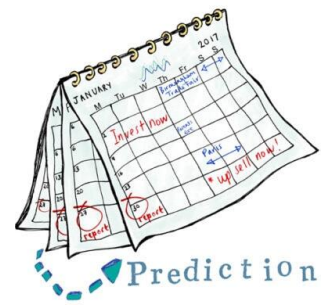


## Machine Learning with Tidymodels

Machine learning is the process of applying statistical techniques to gain systematic information about a quantity of interest. We will be specifically focusing on how we can use the {tidymodels} suite of packages to implement these techniques. We cover key reasons for model fitting, such as prediction and inference, on quantitative and qualitative responses.



### Course Outline

- **Introduction:** A general introduction into statistical modelling techniques and the {tidymodels} R package.
- **Quantitative model fitting:** Using {parsnip} to perform simple and multiple linear regression, allowing us to fit a model.
- **Qualitative model fitting:** Using {parsnip} to perform logistic regression and fit the model.
- **Classification:** Brief introduction to the K-nearest neighbours (KNN) technique for cases where a categorical response has more than two possible outcomes.
- **Model assessment:** Testing the reliability of model predictions and finding optimum models using resampling methods like the validation set approach.
- **Model pre-processing with {recipes}:** Including variable transformations, one-hot encoding and normalisation.

### Learning Outcomes

#### Session 1:

*By the end of session 1 participants will...*

- understand Machine Learning with statistical models including prediction, inference, regression and classification.
- understand the purpose, aims and benefits of performing machine learning in the Tidymodels framework.
- be able to perform fundamental machine learning methods in the Tidymodels style using {parsnip}.
- know how to perform prediction and classification using linear and logistic regression models.
- be able to classify with K-nearest neighbours models.

#### Session 2:

*By the end of session 2 participants will...*

- be able to create training and testing datasets using {rsample}.
- be able to compare models and assess predictive performance using {yardstick}.
- be able to evaluate classification performance metrics such as accuracy, specificity and sensitivity.
- have enough knowledge to apply model pre-processing using {recipes}.

- comfortably create a workflow using the `{workflows}` package.

*This course does not include*

- Using `{parsnip}` to create Linear Discriminant Analysis models.
- Using V-fold cross validation data splits and bootstrap samples for model assessment and parameter tuning.
- Applying penalised regression techniques on models with a high number of predictor variables.
- Using tree-based models in regression & classification problems.

*The above are covered in our [advanced machine learning with Tidymodels](#) course.*

## Attendee Feedback

- “Difficult concepts were well-explained and I never felt like I couldn’t keep up”
- “Teaching staff was great and really patient in answering questions.”
- “The course was brilliant. Theo covered every topic in just enough detail and he had a really engaging style. He created a great atmosphere where everyone felt comfortable enough to ask questions. I have never taken such a comprehensive course that was so well designed (even at Uni).”