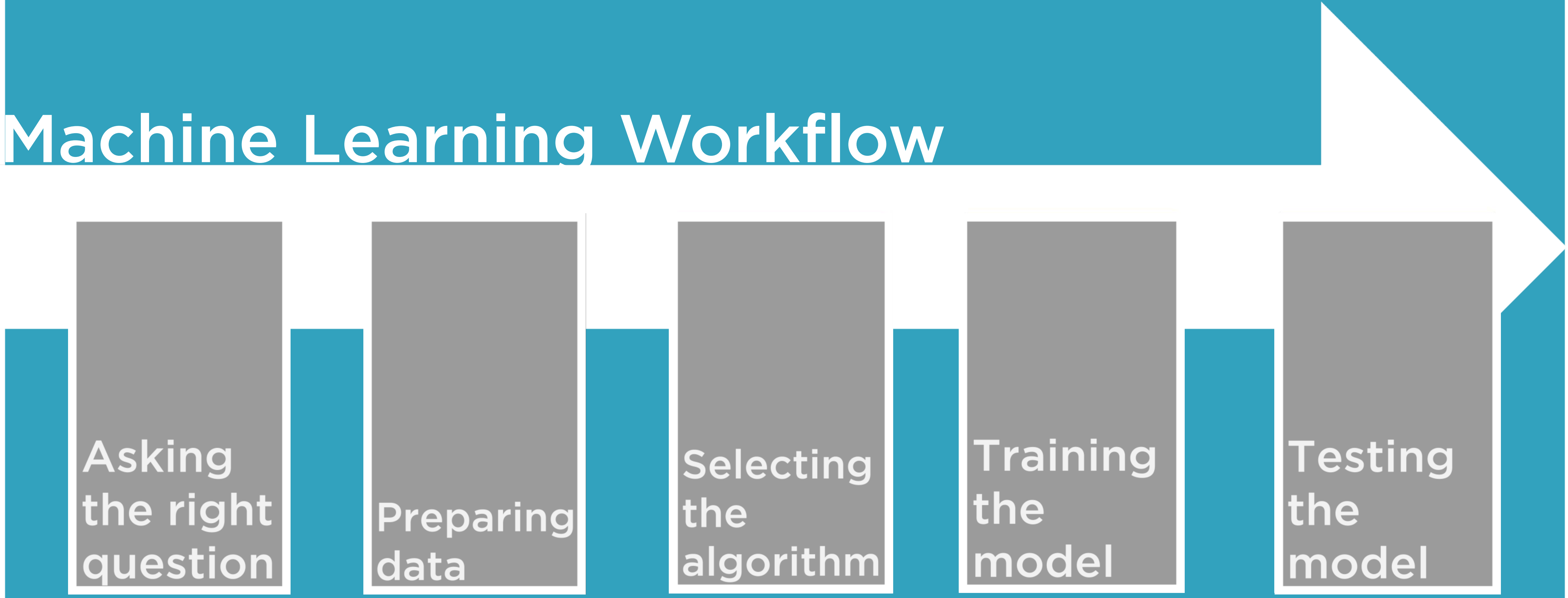
Machine Learning Workflow



Asking the right question

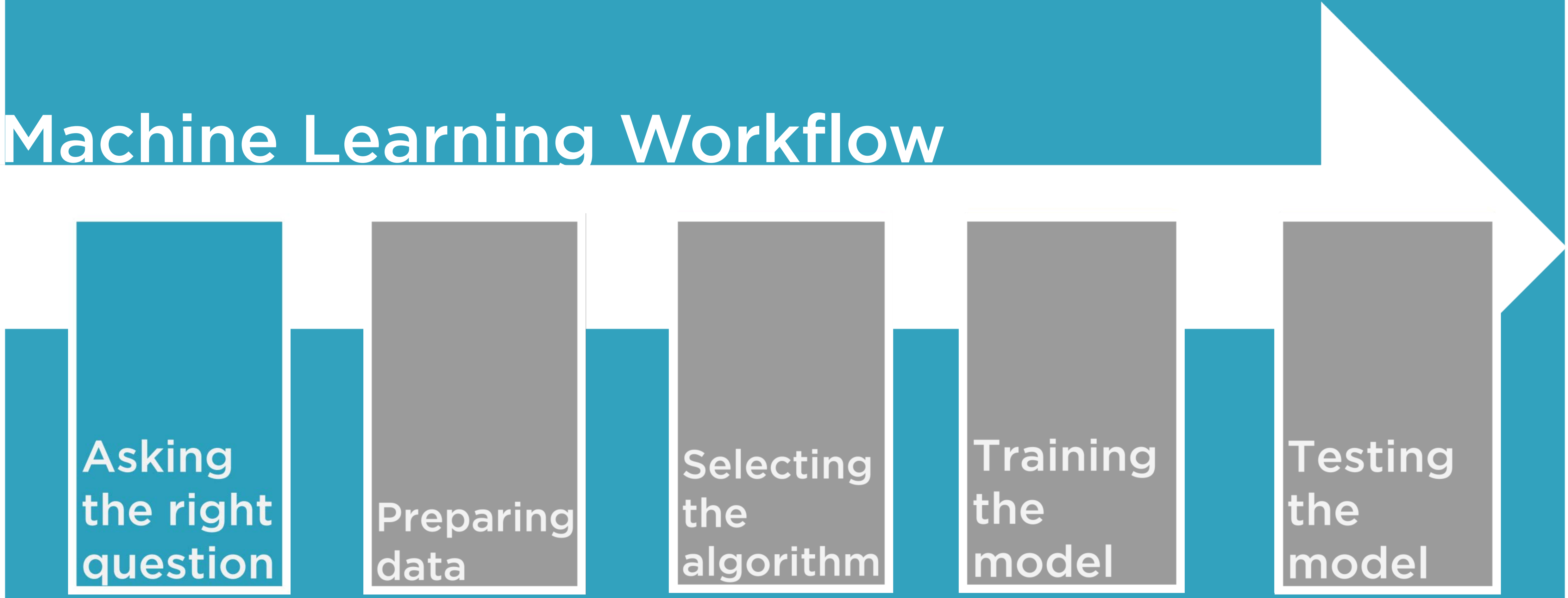
Preparing data

Selecting the algorithm

