Tutorial 3 - DTs, SVMs, KNNs (oh my!)

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Carleton University

Friday 25th September, 2020

Disclaimer: Recorded Tutorials will be Publicly Posted

Goal: to create a companion series of applied machine learning tutorials for the 100MLB text, these tutorials will be publicly posted as a YouTube playlist.

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Privacy Preservation (less easy):
If the above *hinders your ability to learn* $\wedge$ *violates your privacy*, please let me/Dr. Green know ASAP and video will be post-processed accordingly.

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ML Weekly

Recent news events from the ML community

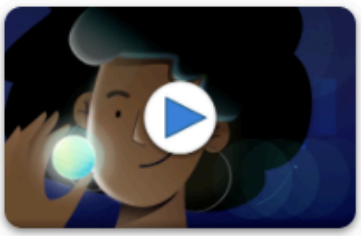
ML Weekly

1. **(NLP)** Go Ahead, Try to Sneak Bad Words Past AI Filters—for Research

Rethinking AI Benchmarking

Dynabench is a research platform for dynamic data collection and benchmarking. Static benchmarks have well-known issues: they saturate quickly, are susceptible to overfitting, contain exploitable annotator artifacts and have unclear or imperfect evaluation metrics.

This platform in essence is a scientific experiment: can we make faster progress if we collect data dynamically, with humans and models in the loop, rather than in the old-fashioned static way?



ML Weekly

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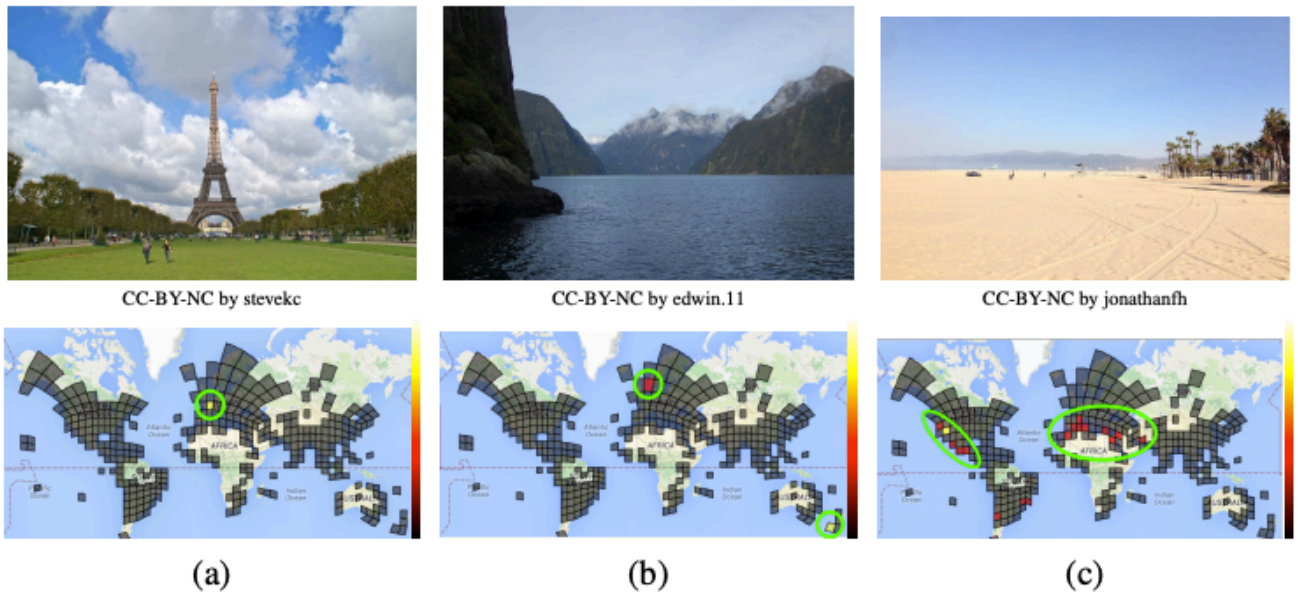

