Deliverable 3.1 – Deployed Multimedia and AR Content

Introduction

This report details Deliverable 3.1 – Deployed Multimedia and Augmented Reality (AR) Content, an essential outcome of the EduVerse project, showcasing the innovative integration of interactive multimedia and AR within the IM0503 Data Analytics course. This deliverable represents a significant step in realizing our vision of an adaptive pedagogical model designed to address diverse student learning needs.

At its core, this deliverable comprises a collection of interactive multimedia elements and AR content, curated and developed to enhance the learning experience. These resources are designed to be dynamic, engaging, and directly introducible to different learning trajectories. All these contents have been deployed on a publicly accessible server and are freely available for exploration and use at wisenuggets.net. This open access facilitates wider adoption and experimentation by the broader educational community.

For other education professionals, this deliverable serves as a practical framework and a rich repository of adaptable learning resources. It demonstrates how technology can be utilized to create more immersive and personalized educational environments. Educators can explore the deployed content on wisenuggets.net to understand concrete examples of interactive learning elements, draw inspiration for their own courses, and even directly use these resources for their specific pedagogical contexts. By illustrating how abstract data analytics concepts can be made tangible and interactive, this deliverable provides valuable insights into modern instructional design for technology-enhanced learning.

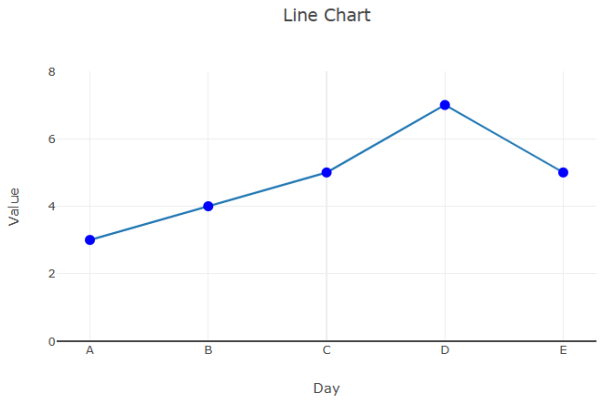
To further demonstrate the technical and pedagogical utility, we have included a Technology Showcase Document as an appendix to this deliverable. This appendix aims to demonstrate the diverse range of multimedia elements and enhancements integrated into our approach. It features examples of how complex ideas are conveyed through enriched interactive components; how figures and schemas come alive with explanatory overlays; the strategic use of short videos and animations to clarify challenging concepts; and, innovatively, how editable code and executable analytics workflows empower students with hands-on learning directly within the content. This showcase is particularly valuable for instructional designers and technologists looking to replicate or build upon our methods.

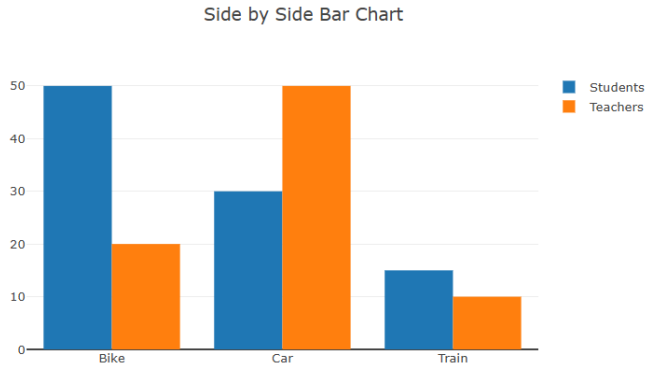
Finally, and most directly impactful, all the multimedia and AR content generated as part of this deliverable have been introduced and integrated into the main workbook of the IM0503 Data Analytics course. This means students enrolling in the course now directly benefit from the EduVerse project outcomes, gaining access to a highly interactive learning environment that is curated to address their needs. This integration transforms the traditional workbook into a dynamic learning tool, allowing students to engage with complex data analytics concepts through interactive visualizations, practical coding exercises, and augmented reality experiences that significantly deepen their understanding and foster motivation.