Training the model

Testing the model

Machine Learning Workflow



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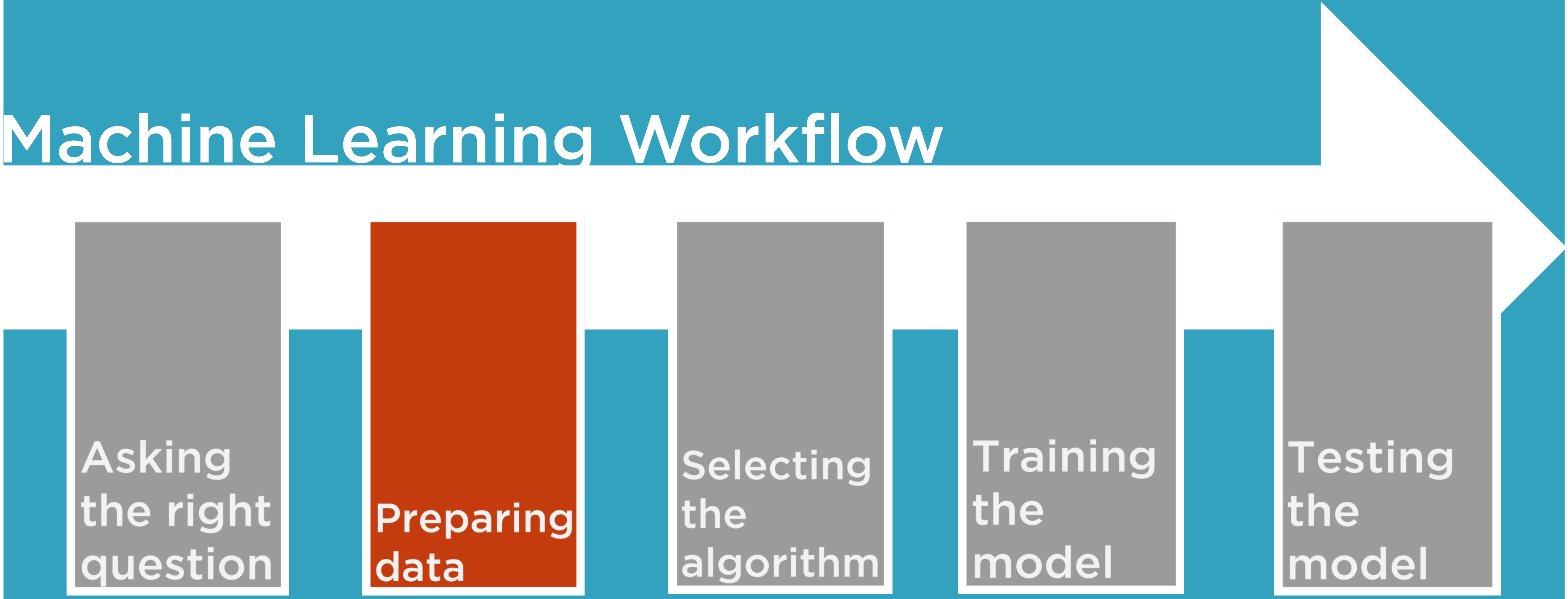