ML Weekly

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2. **(Robotics)** An adaptive deep reinforcement learning framework enables curling robots with human-like performance in real-world conditions
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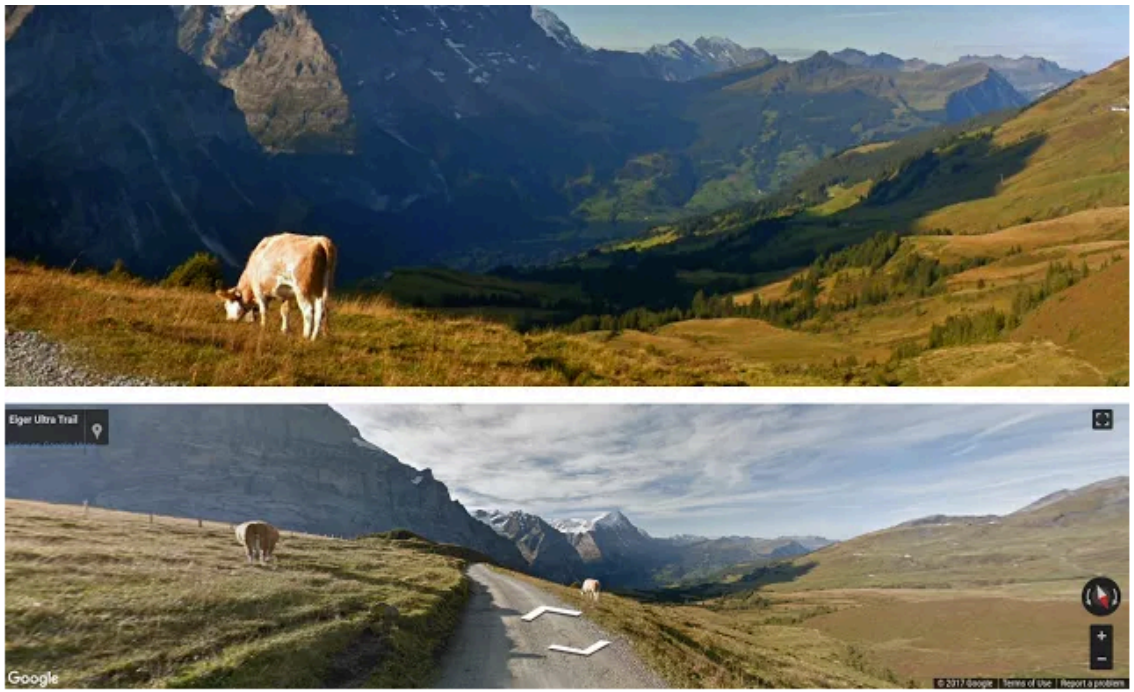
4. **(Vision)** Google is using AI to create stunning landscape photos using Street View imagery



Tutorial Intuition

Building an Intuition for the Concepts of this Tutorial

Creating and Visualizing Decision Boundaries

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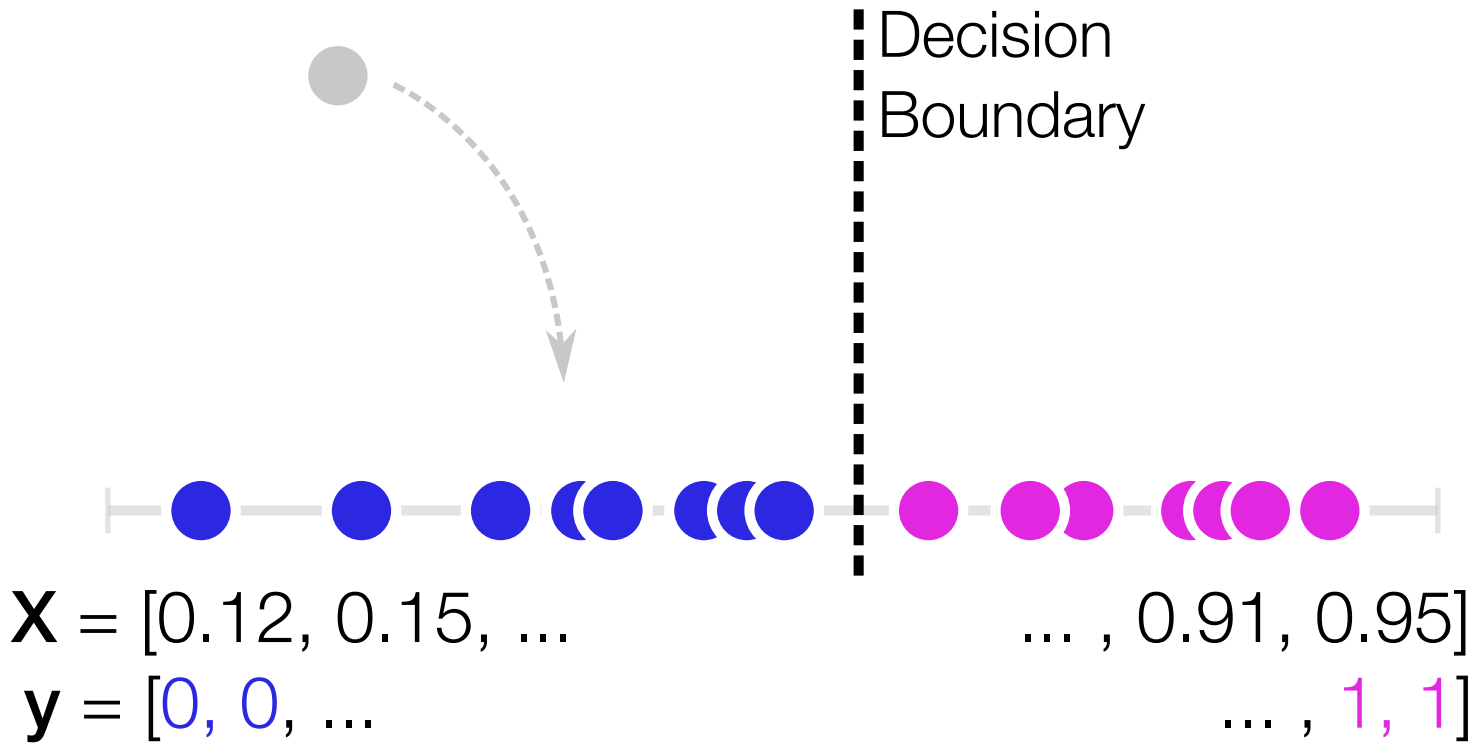
$\mathbf{X}$ = [0.12, 0.15, ... , 0.91, 0.95]