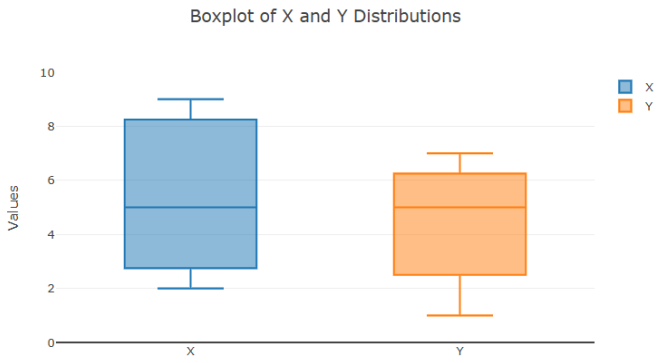
See:

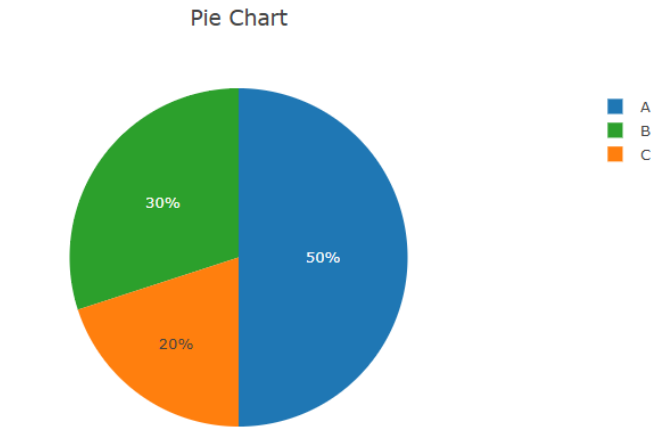
- https://wisenuggets.net/
- Appendix I: EduVerse_Technology_Showcase.pdf
- Appendix II: IM0503_Data Analytics_Workbook.pdf

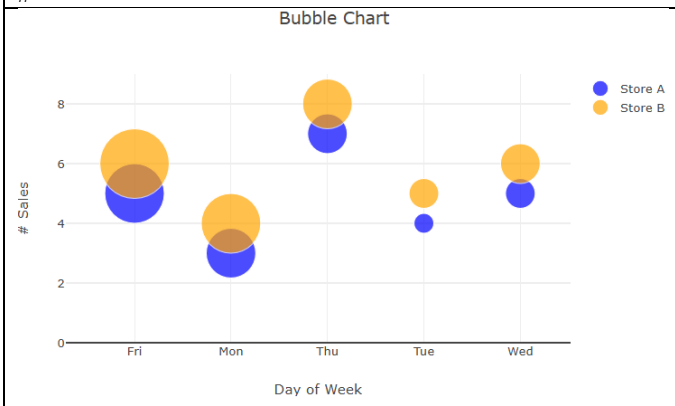
Repository of Interactive Multimedia Elements

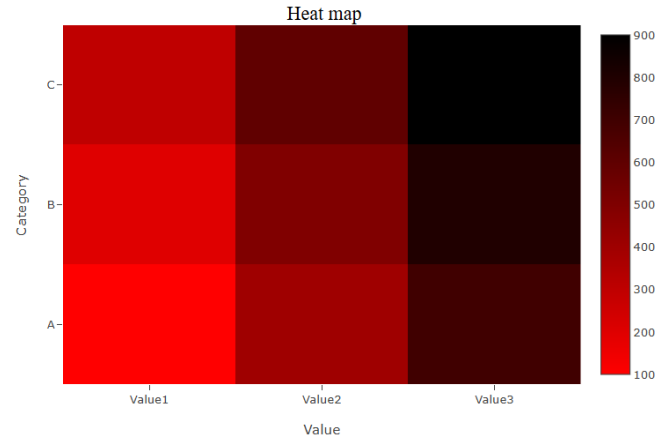
Interactive Line Chart	
#	1
	
URL	https://wisenuggets.net/line_chart/
Description	Demonstrates trends and changes over time; useful for explaining continuity and time series analysis.