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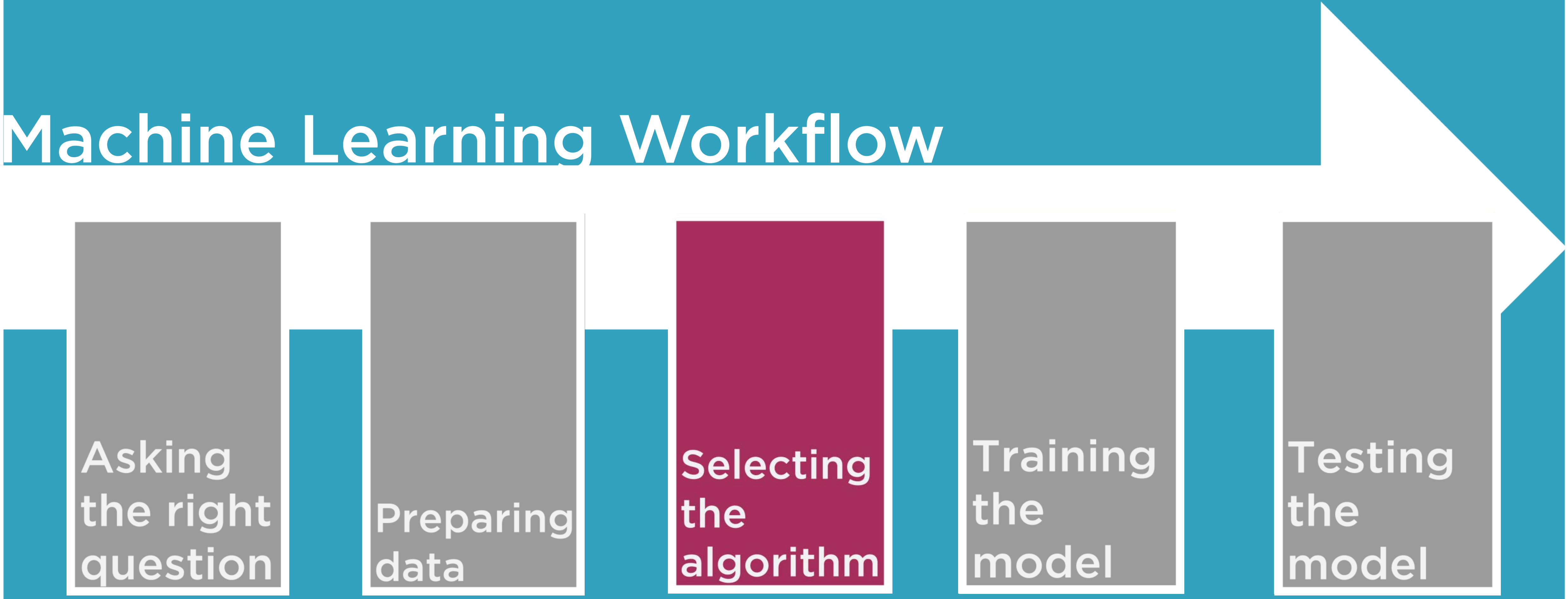

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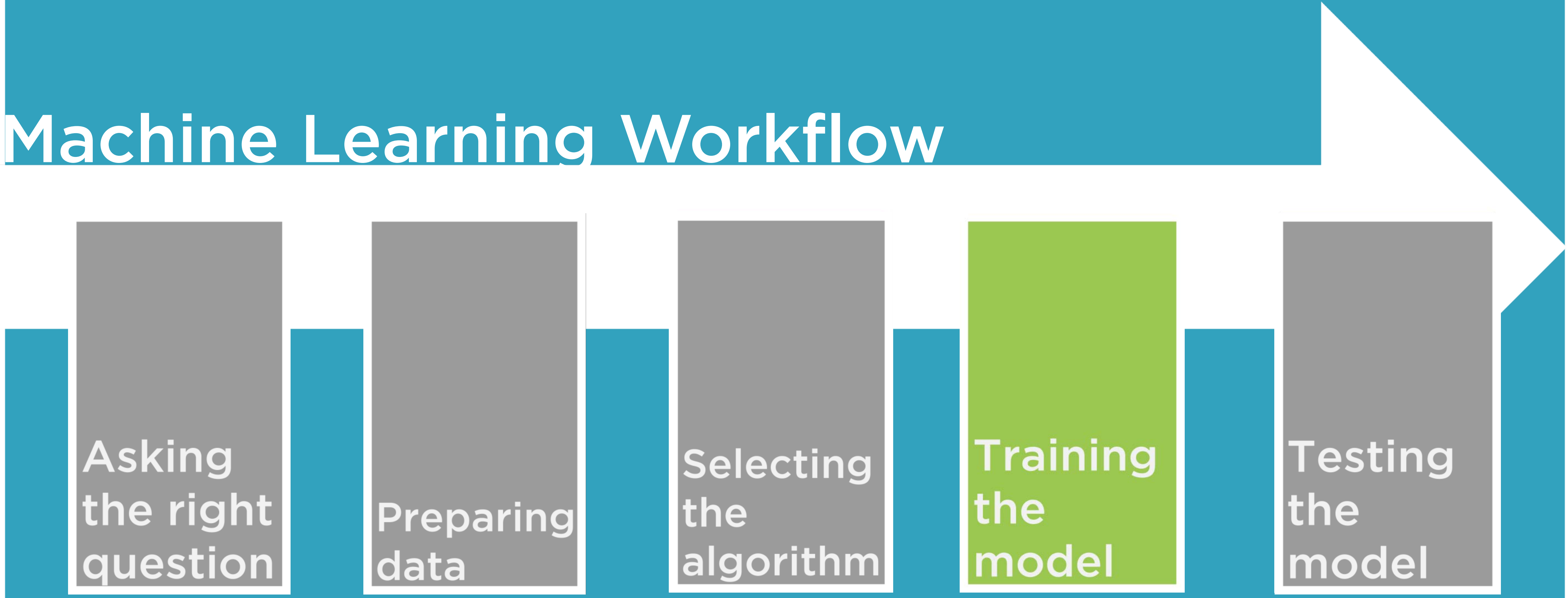