$\mathbf{y}$ = [0, 0, ... , 1, 1]

Creating and Visualizing Decision Boundaries



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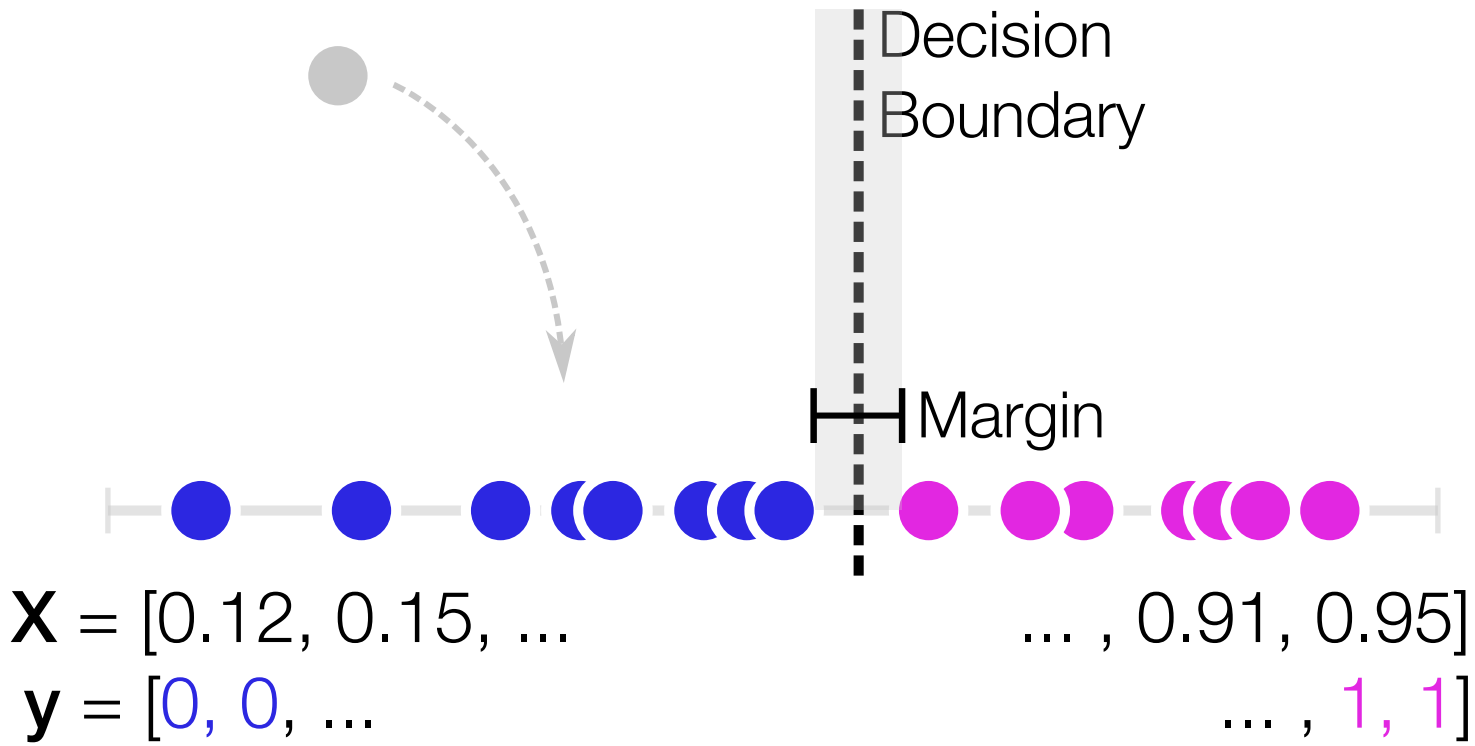