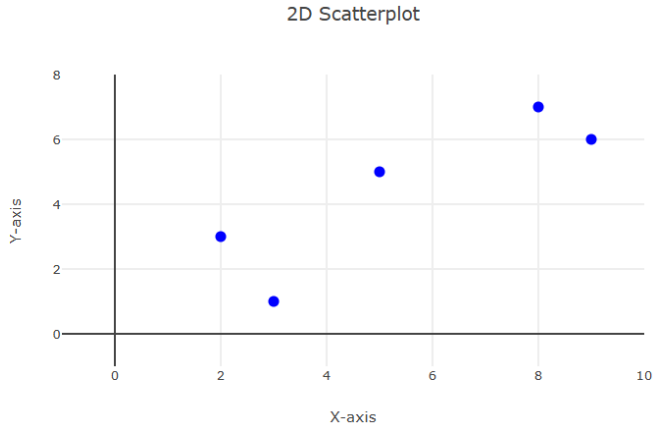
Interactive Bar Chart	
#	2
	
URL	https://wisenuggets.net/bar_chart/
Description	Lets learners compare categories interactively; ideal for teaching frequency, proportions, or categorical comparisons.

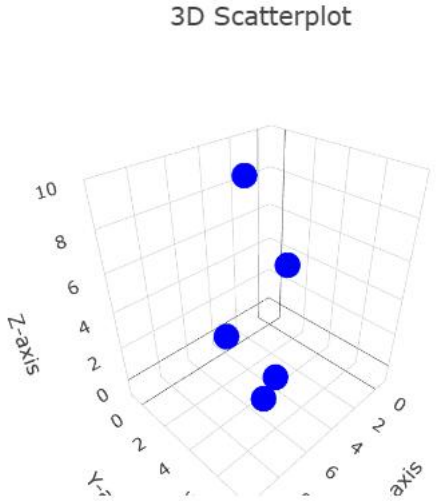
Interactive Box Plot	
#	3
	
URL	https://wisenuggets.net/boxplot/
Description	Shows medians, quartiles, and outliers; helps explain data spread and variability.

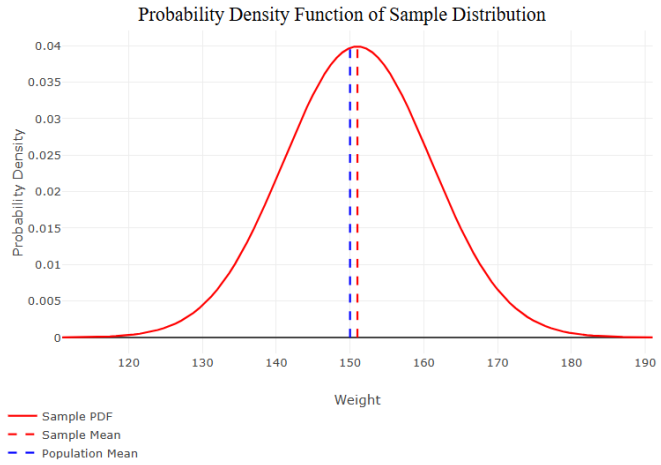
Interactive Pie Chart	
#	4
	
URL	https://wisenuggets.net/pie_chart/
Description	Visualizes proportions of a whole; effective for teaching parts-to-whole relationships.

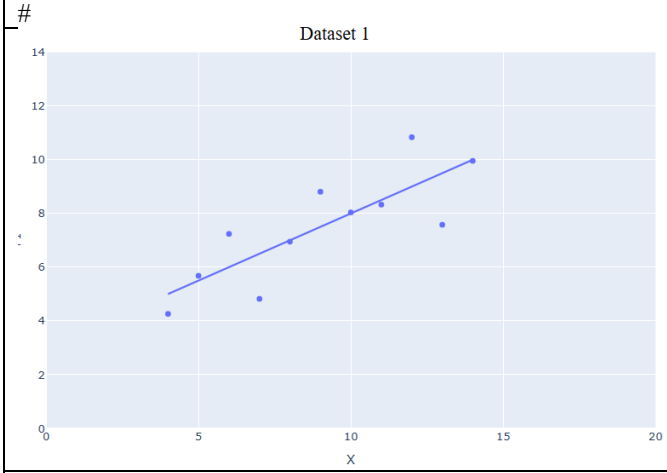
Interactive Bubble Chart	
#	5
	
URL	https://wisenuggets.net/bubble_chart/
Description	Adds a third variable through bubble size; great for illustrating multivariate relationships.

