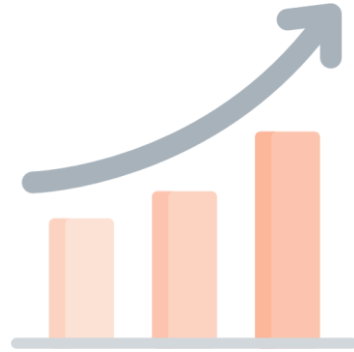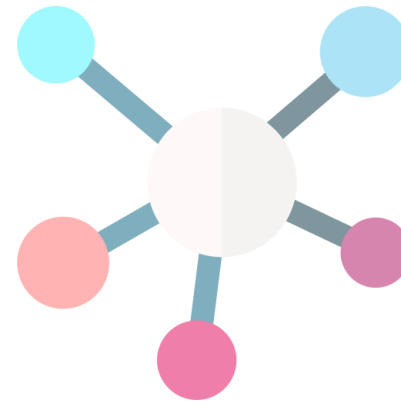# Types of Machine Learning Problems
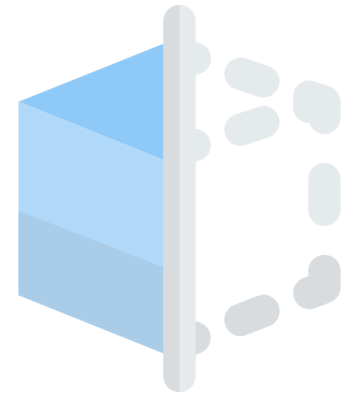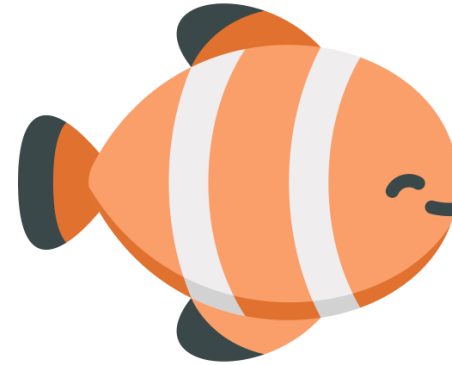