Asking the right question

Preparing data

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Overview

Understand the training process

Scikit-learn package

Train algorithm with Diabetes data

Machine Learning Training

Letting specific data teach a Machine Learning algorithm to create a specific prediction model.

Machine Learning Training

Letting specific data teach a Machine Learning algorithm to create a specific prediction model.

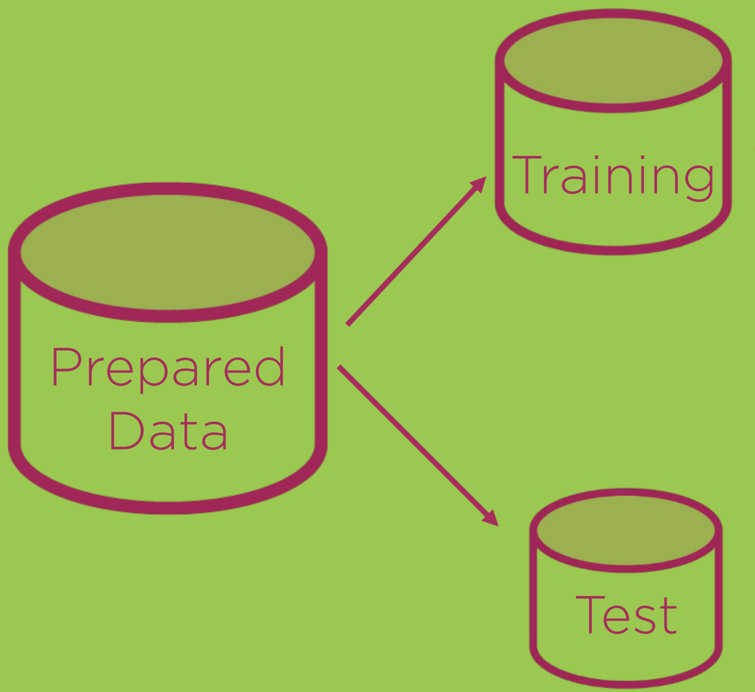
Why retrain?