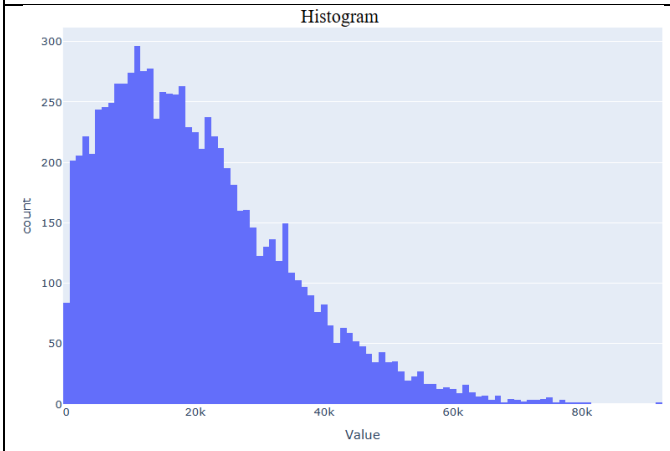
Heatmap	
#	6
	
URL	https://wisenuggets.net/heatmap/
Description	Uses color gradients to visualize intensity or correlation; supports pattern recognition and comparison.

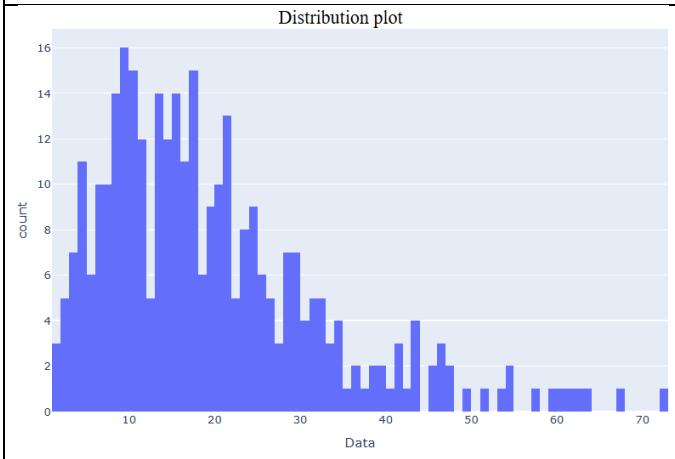
Interactive Scatterplot (2D)	
#	7
	
URL	https://wisenuggets.net/scatter_2d/
Description	Allows exploration of relationships between two variables; ideal for discussing correlation and regression.

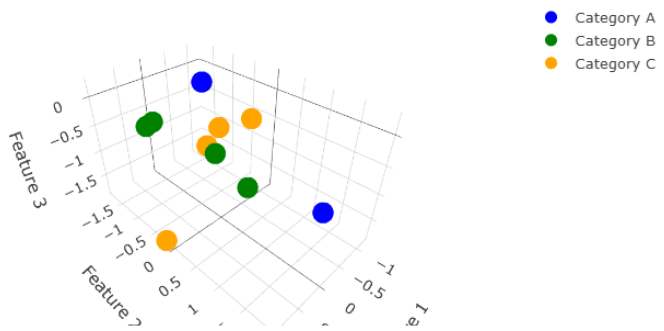
Interactive Scatterplot (3D)	
#	8
	
URL	https://wisenuggets.net/scatter_3d/
Description	Adds depth for multidimensional data; useful for showing non-linear or clustered patterns.