Classification

Regression

Clustering

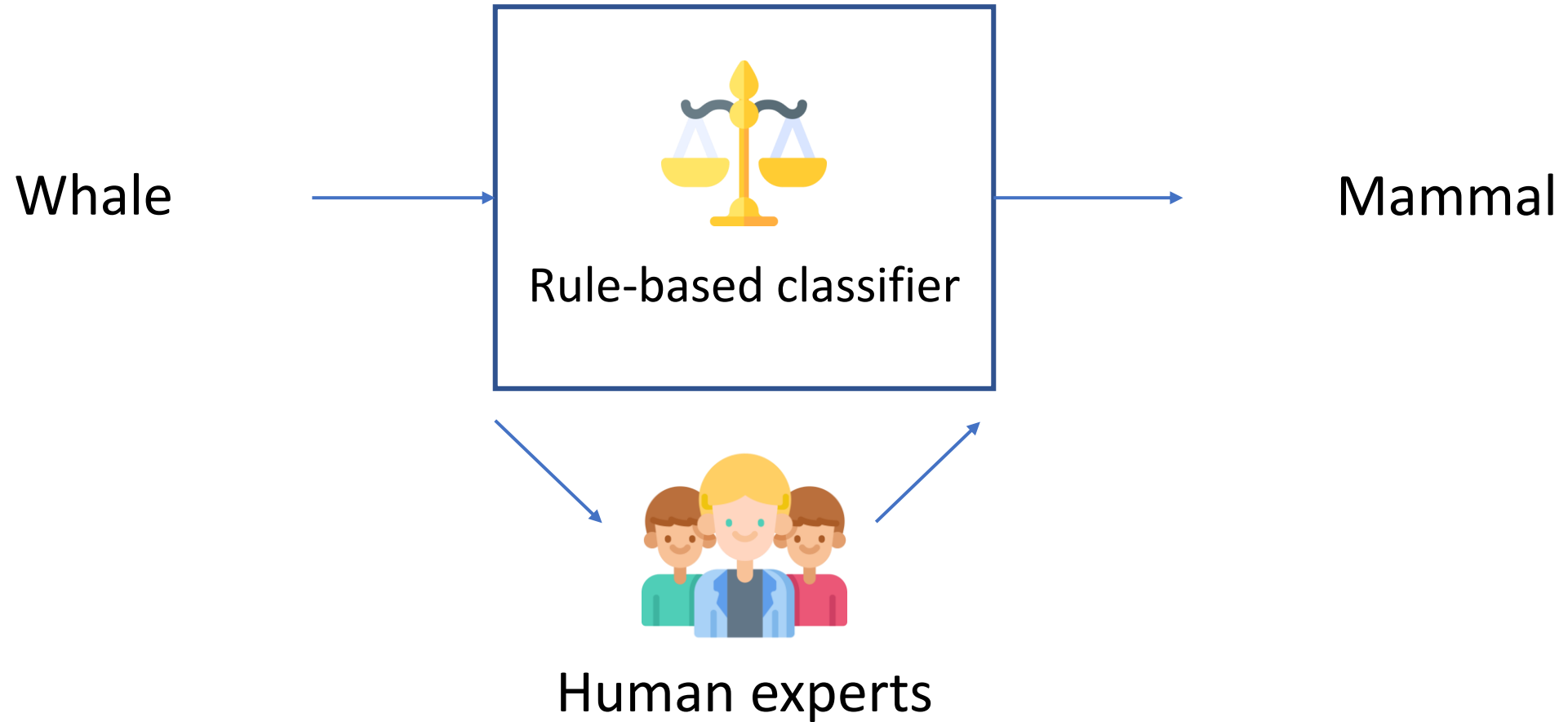Dimensionality reduction

Whales: Fish or Mammals?

Mammals

