

Statistical Learning, Machine Learning & Artificial Intelligence

- Course Syllabus -

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Lecture 0 - Tidyverse

Tidyverse:

- Core Tidyverse
- Wrangle (tidyr & dplyr)
- Program (purrr)

R Code Evaluation Methods:

- Standard Evaluation
- Non-Standard Evaluation
- Tidy Evaluation

Pipe Operator:

- Basic Piping
- Argument Placeholder
- Re-using Placeholder for Attributes

Lecture 1: Tidymodels

Recipe:

- feature engineering
- steps
- recipes

Parsnip:

- engines
- modelling
- workflows

Rsample:

- sampling
- validation
- cross-validation

Lecture 2: Machine Learning, Regression & Classification

Regression Algorithms:

- Linear Regression
- Ridge, LASSO, Elastic Net
- MARS
- SVM
- KNN

- Bagging
- Random Forest
- XGBoost, LightGBM, CatBoost
- Cubist
- Multi Layer Perceptron

Classification Algorithms:

- Naive Bayes
- Logistic Regression
- Ridge, LASSO, Elastic Net
- SVM
- KNN
- CART
- Bagging
- Random Forest
- XGBoost, LightGBM, CatBoost
- Cubist
- Multi Layer Perceptron

Lecture 3: Hyperparameter Tuning

Tune:

- tuning
- grid searches
- validation

Lecture 4: Ensemble Learning & Stacking

Stacks:

- ensembling
- stacking
- elastic net stacking
- simple ensembles

Lecture 5: Automatic Machine Learning

H2O:

- H2O modelling
- AutoML
- Tidymodels integration, h2oparsnip

Lecture 6: Deep Neural Networks

Tensorflow

Keras:

- network structure
- activation functions
- backpropagation
- training
- evaluation
- tuning

Lecture 7: Explainable AI