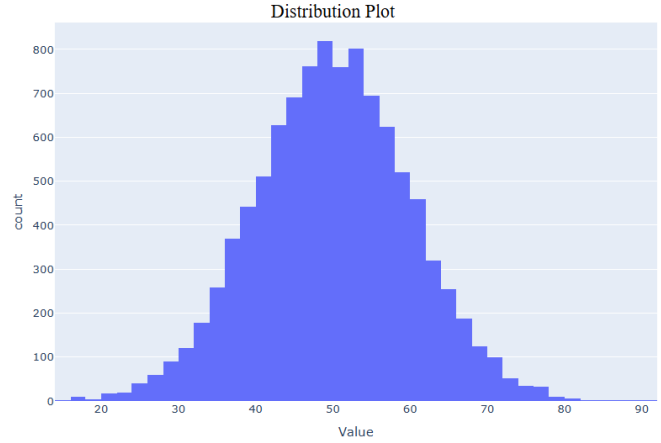
Hypothesis Testing	
#	9
	
URL	https://wisenuggets.net/hypothesis_testing/
Description	Lets students interactively test statistical claims; helps visualize confidence intervals and p-values.

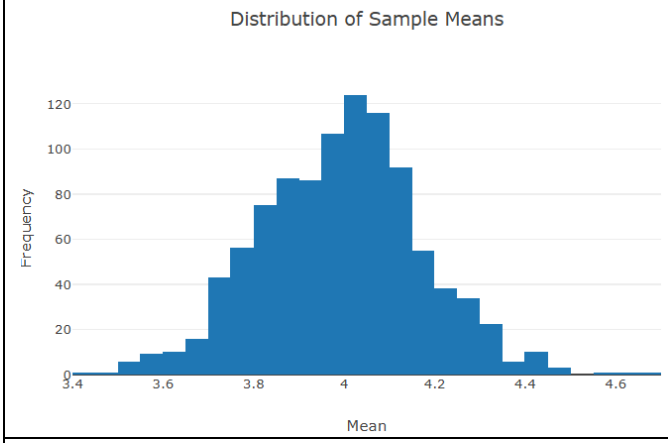
Anscombe's Quartet	
#	10
	
URL	https://wisenuggets.net/anscombe/
Description	Demonstrates that identical statistics can hide very different distributions; emphasizes why visualization matters.

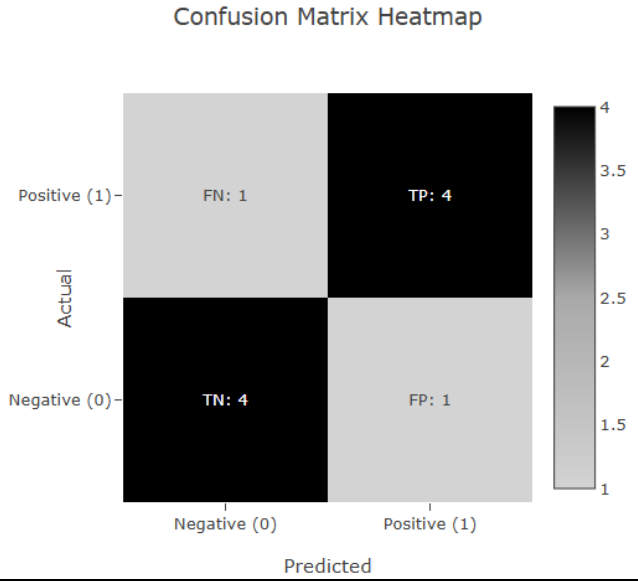
Discretization	
#	11
	
URL	https://wisenuggets.net/discretization/
Description	Allows exploration of how continuous data are binned; clarifies the impact on model granularity.

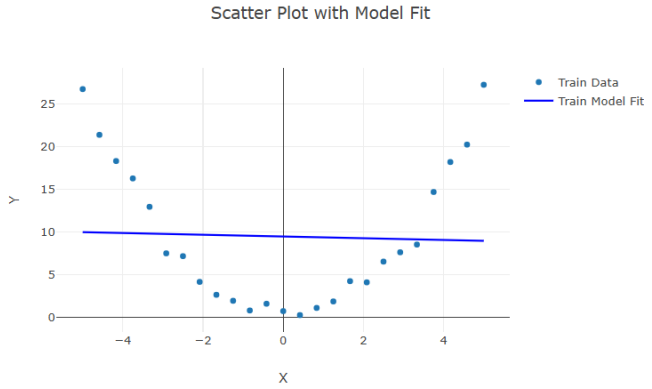
Feature Scaling	
#	12
	
URL	https://wisenuggets.net/feature_scaling/
Description	Shows normalization and standardization effects; useful for explaining why scaling matters in distance-based models.