Members of the infraorder Cetacea

Fish

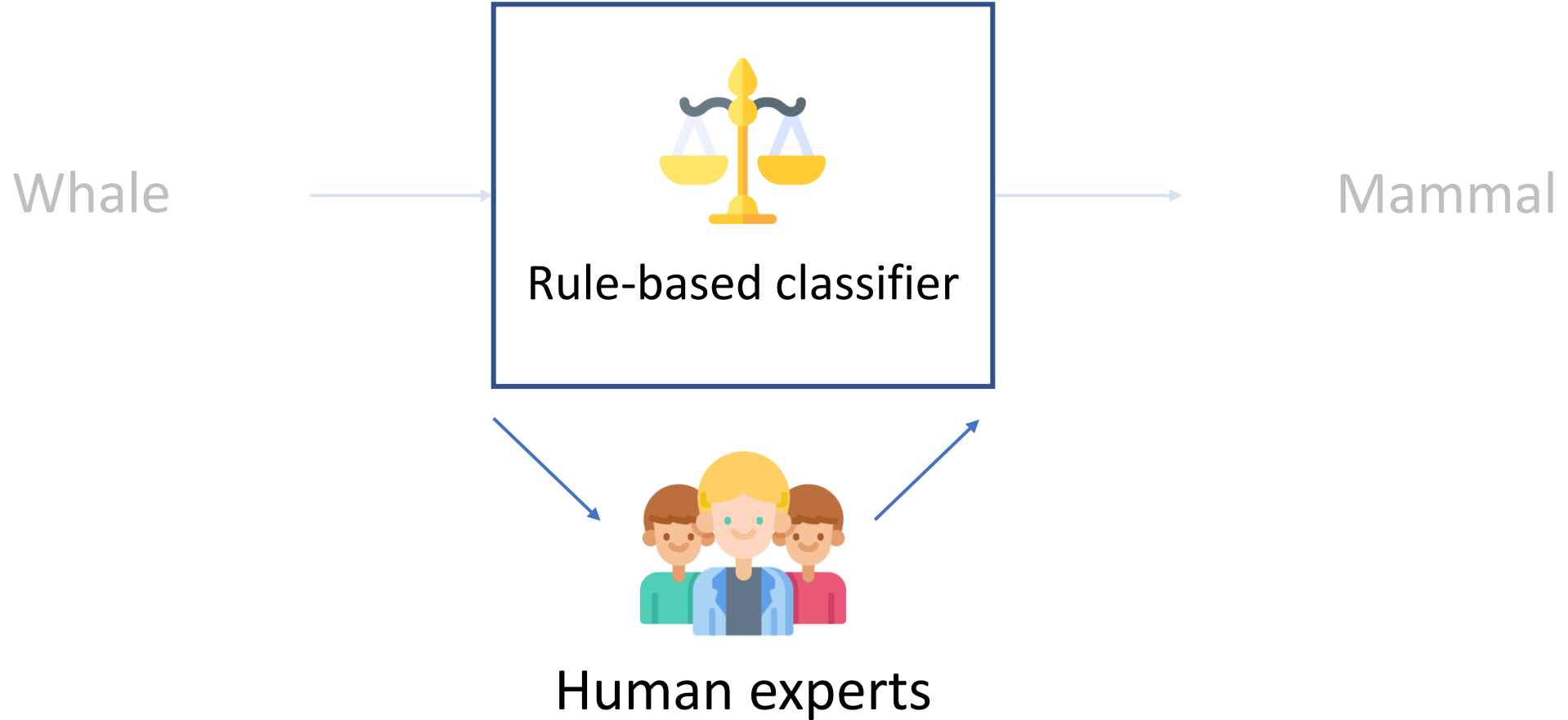Look like fish, swim like fish, and move like fish