New data => better predictions

Verify training performance with new data

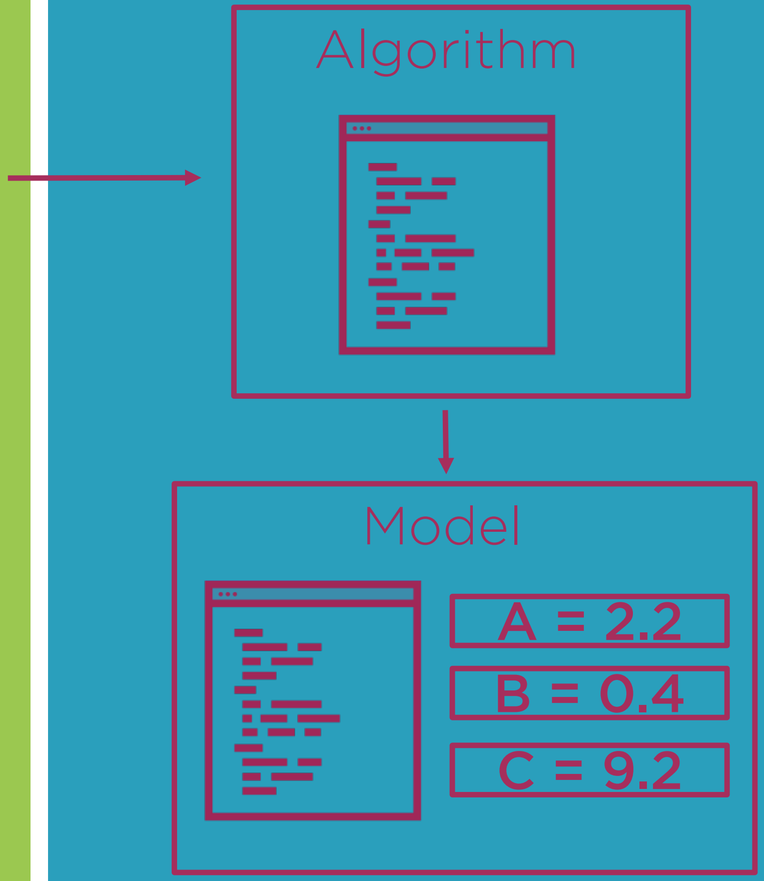
Training Overview

Split Data



70% Training