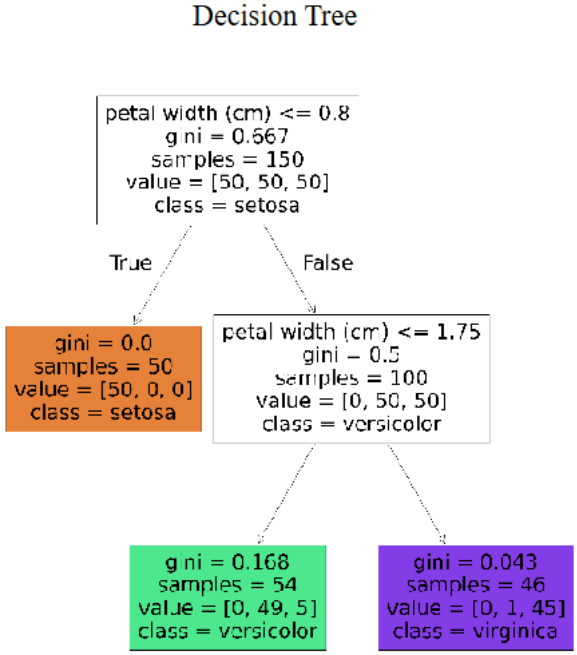
Principal Component Analysis	
#	13
	
URL	https://wisenuggets.net/pca/
Description	Visualizes dimensionality reduction; helps educators show variance preservation and data projection.

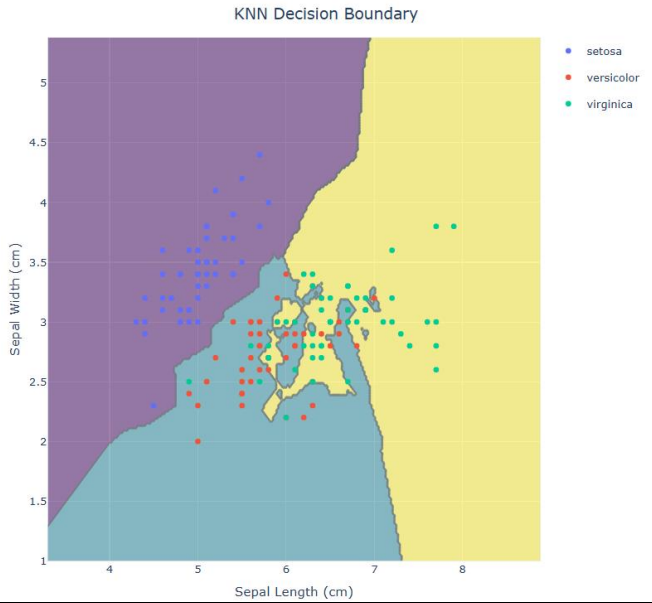
Histogram - Distributions	
#	14
	
URL	https://wisenuggets.net/distributions/
Description	Enables exploration of normal, skewed, or uniform shapes; useful for explaining data tendencies.

