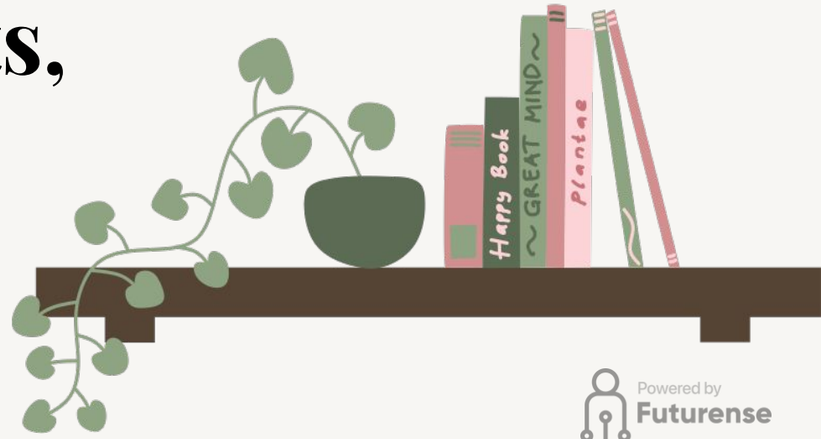
BS/BSc

Applied AI & Data Science

Predicting Employee Attrition Using Weka, Google Sheets, Flourish & Napkin AI



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Mini Project Session Plan (PRP)

Predicting Employee Attrition Using Weka, Google Sheets, Flourish & Napkin AI

A complete end-to-end ML workflow for beginners

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Agenda

01 Corporate Story

02 Dataset Overview

03 Dataset Generation Prompt

04 Public Dataset Option

05 Mini-Project Overview

06 Step-by-Step Execution Guide

07 Overfitting Activity

08 Underfitting Activity

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Corporate Story: Why This Matters

TechNova Solutions faces increasing employee attrition. HR, Managers, Finance & Leadership are affected.

Decisions impacted:

- Salary hikes
- Department-level interventions
- Predicting who will leave
- Training & upskilling

Data analysis + ML models help anticipate attrition and improve retention strategies.

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How Tools Solve This Problem

Google Sheets

Clean and prepare data

Weka

Build predictive models

Flourish

Visual dashboards and insights

Napkin AI

Hypothesis building & interpretation

Together, these simulate real HR Analytics workflows used in companies like TCS, Accenture, Infosys, Amazon.

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Dataset Specification (1/2)

Dataset Name:

TechNova Employee Attrition Dataset

Rows:

500

Columns:

15

Target Variable:

Attrition (Yes/No)

Features include:

- EmployeeID
- Age
- Gender
- Department
- JobRole
- MonthlyIncome
- YearsAtCompany
- Promotions
- JobSatisfaction
- WorkLifeBalance
- EducationLevel
- TrainingHours
- OverTime
- PerformanceRating

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Dataset Specification (2/2)

Why this dataset works:

Mix of numeric + categorical fields

Strong correlation patterns for ML

Perfect for classification tasks in Weka

Helps demonstrate both overfitting and underfitting

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Synthetic Dataset Generation Prompt

Copy and paste this into ChatGPT:

```
Generate a synthetic CSV dataset with 500 rows for an HR attrition prediction problem.Columns required:EmployeeID (1001–1500)Age (22–58)Gender (Male/Female)Department (IT, Sales, HR, Finance, R&D)JobRole (realistic roles)MonthlyIncome (15000–150000)YearsAtCompany (0–20)YearsSinceLastPromotion (0–10)JobSatisfaction (1–4)WorkLifeBalance (1–4)EducationLevel (1–5)TrainingHoursLastYear (0–80)OverTime (Yes/No)PerformanceRating (1–5)Attrition (target)Ensure correlations & no missing values.
```