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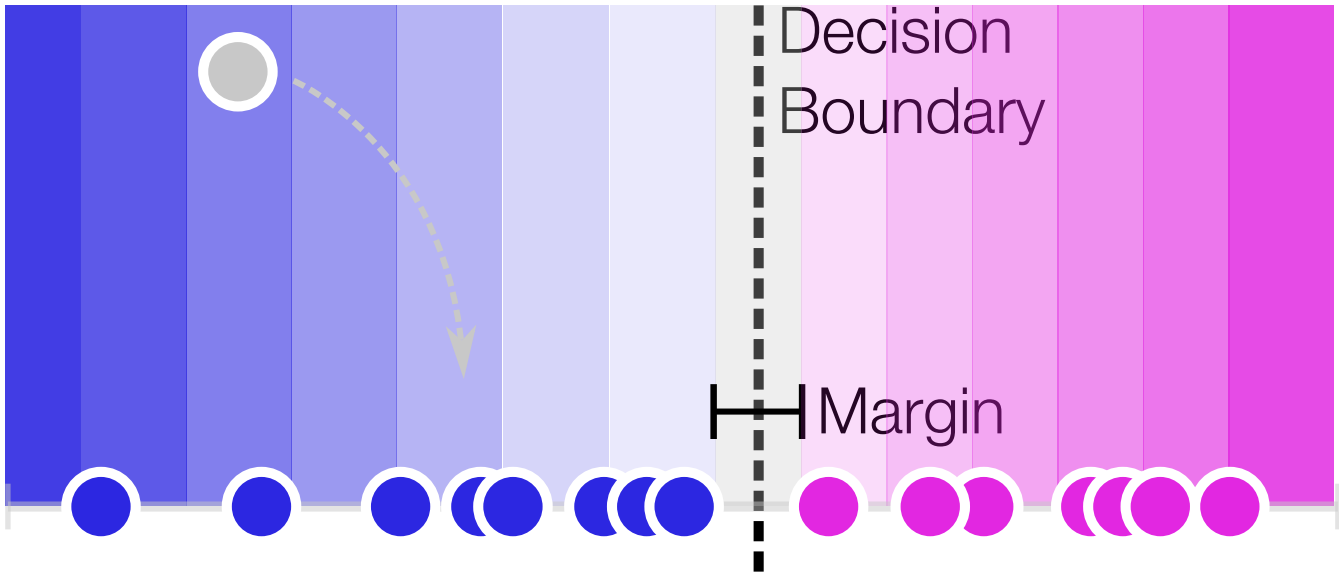

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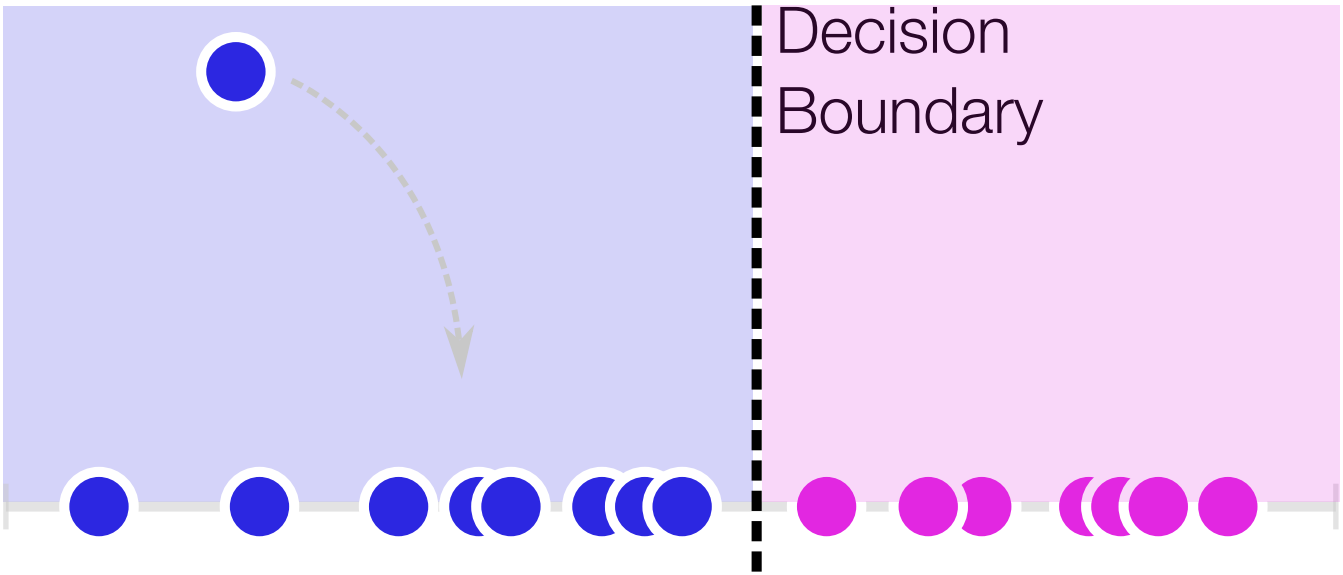