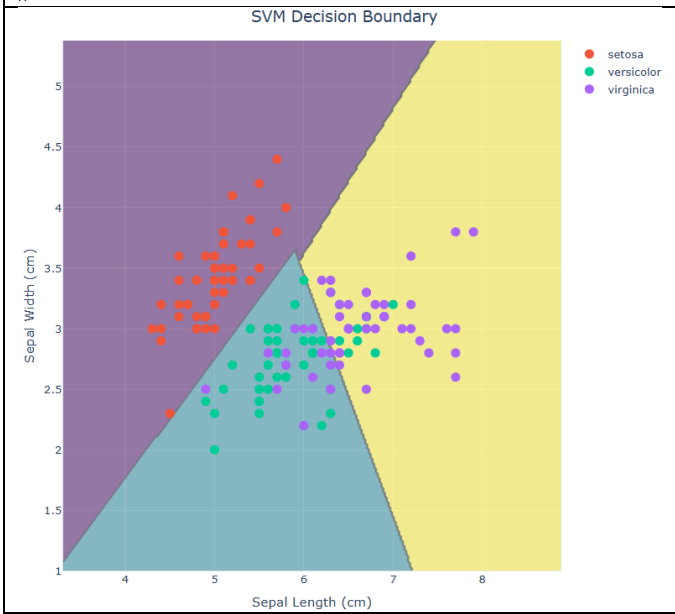
Central Limit Theorem	
#	15
	
URL	https://wisenuggets.net/central_limit_theorem/
Description	Interactive sampling illustrates how means approximate a normal distribution; clarifies foundational statistical reasoning.

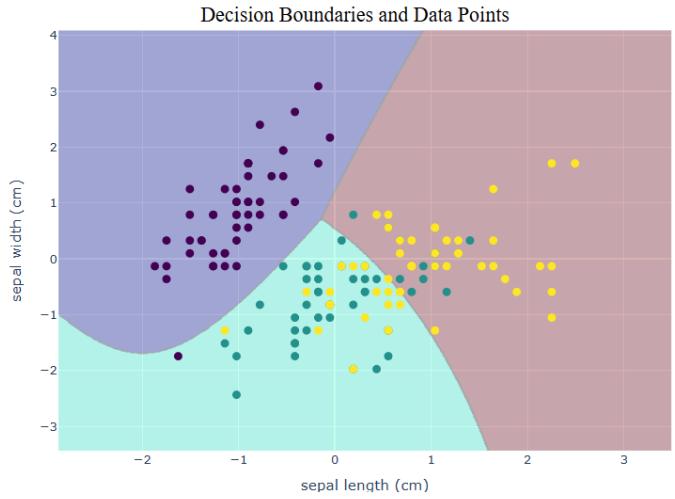
Confusion Matrix	
#	16
	
URL	https://wisenuggets.net/confusion_matrix/
Description	Visualizes classification results; helps explain precision, recall, and accuracy.

Interactive Model Fit Analysis	
#	17
	
URL	https://wisenuggets.net/model_fit/
Description	Compares predicted vs. actual values; ideal for teaching model validation and residual analysis.

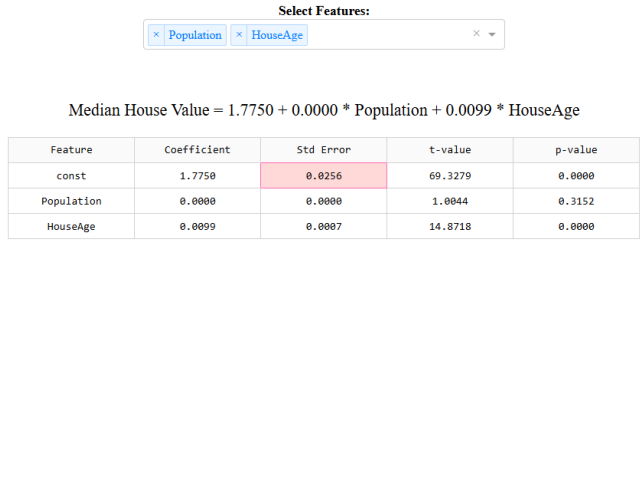
Decision Tree	
#	18
	
URL	https://wisenuggets.net/decision_tree/
Description	Lets students trace decisions step-by-step; demonstrates feature importance and interpretability.

K-Nearest Neighbors	
#	19
	
URL	https://wisenuggets.net/knn/
Description	Shows how classification depends on neighborhood size; clarifies distance metrics and decision boundaries.

