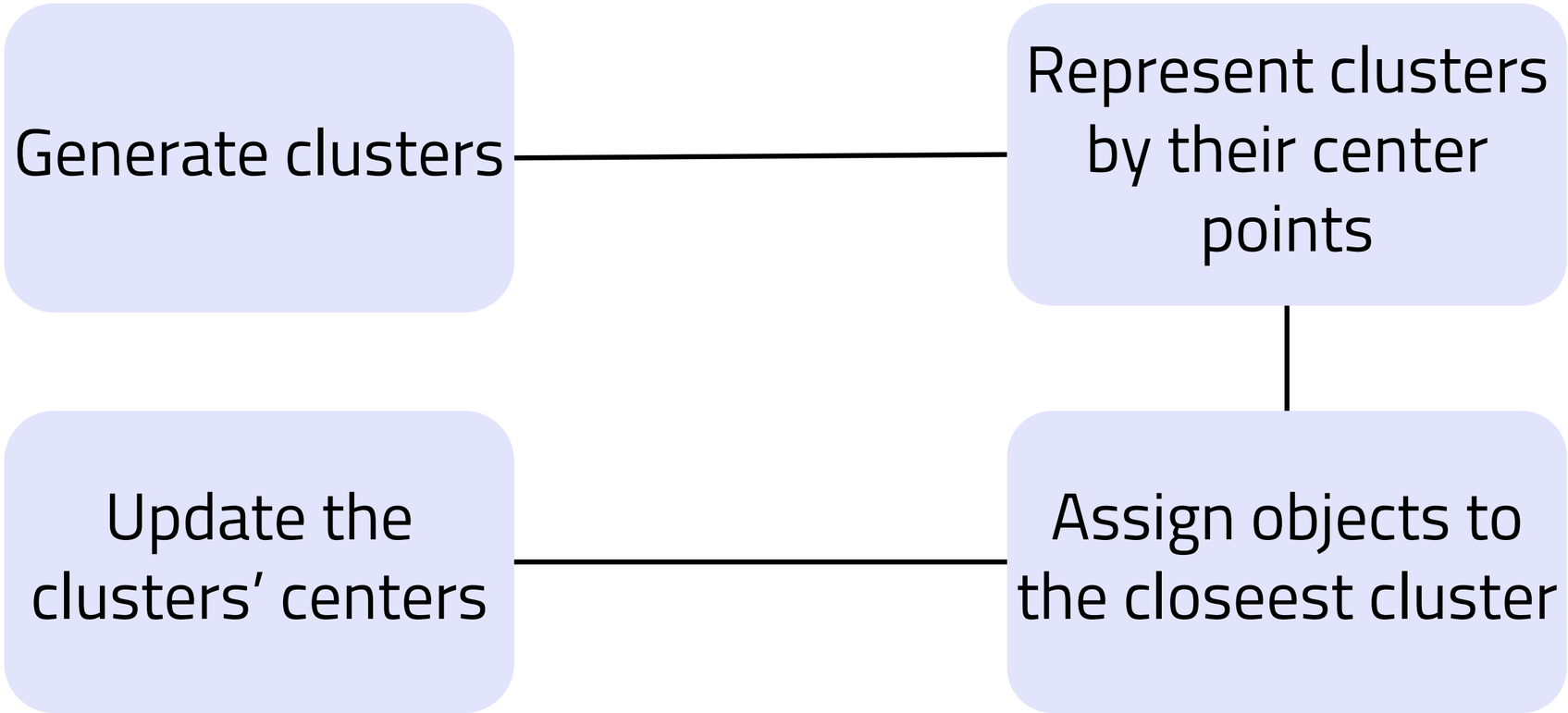
Classification:



6 Conditions

Clustering

How K-means algorithm is done?



Clustering

Evaluation and Comparison

	K=2	K=3	K=4
Average Silhouette width	0.3	0.25	0.22
total within-cluster sum of square	40750.1	34529.21	29822.08
BCubed precision	0.3349891	0.3352973	0.3362805
BCubed recall	0.512721	0.3487142	0.2555154

Clustering

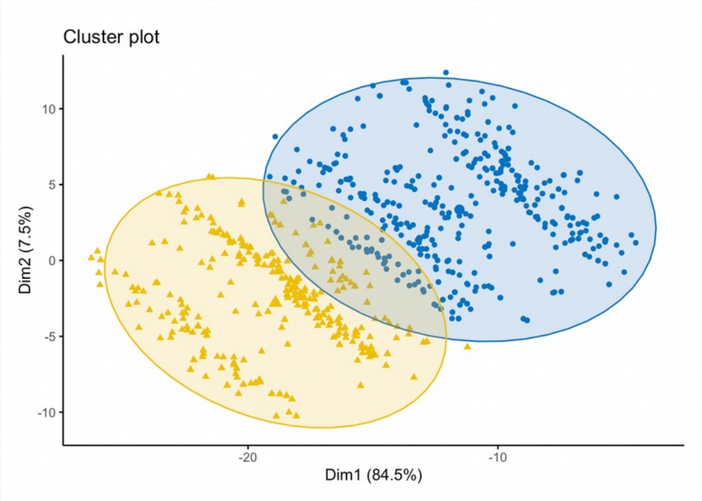
- **Partition our data using k-mean algorithm:**
- We tried three different k-mean values (2,3 and 4).