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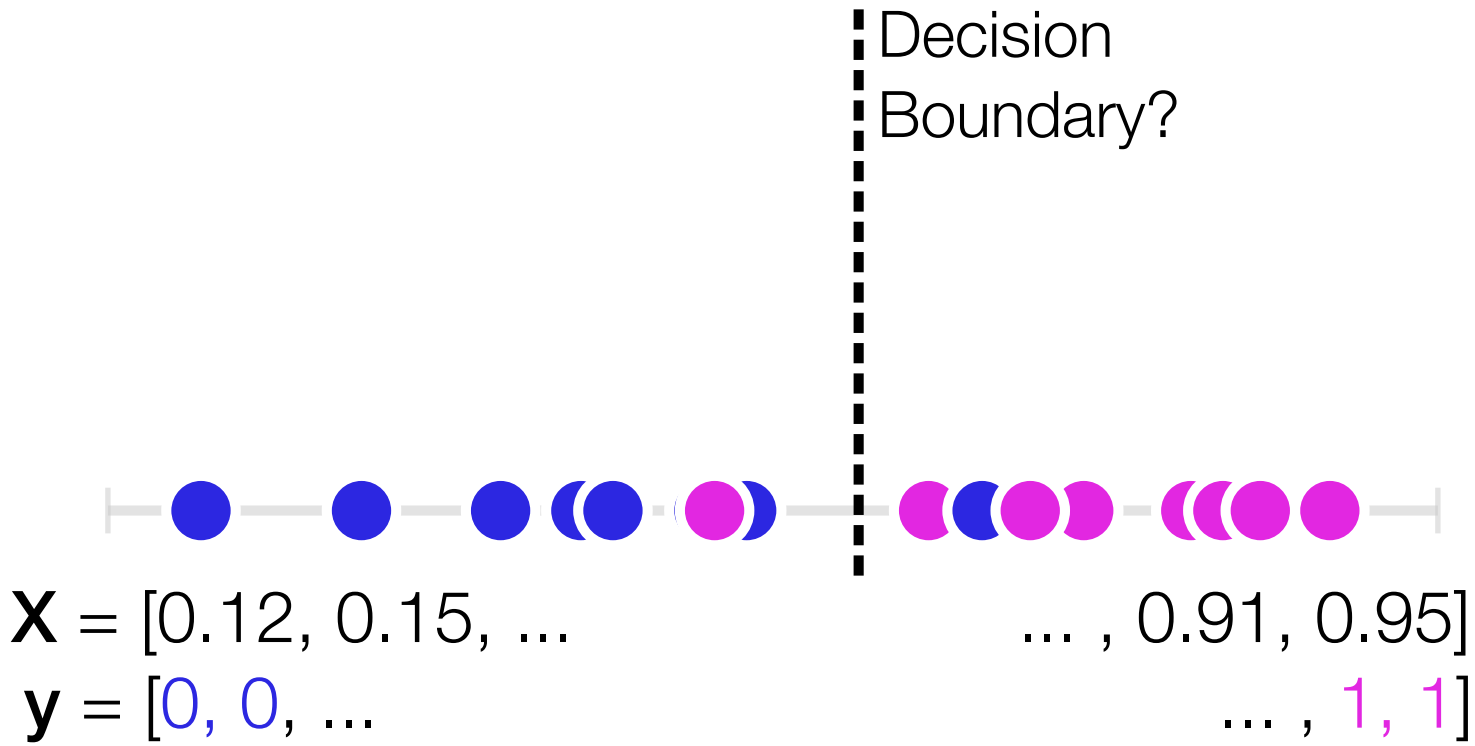