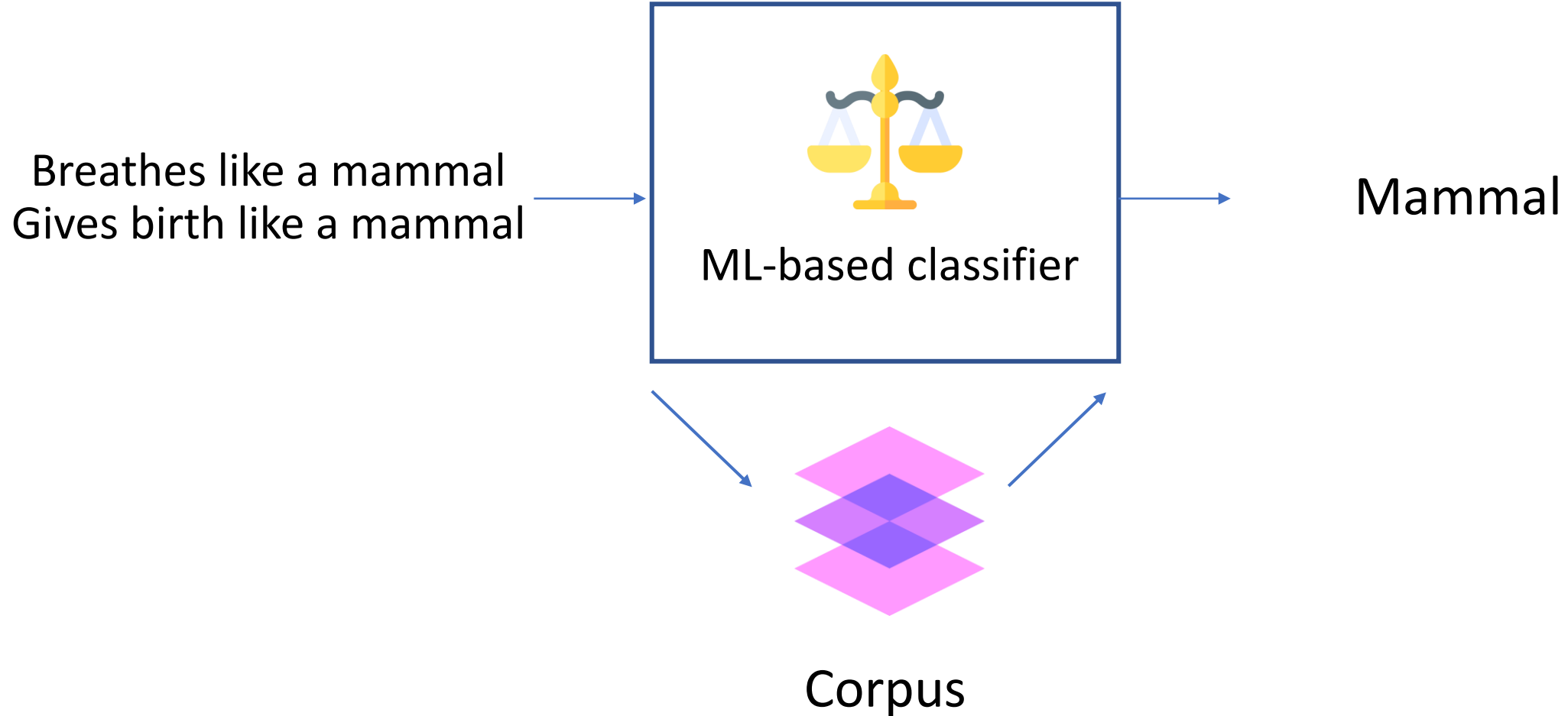# Rule-based Binary Classifier

Whale → Rule-based classifier → Mammal

Human experts

Expert Know What Rule to Apply

Whale →

Rule-based classifier