30% Testing

Train Model



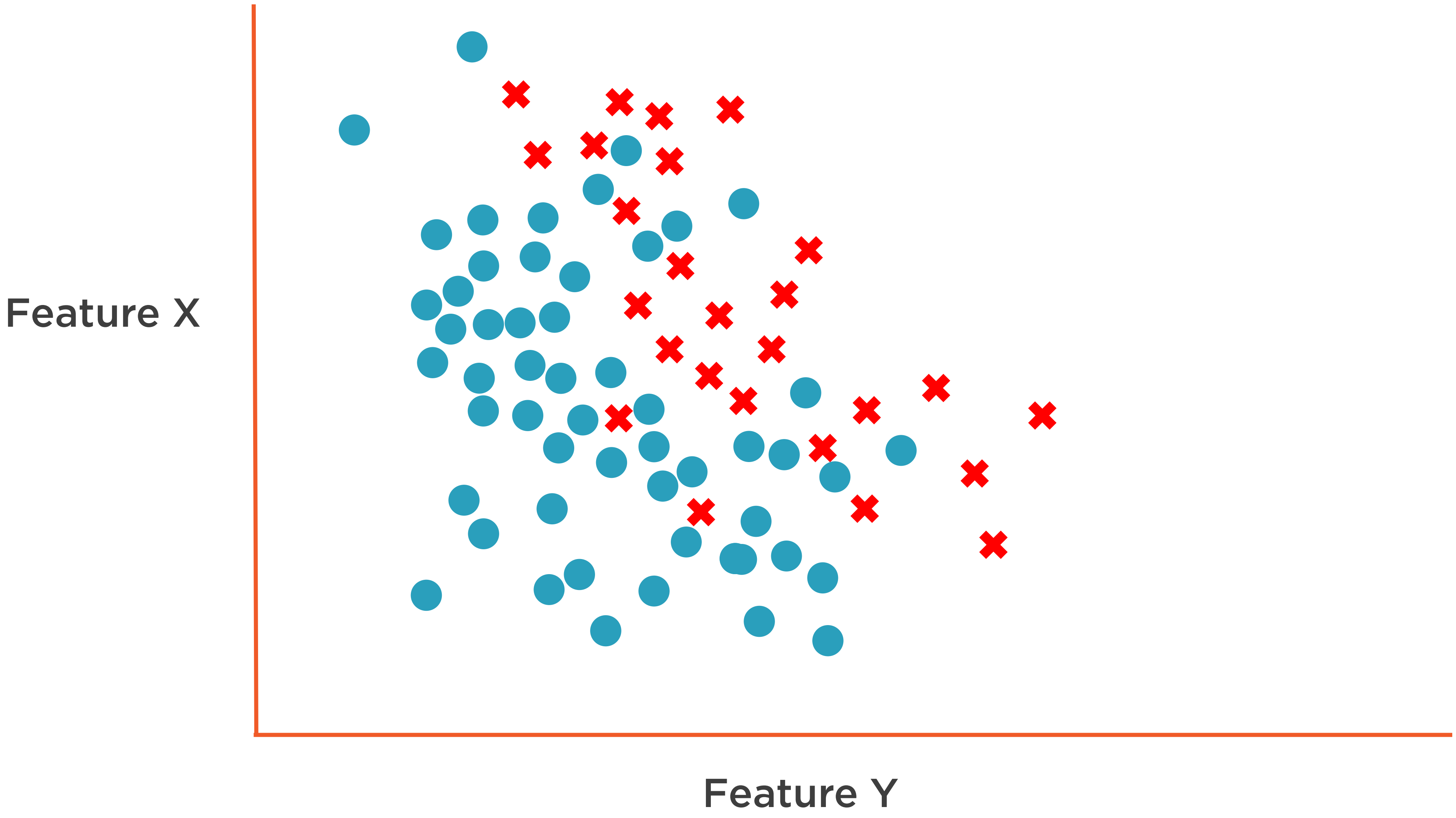
Evaluate Model

Training Goal

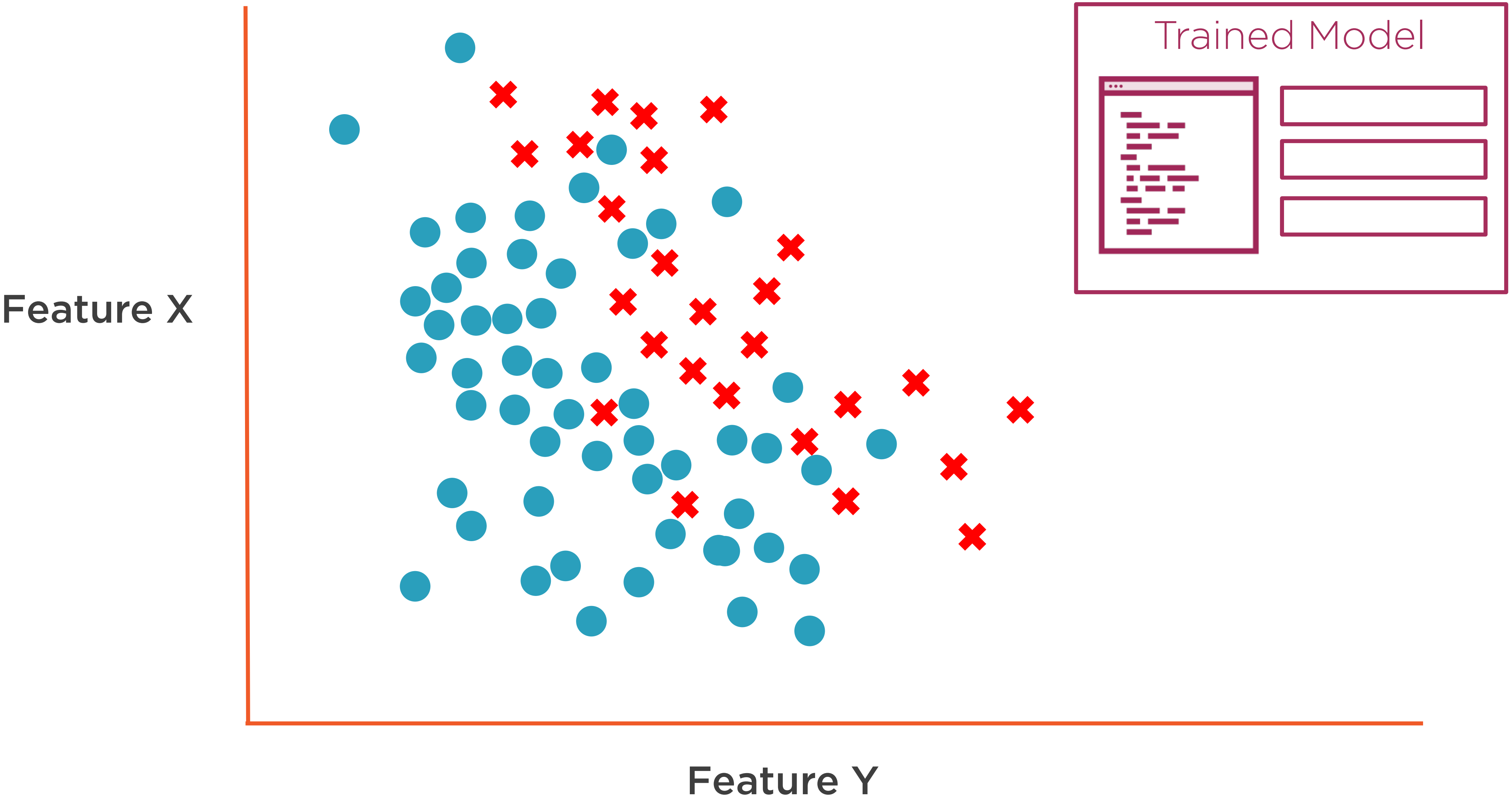
Hypothetical Data

Not Diabetes Data