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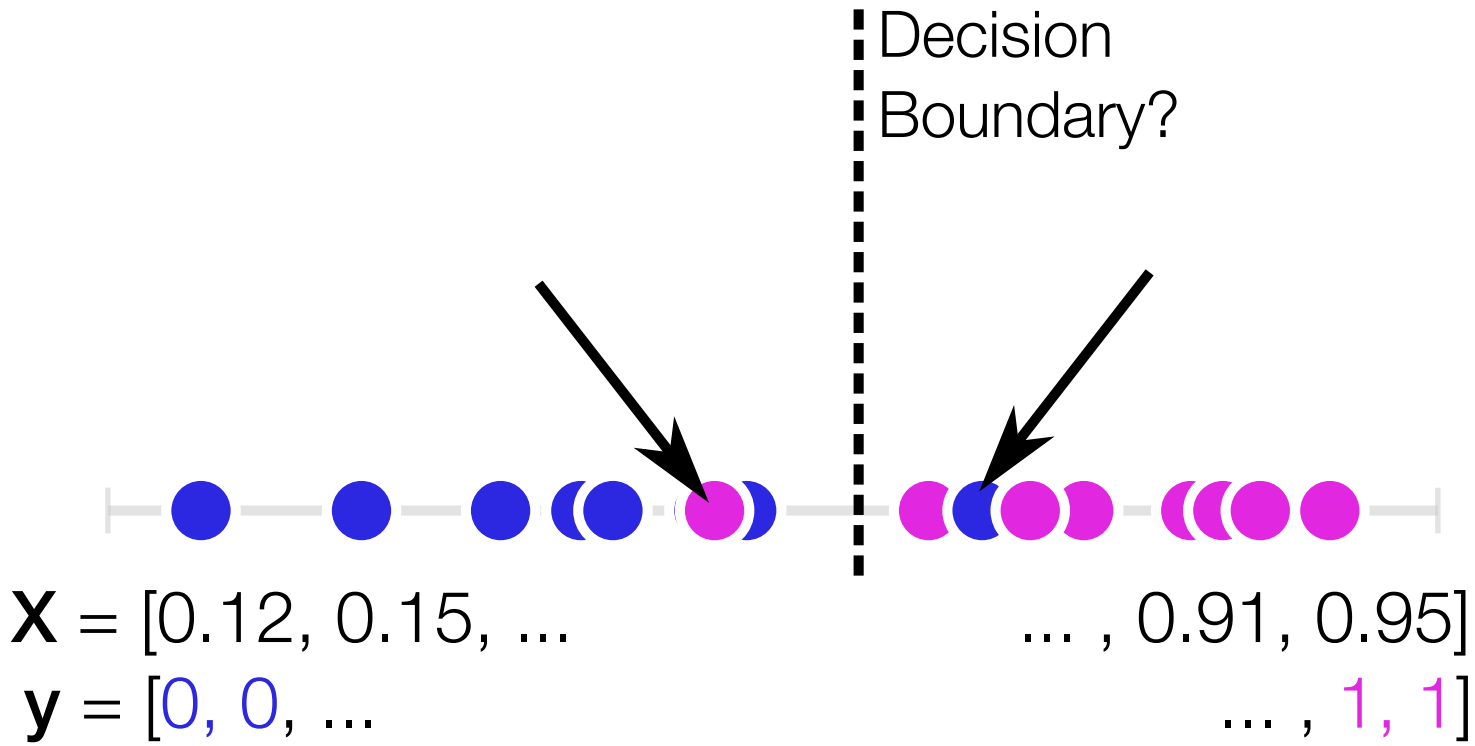

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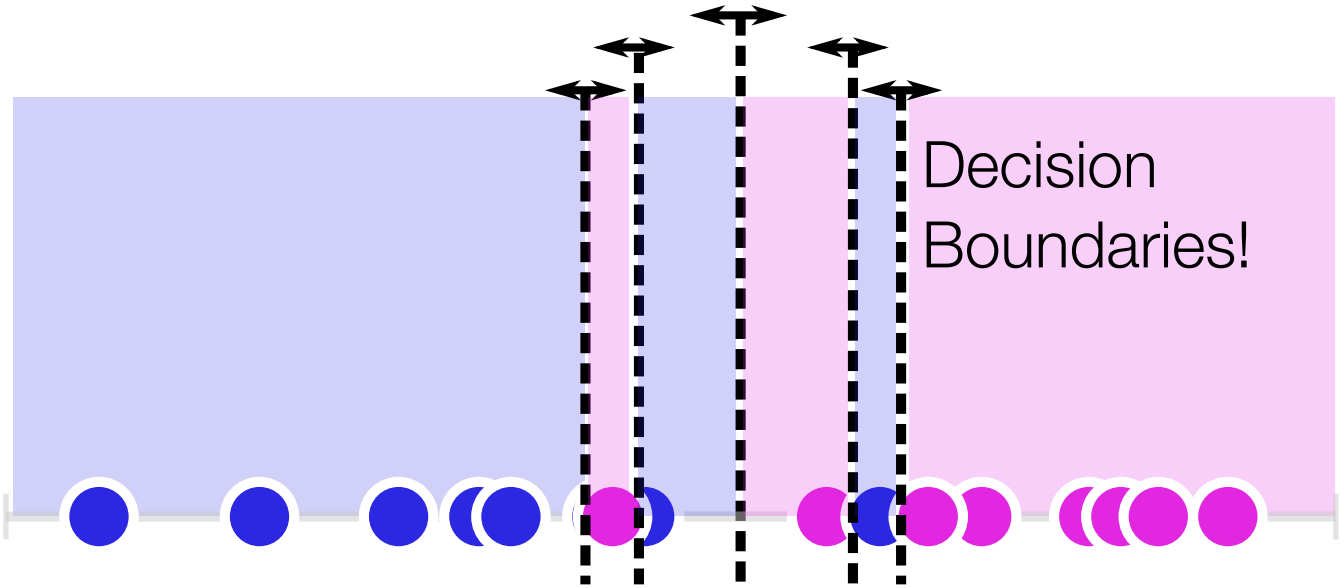