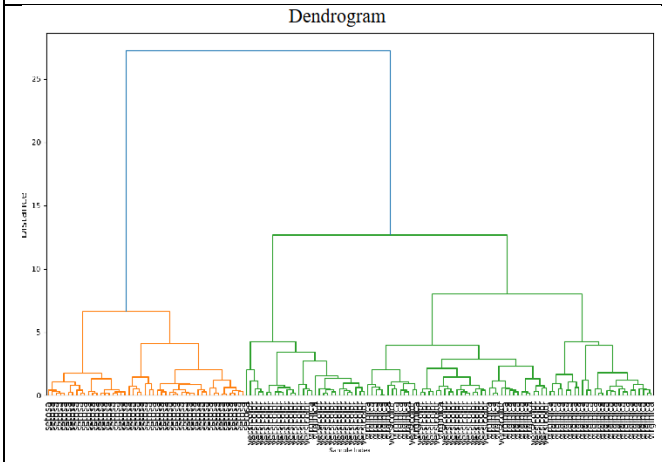
Support Vector Machines	
#	20
	
URL	https://wisenuggets.net/svm/
Description	Interactive margins illustrate hyperplanes; teaches separation of classes and the concept of kernel functions.

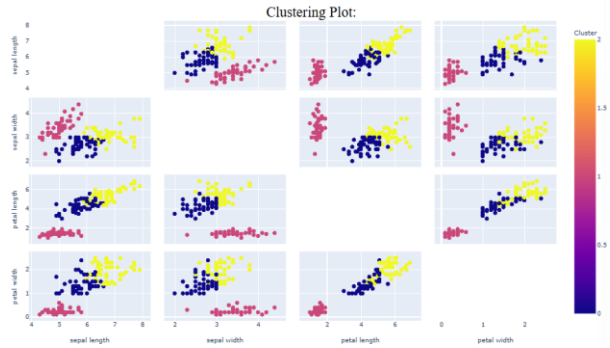
Naïve Bayes	
#	21
	
URL	https://wisenuggets.net/naive_bayes/
Description	Simulates probabilistic reasoning; helps visualize class probabilities and conditional independence.

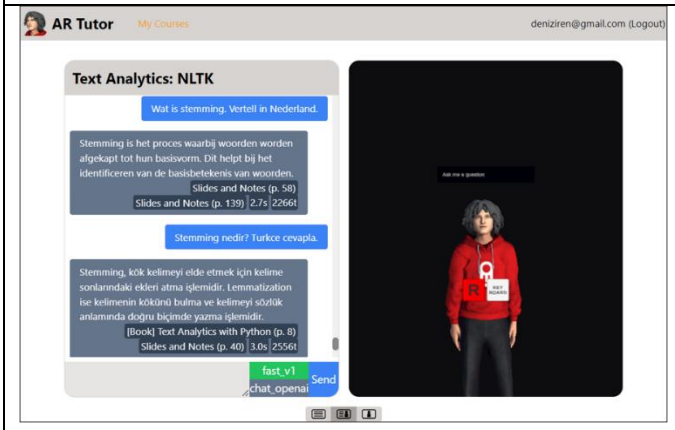
Linear Regression	
#	22
	
URL	https://wisenuggets.net/linear_regression/
Description	Plots best-fit lines dynamically; ideal for teaching slope, intercept, and error concepts.

Multiple Linear Regression	
#	23
 Feature / Coefficient / Std Error / t-value / p-value const / 1.7750 / 0.0256 / 69.3279 / 0.0000 Population / 0.0000 / 0.0000 / 1.0044 / 0.3152 HouseAge / 0.0099 / 0.0007 / 14.8718 / 0.0000	
URL	https://wisenuggets.net/multiple_linear_regression/
Description	Adds multiple predictors; demonstrates multicollinearity and model complexity.

Grid-Based Clustering	
#	24
	
URL	https://wisenuggets.net/clustering_grid/
Description	Lets learners experiment with spatial grouping; shows how grids influence clustering granularity.

Hierarchical Clustering	
#	25
	
URL	https://wisenuggets.net/clustering_hierarchical/
Description	Interactive dendrograms help visualize merging processes and distance thresholds.

Objective Function-based Clustering	
#	26
	
URL	https://wisenuggets.net/clustering_objective_function/
Description	Demonstrates optimization (e.g., k-means); shows how minimizing distance yields cluster centers.

Augmented Reality Tutor (ART) Course Joining	
#	27
	
URL	https://artutor.art/
Description	Example of how to allow students join a course on Augmented Reality Tutor (ART) platform.