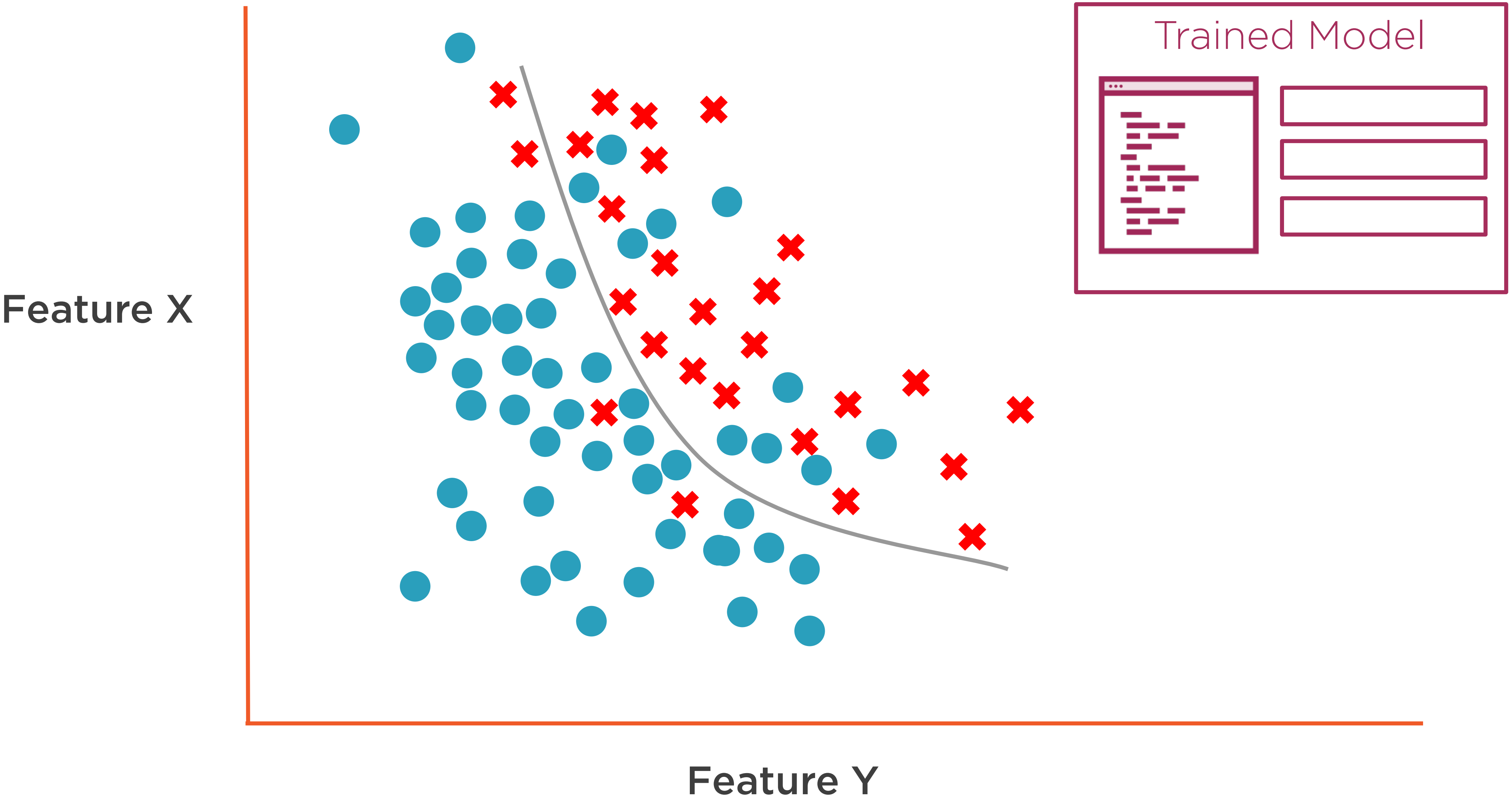
Training Goal



Training Goal



Training Goal



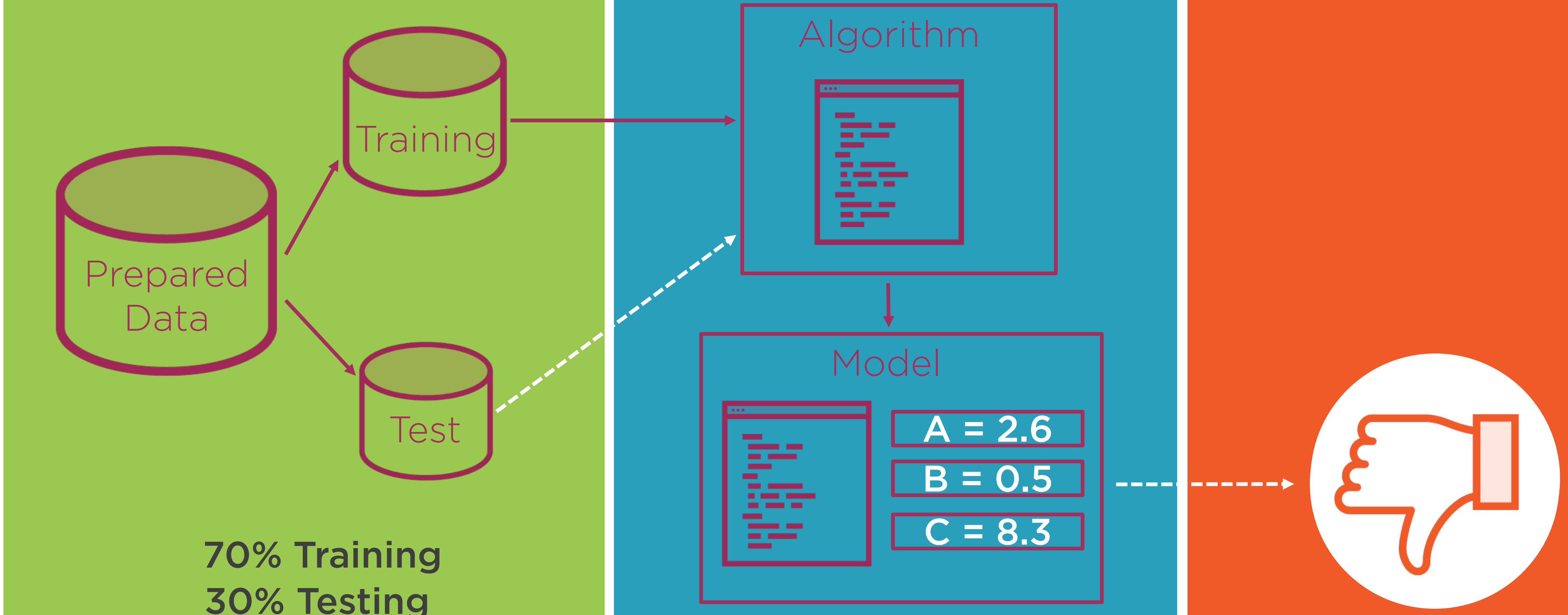
What about the test data?

