RESEARCH & DATA SCIENCE WORK

Data Science Researcher | Machine Learning | Predictive Modeling | Visualization | IRB Researcher

1. Published Work – Data-Driven Clinical Research

Title: *Management of Open Apex and Apexogenesis: A Data-Driven Approach*
Journal: *International Journal of Early Childhood Special Education*
Published: August 2022
Link: Read Publication

As a co-author on this peer-reviewed clinical research study, I contributed to developing a reproducible data science pipeline to investigate apexogenesis treatment outcomes. The goal was to apply statistical learning to identify clinical patterns across treatment types and patient demographics.

My Contributions:

- **Data Acquisition & Cleaning**: Parsed and cleaned unstructured dental treatment records using **R** and **SPSS**, ensuring consistency across multiple provider sources.
- **Feature Engineering**: Created analytical variables from clinical notes, demographic entries, and procedural types to enable supervised modeling.
- **Predictive Modeling**: Implemented **logistic regression** and **CART decision trees** to classify treatment outcomes. Evaluated model performance using accuracy, AUC, and k-fold cross-validation.
- **Statistical Validation**: Performed correlation analysis, chi-square tests, and variable importance scoring to interpret model outputs in a clinical context.
- **Reproducibility & Documentation**: Used **R Markdown** to document the entire pipeline including data transformations, exploratory steps, modeling decisions, and evaluation metrics for future clinical replication.

Tools Used: R, SPSS, Excel, ggplot2, R Markdown