→ Mammal

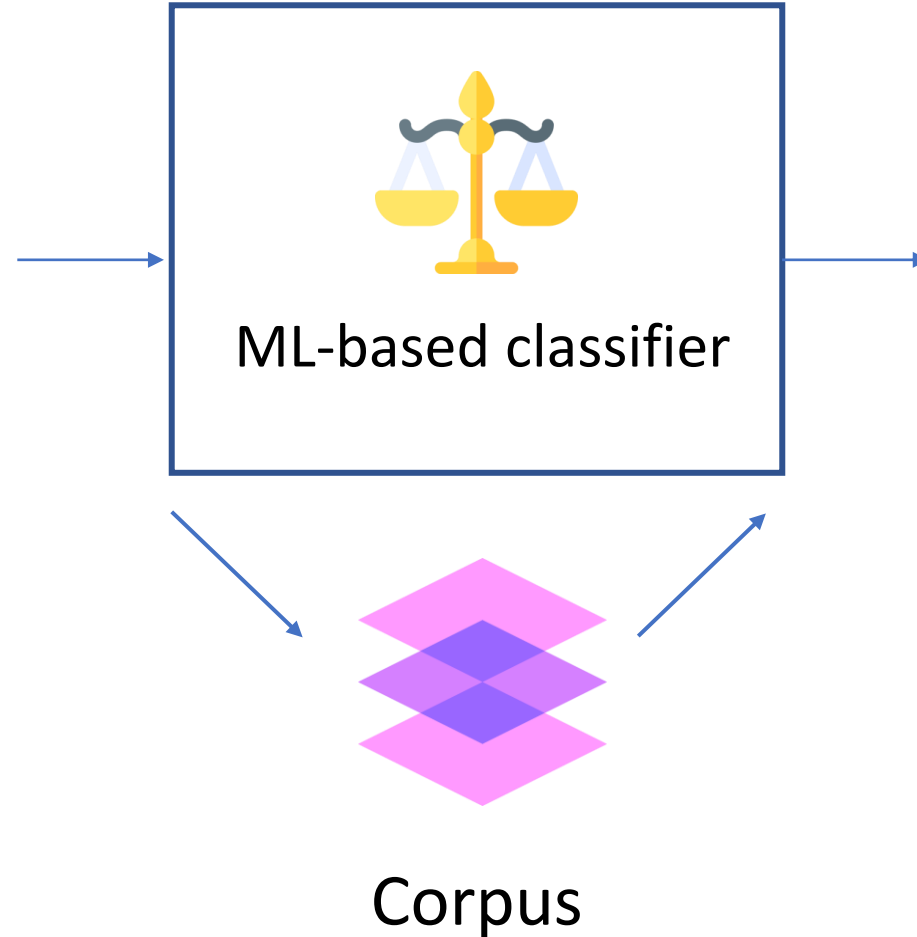Human experts

ML-based Binary Classifier

Data Used to Train Model Parameters
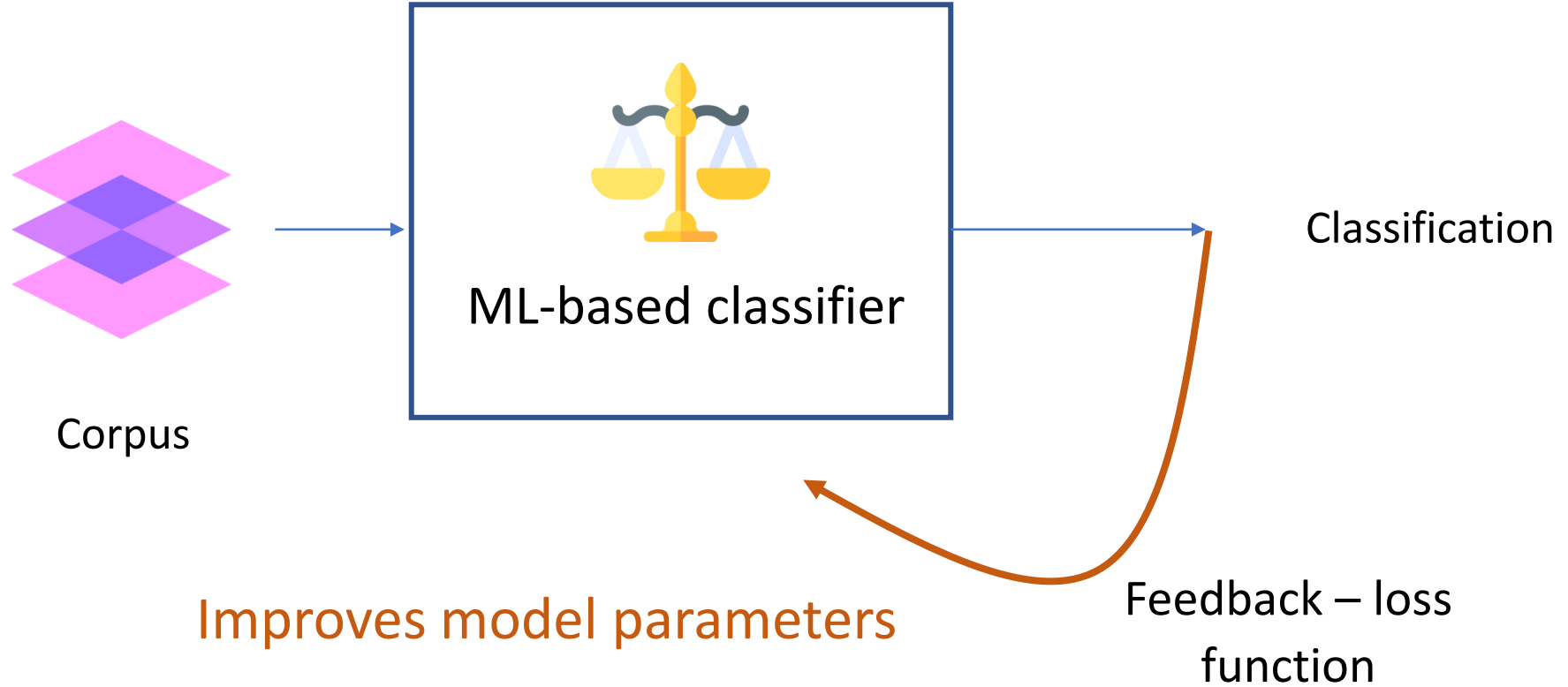
ML-based Classifier