Training Overview

Split Data

Train Model

Real World Model Performance



Prepared Data

Training

Test

Algorithm

Model

A = 2.6

B = 0.5

C = 8.3

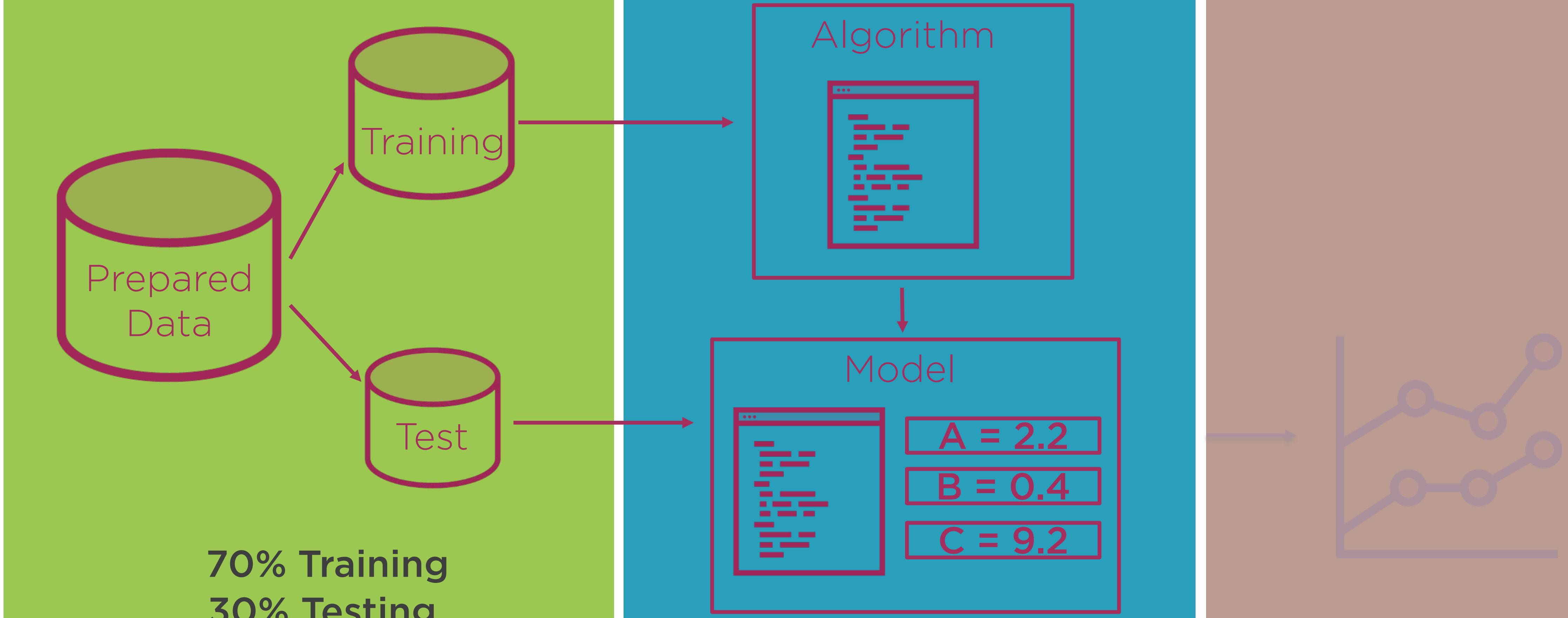
70% Training
30% Testing

Training Overview

Split Data

Train Model

Evaluate Model



Prepared Data

Training

Test

Algorithm

Model

A = 2.2

B = 0.4

C = 9.2

70% Training
30% Testing

Selecting Training Features

We want minimum features (columns)

Selected features

- # of Pregnancies
- Glucose Concentration
- Blood Pressure
- Skin Thickness
- Insulin Level
- Body Mass Index
- Diabetes Predisposition
- Age

Python Training Tip

Don’t rewrite from scratch

scikit-learn has training functions

Scikit-learn library

Designed to work with NumPy, SciPy and Pandas

Toolset for training and evaluation tasks

- Data splitting
- Pre-processing
- Feature selection
- Model training
- Model tuning

Common interface across algorithms

Demo

Split data into training and test data sets

Perform post split data preparation

Train with initial algorithm

Missing Data

Common Problem

Options

- Ignore
- Drop observations (rows)
- Replace values (Impute)

Data numbers

- 768 rows
- 374 missing insulin values
- Can we ignore/delete almost 50% of data?

Imputing Options

Replace with mean, median

Replace with expert knowledge derived value

Using mean imputing

Summary

Reviewed training process

Used Python to split data

- Utilized the scikit-learn methods with NumPy and Pandas data structures

Reasoned about missing data

- Used mean imputation

Trained the initial Naïve Bayes model