2.**Cluster evaluation:**

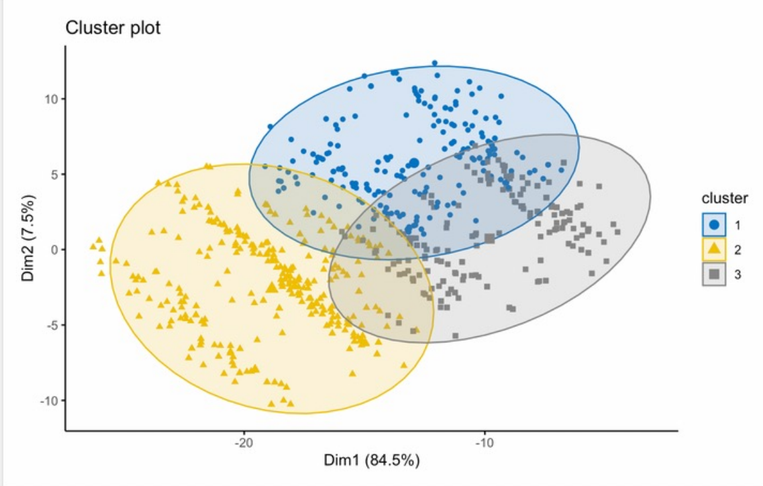
- We calculated the average silhouette width, total within cluster sum of square and BCubed (precision and recall).

Clustering

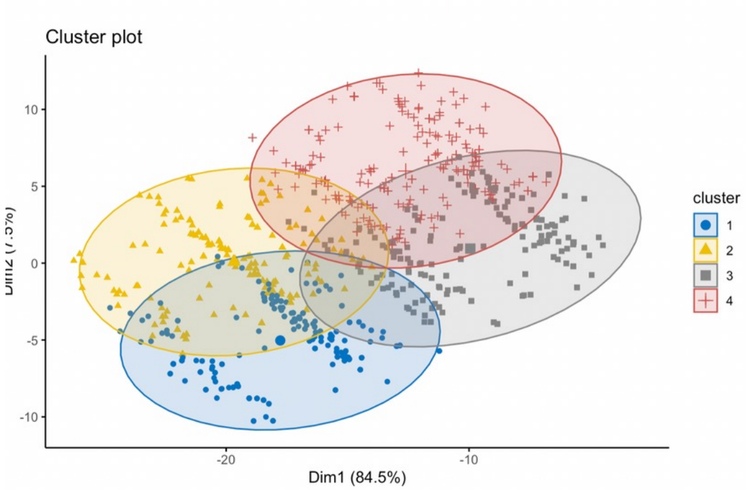
- **Partition our data using k-mean algorithm:**



k=2



k=3

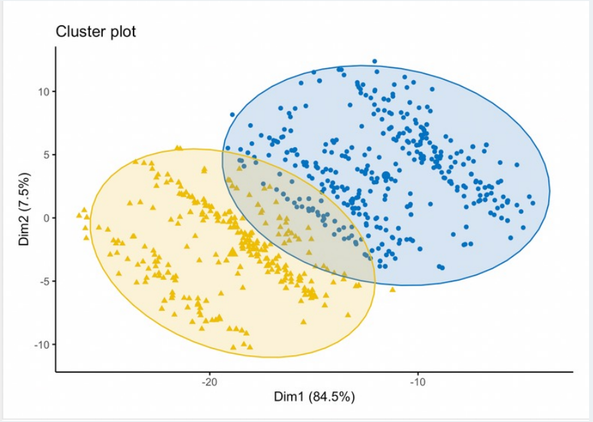


k=4

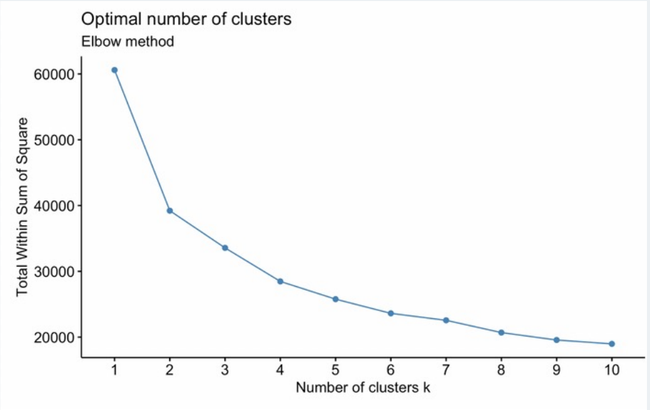
Findings

Clustring:

- Average silhouette width = 0.3
- Total within cluster sum = 39732.43
- BCubed (precision) = 0.3349891
- BCubed (recall) = 0.512721



k=2



Classification

What is the best to predict Salary?

Clustering

Thank you!

Do you have any question?