Training

Feed in a large corpus of data
Classified correctly

Prediction

Use it to classify new instances
which it has not seen before
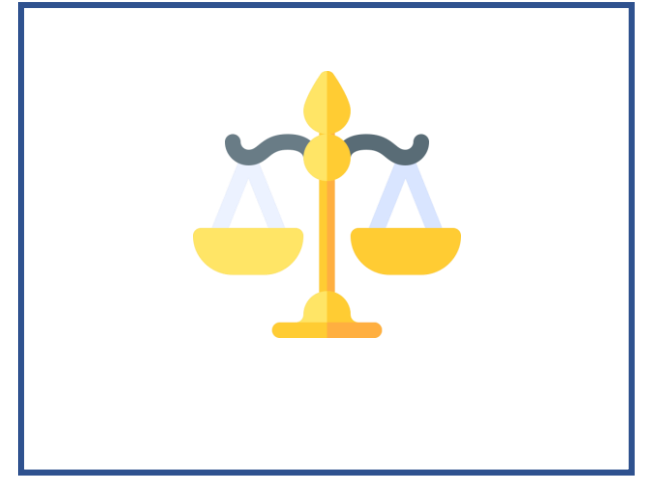
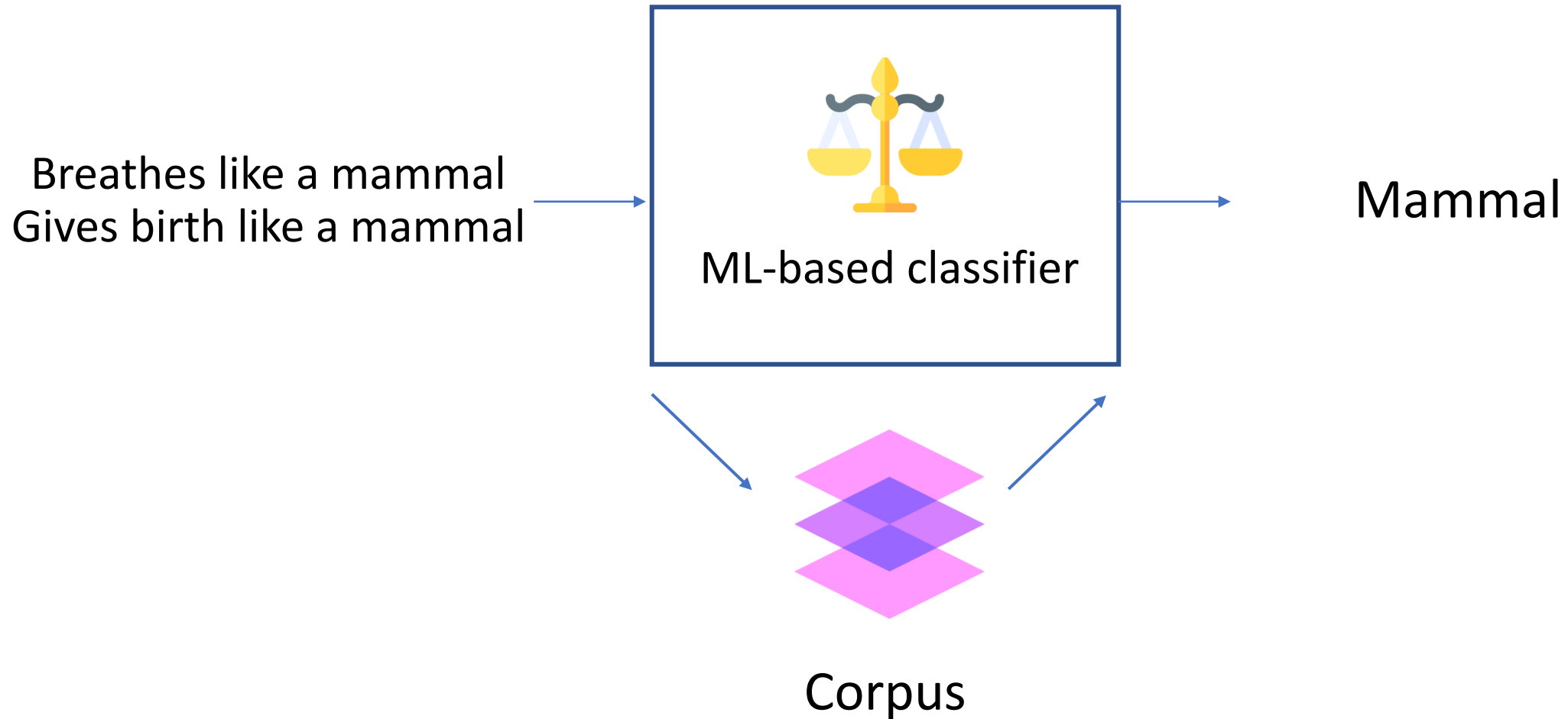# Training the ML-based Classifier