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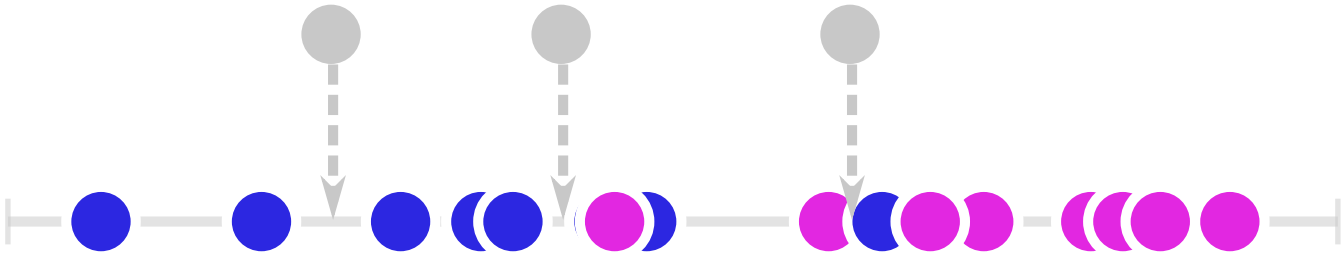

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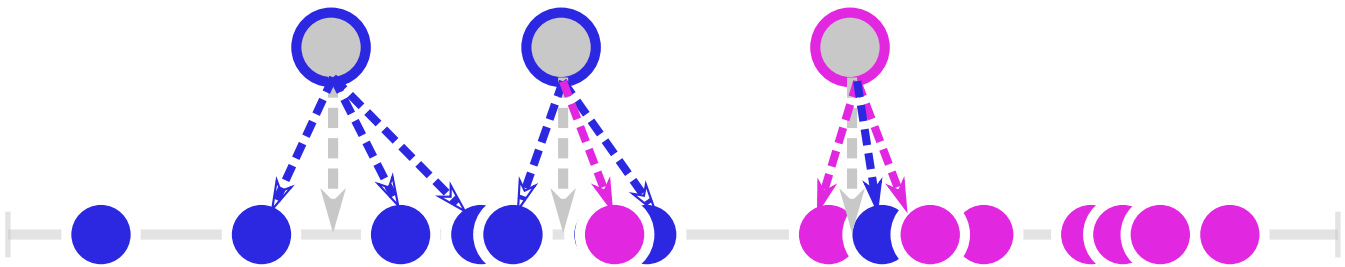
Creating and Visualizing Decision Boundaries

Instance-Based Method

3-Nearest Neighbours



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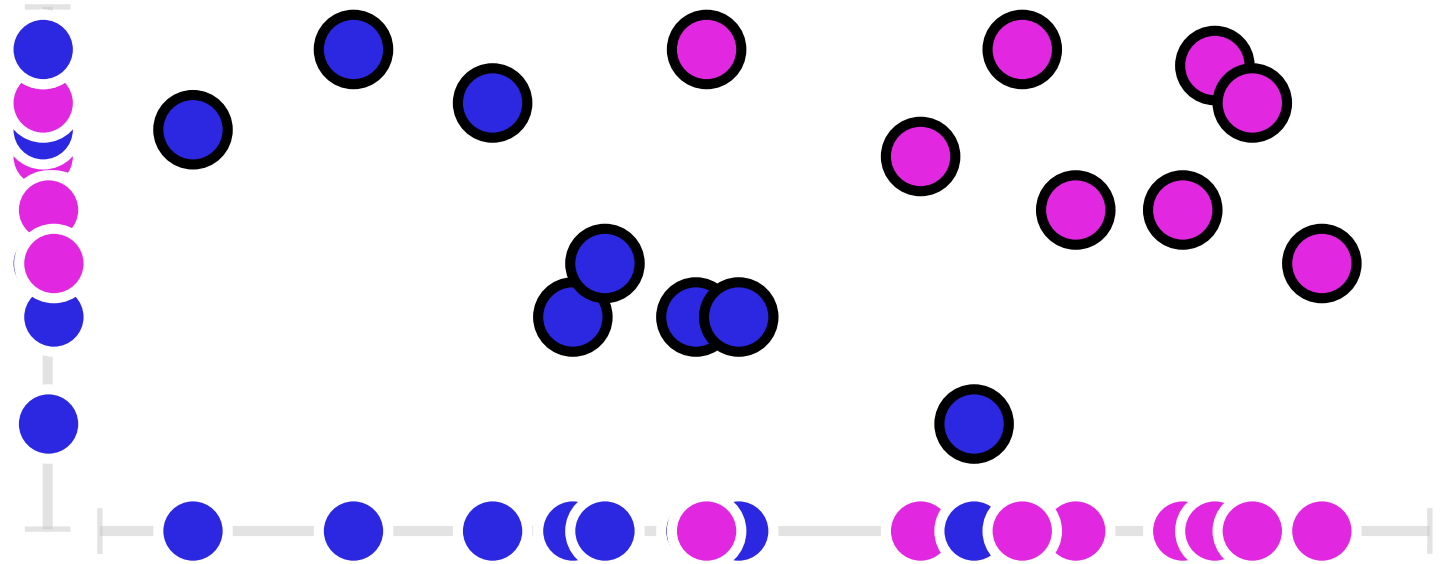