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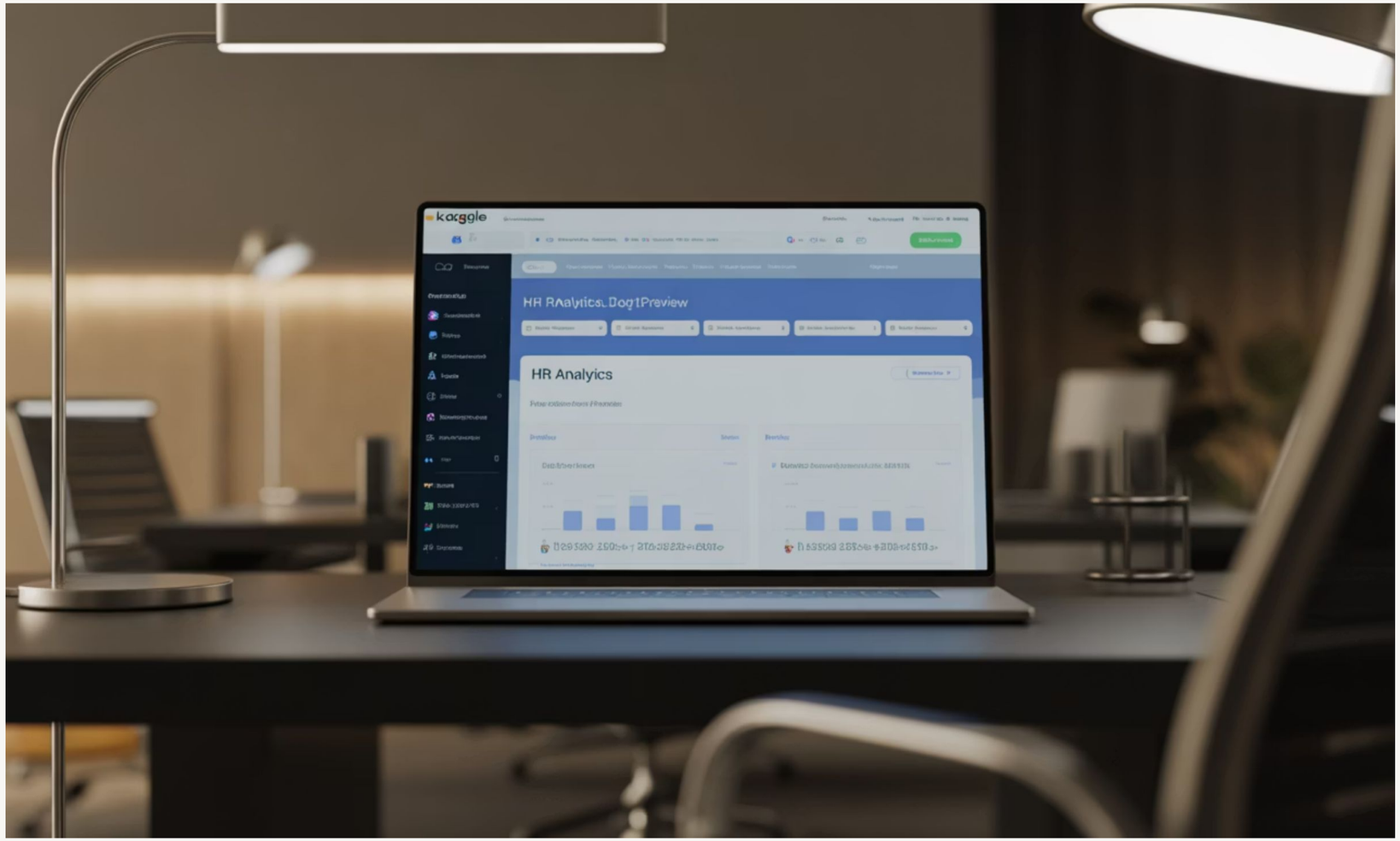
Public Dataset Recommendation

IBM HR Analytics Attrition Dataset

Link: Kaggle → IBM HR Analytics

Why suitable:

- Realistic HR data
- Industry-standard for attrition prediction
- Easy to load in Weka



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Mini Project Overview

Students will:

- Clean dataset in Google Sheets
- Visualize patterns in Flourish
- Train ML models in Weka
- Detect overfitting & underfitting
- Interpret model outcomes using Napkin AI
- Submit all screenshots in a single PDF

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Step 1: Load Dataset

Tool:

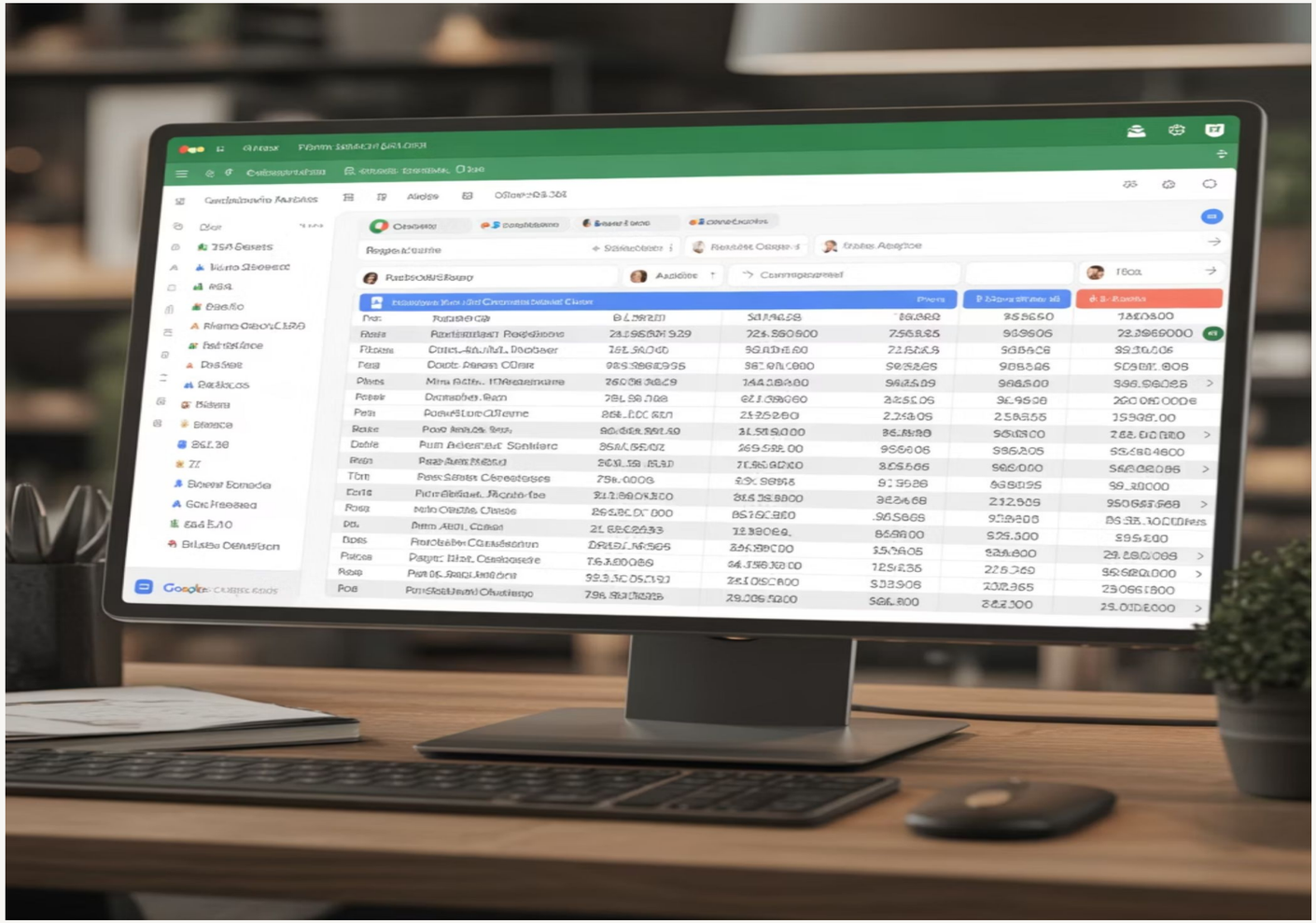
Google Sheets

Click Path:

File → Import → Upload → Replace Spreadsheet

Capture:

Screenshot of first 10–15 rows.



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Step 2: Clean & Prepare Data

Tool:

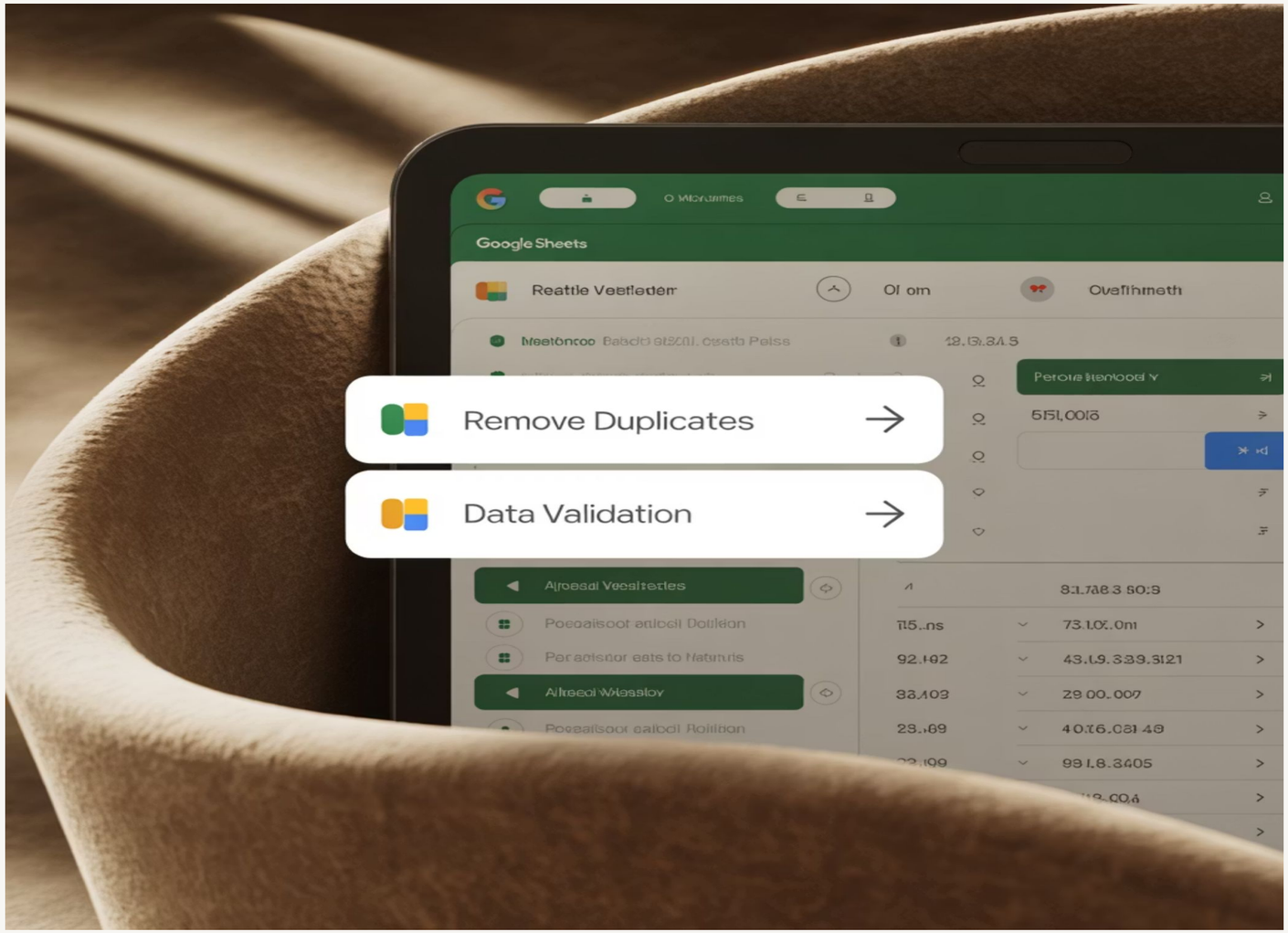
Google Sheets

Click Path:

- Data → Data Cleanup → Remove duplicates
- Format → Number
- Data → Data Validation
- File → Download → CSV

Capture:

Screenshots of data cleanup steps.



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Step 3: Convert CSV to ARFF

Tool:

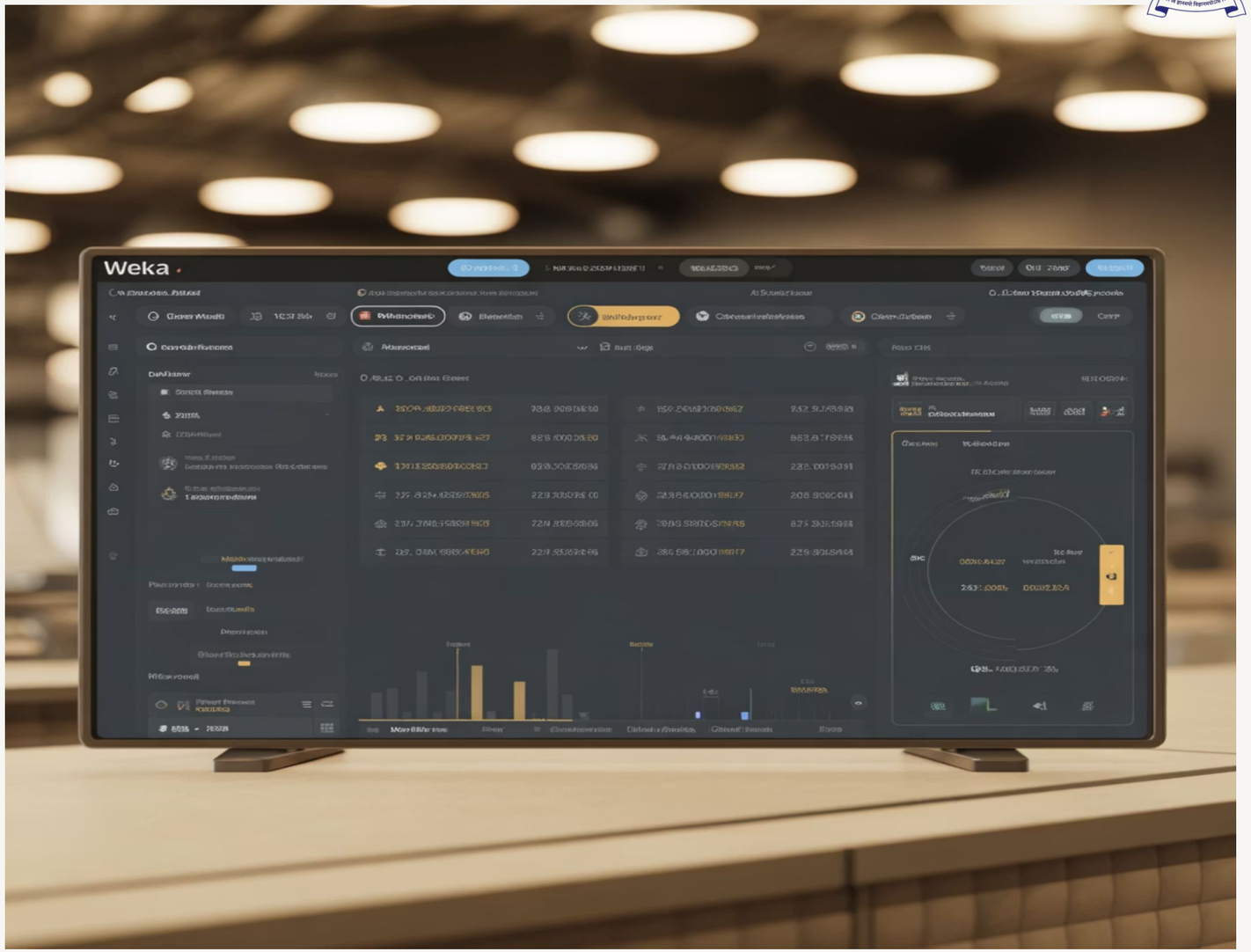
Weka → ARFF Viewer

Click Path:

Weka → Tools → ArffViewer → File → Open → Save As → .arff

Capture:

Screenshot of ARFF Viewer with attributes.



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Step 4: Load Dataset in Weka

Tool:

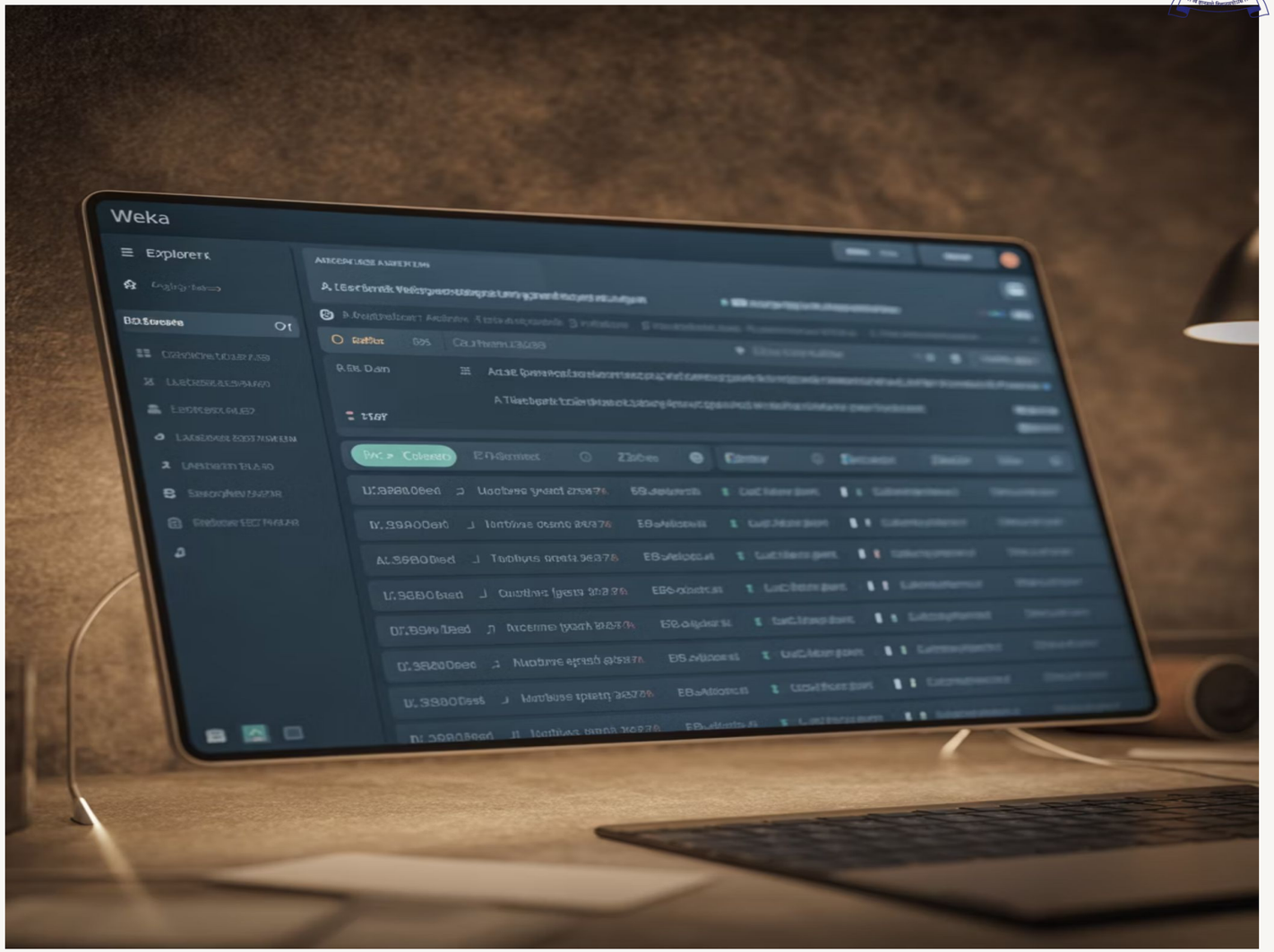
Weka → Explorer

Click Path:

Explorer → Preprocess → Open File

Capture:

Screenshot showing all attributes and class variable.



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Step 5: Explore Attributes

Tool:

Weka → Explorer

Click Path:

Preprocess → Select Attribute → Visualize All

Capture:

Screenshot of graphs:

- Attrition vs Job Satisfaction
- Attrition vs OverTime

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Step 6: Create Visual Narratives

Tool:

Flourish

Click Path:

New Visualization → Upload Data → Choose Chart

Create:

- Attrition by Department
- Attrition vs JobSatisfaction

Capture:

Final chart screenshots.

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Step 7: Train Baseline Model

Tool:

Weka

Click Path:

Classify → Choose → Trees → J48 → Use Training Set → Start

Capture:

Screenshot of:

- Accuracy
- Confusion Matrix

Overfitting Activity (1/2)

Purpose:

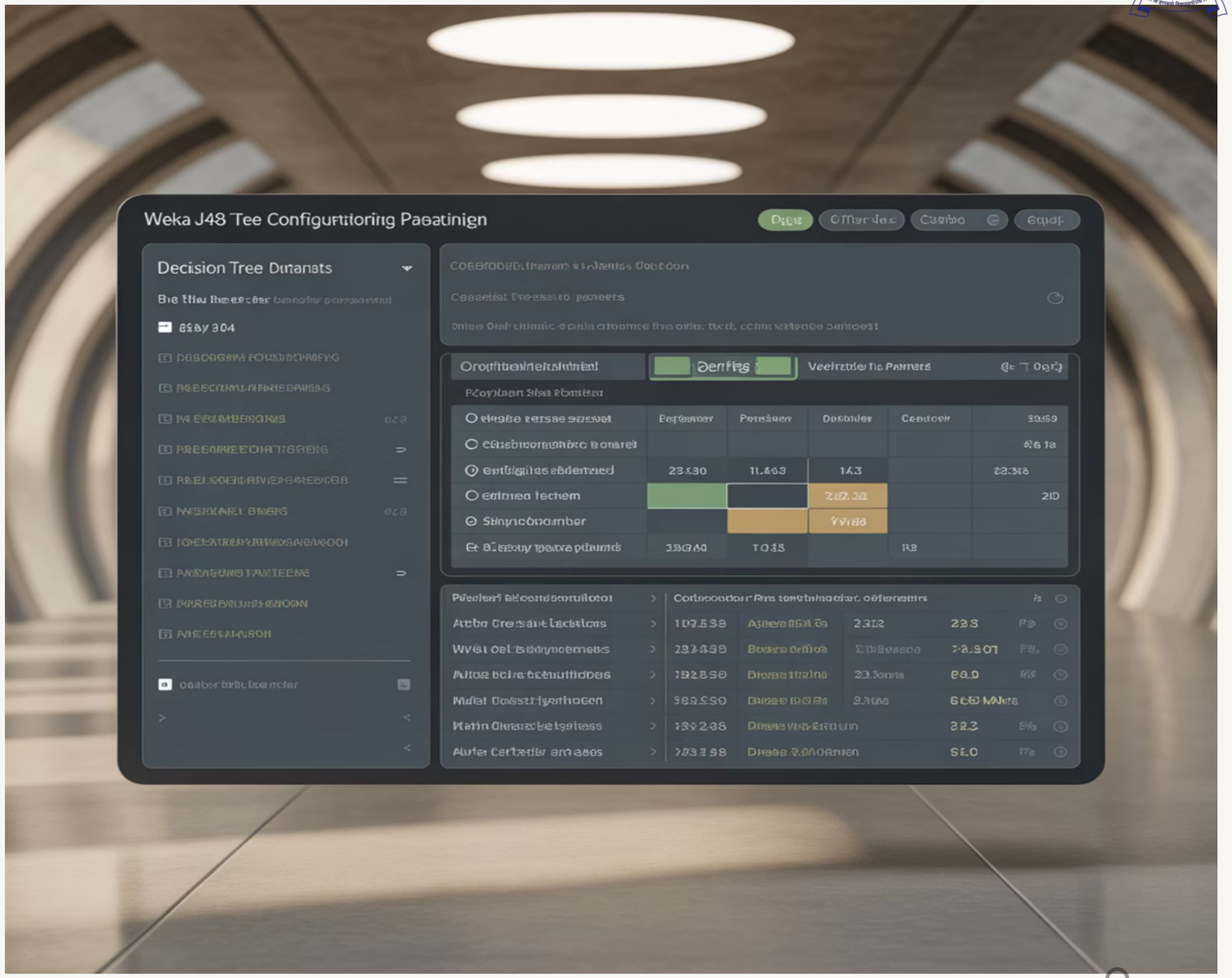
Create an overfitted decision tree.

Tool:

Weka

Click Path:

Classify → Trees → J48 → More Options → minNumObj=1 & unpruned=True → Start



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Overfitting Activity (2/2)

Observe:

- Training accuracy near 100%
- Cross-validation accuracy drops

Capture:

- Training accuracy screenshot
- Cross-validation accuracy screenshot

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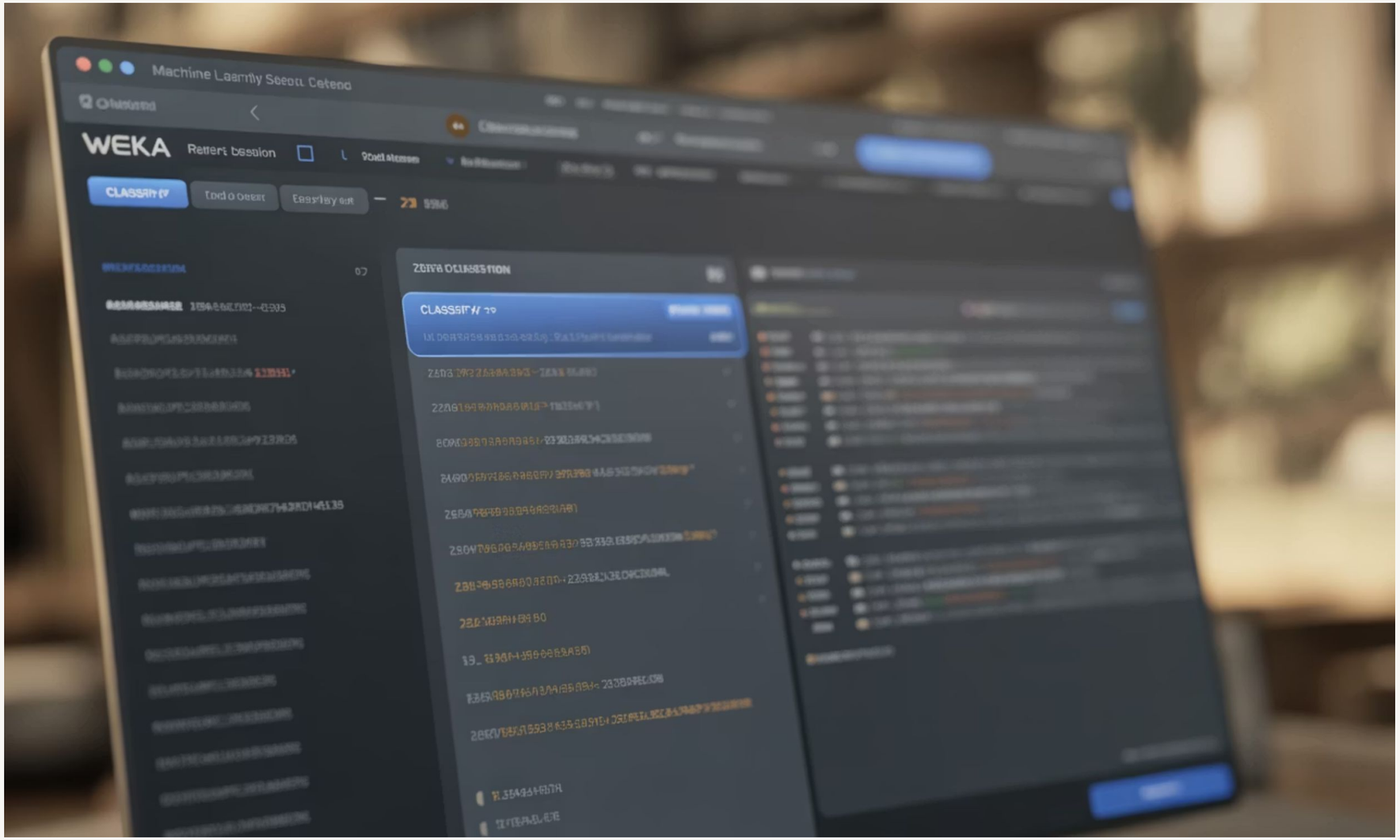
Slide 19 — Underfitting Activity (1/2)

Purpose: Build a too-simple model.

Tool: Weka

Click Path:

Classify → Rules → ZeroR → Start



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Slide 20 — Underfitting Activity (2/2)

Observe:

- Majority class prediction
- Low overall accuracy

Capture:

- ZeroR model output screenshot
- Evaluation screenshot

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Slide 21 — Step 10: Summarize Insights

Tool: Napkin AI

Paste model outputs: "Summarize insights and recommend improvements."

Capture: Summary screenshot.

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Slide 22 — Clues & Hints

Overfitting

If training accuracy >> test accuracy → Overfitting

Underfitting

If accuracy is low everywhere → Underfitting

Generalization

Simpler models usually generalize better

Look for strong predictors:

- Overtime
- Job Satisfaction
- Promotions

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Slide 23 — Learning Outcomes

Students will learn to:

01

Perform end-to-end ML workflow

02

Clean data

03

Visualize insights

04

Build classification models

05

Diagnose overfitting/underfitting

06

Interpret HR-related predictions

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Slide 24 — Submission Checklist

Students must combine all screenshots into a single PDF:

Submit:

- Google Sheets cleaning screenshots
- Flourish visualizations
- Weka ARFF Viewer
- Baseline model output
- Overfitting model output
- Underfitting model output
- Napkin AI summary
- Short written reflection

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Reflection Questions

Answer any 3:

1. Which factors contributed most to attrition?
2. Did your model overfit or underfit? Why?
3. How can dataset quality be improved?
4. How should HR teams use this model?

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Thank You

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