ML-based Binary Classifier

Corpus

Classification algorithm

ML-based classifier

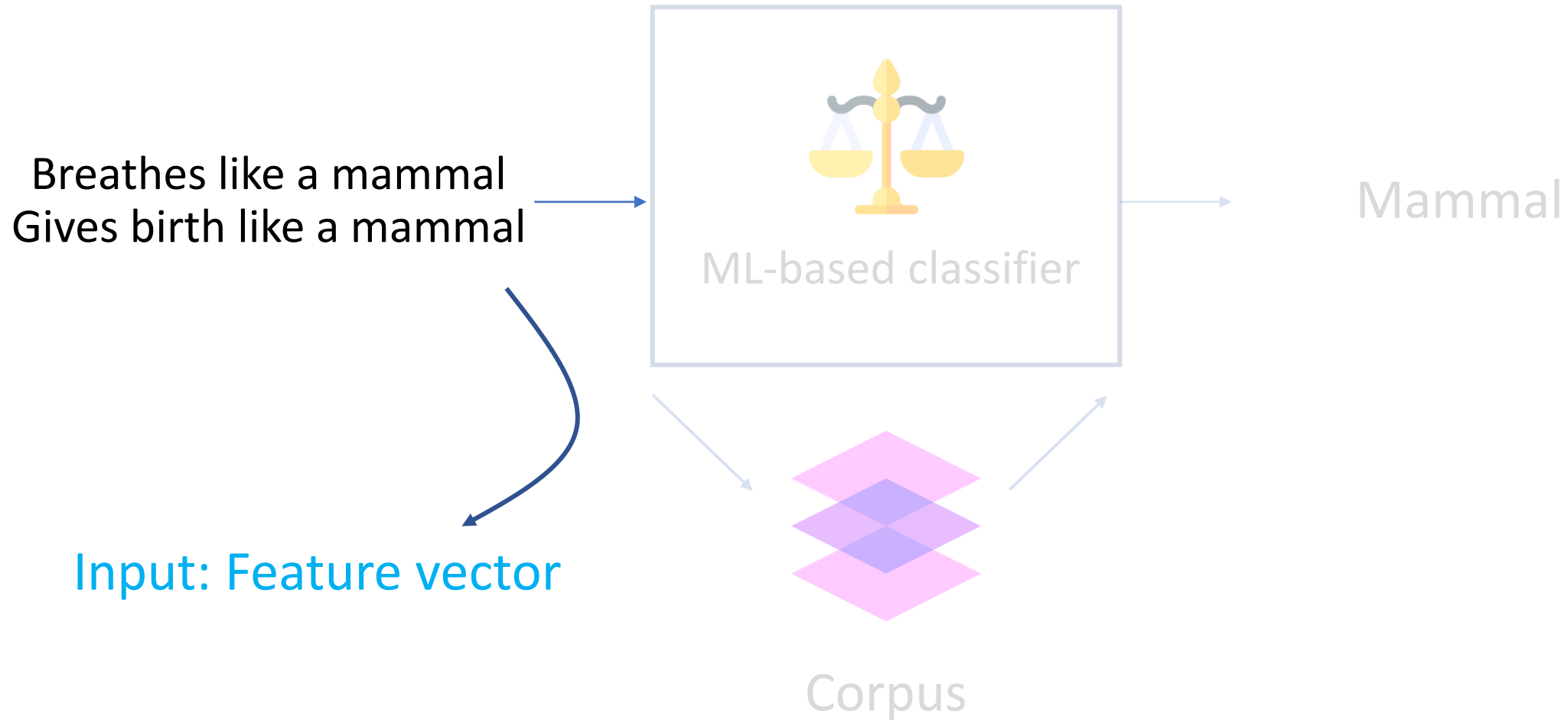# ML-based Binary Classifier

Breathes like a mammal
Gives birth like a mammal

ML-based classifier

Mammal

Corpus

ML-based Binary Classifier

Breathes like a mammal
Gives birth like a mammal

ML-based classifier

Mammal

Input: Feature vector

Corpus

ML-based Binary Classifier

Breathes like a mammal
Gives birth like a mammal

ML-based classifier

Corpus

Mammal

Output: Label

ML-based Binary Classifier

Moves like a fish,
Looks like a fish

ML-based classifier

Fish

Corpus

ML-based Binary Classifier

Breathes like a mammal
Gives birth like a mammal

ML-based classifier

Fish

Corpus

Input: Wrong
choice of features

ML-based Binary Classifier

Breathes like a mammal
Gives birth like a mammal

ML-based classifier

Corpus

Fish

Predicted label
≠
Actual label