$$\mathbf{X} = \begin{bmatrix} 0.12, 0.15, \ldots & \ldots, 0.91, 0.95 \\ 0.02, 0.09, \ldots & \ldots, 0.93, 0.97 \end{bmatrix}$$

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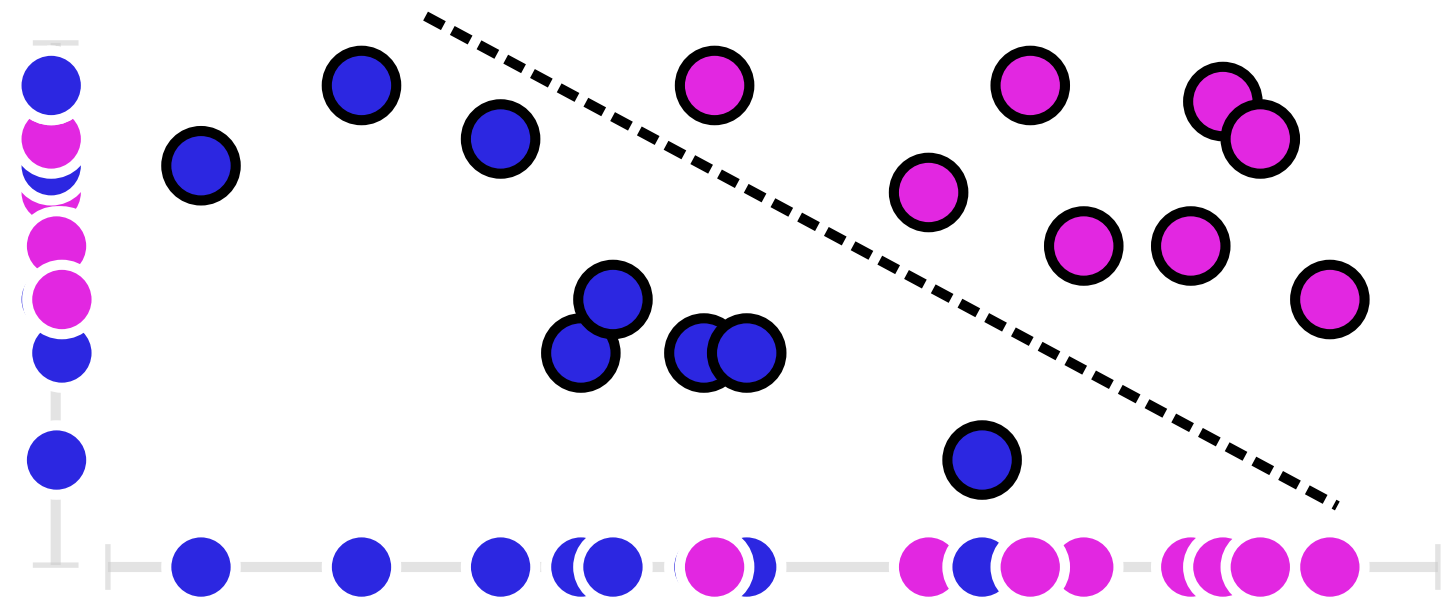

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Comparing "Classical" ML Algorithms

In this tutorial, we will build and compare *classical* learning algorithms and demonstrate where each are more or less useful.

Key Takeaway: no one method is a *Silver Bullet*!

Notebooks

We will cover one new notebook and (with enough time) cover a previous tutorial.

1. Tutorial 3 - DTs, SVMs, KNNs (oh my!)
2. Tutorial 2 - The Prototypical Machine Learning Notebook (Iris Dataset)

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