Tutorial 8 - seq2seq & Active Learning

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Carleton University

Friday 13th November, 2020

Asynchronous Tutorial

To watch and following along at your leisure

ML Weekly

Recent news events from the ML community

ML Weekly

1. **(ML)** OpenAI's Open Sourced These Frameworks to Visualize Neural Networks

ML Weekly

1. **(ML)** OpenAI's Open Sourced These Frameworks to Visualize Neural Networks
2. **(RL)** GoogleAI Open Sourced this Architecture for Massively Scalable Reinforcement Learning Models

ML Weekly

1. **(ML)** OpenAI's Open Sourced These Frameworks to Visualize Neural Networks
2. **(RL)** GoogleAI Open Sourced this Architecture for Massively Scalable Reinforcement Learning Models
3. **(RL)** DeepMind Open-Sources Lab2D: Environmental Design for Multi-Agent RL Research

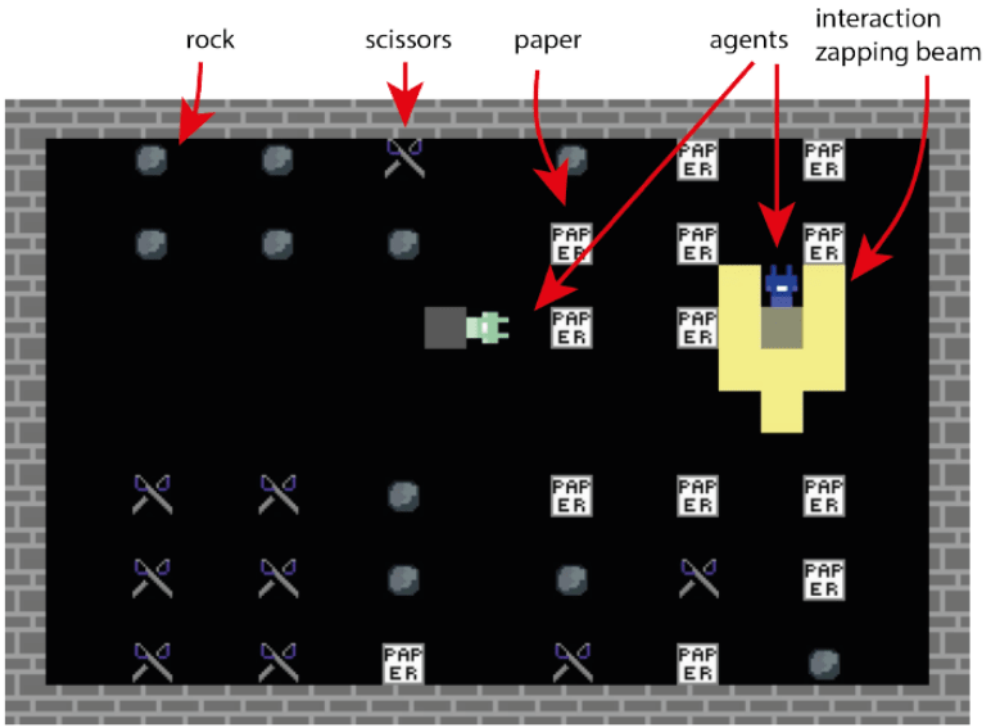


Figure 1 | "Running With Scissors" screenshot.

Tutorial Overview

We will cover two main concepts within a single notebook:

1. seq2seq for “translation” tasks

Tutorial Overview

We will cover two main concepts within a single notebook:

1. seq2seq for "translation" tasks
2. Active Learning

Tutorial Intuition

Building an Intuition for the Concepts of this Tutorial

seq2seq Intuition

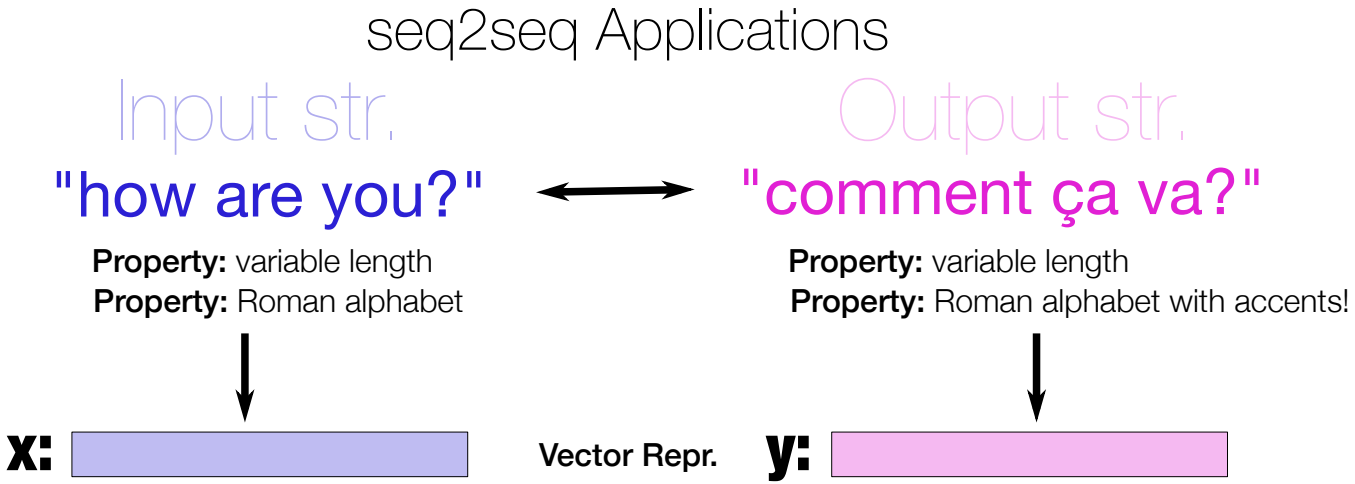
seq2seq Applications

"how are you?" ⟷ "comment ça va?"

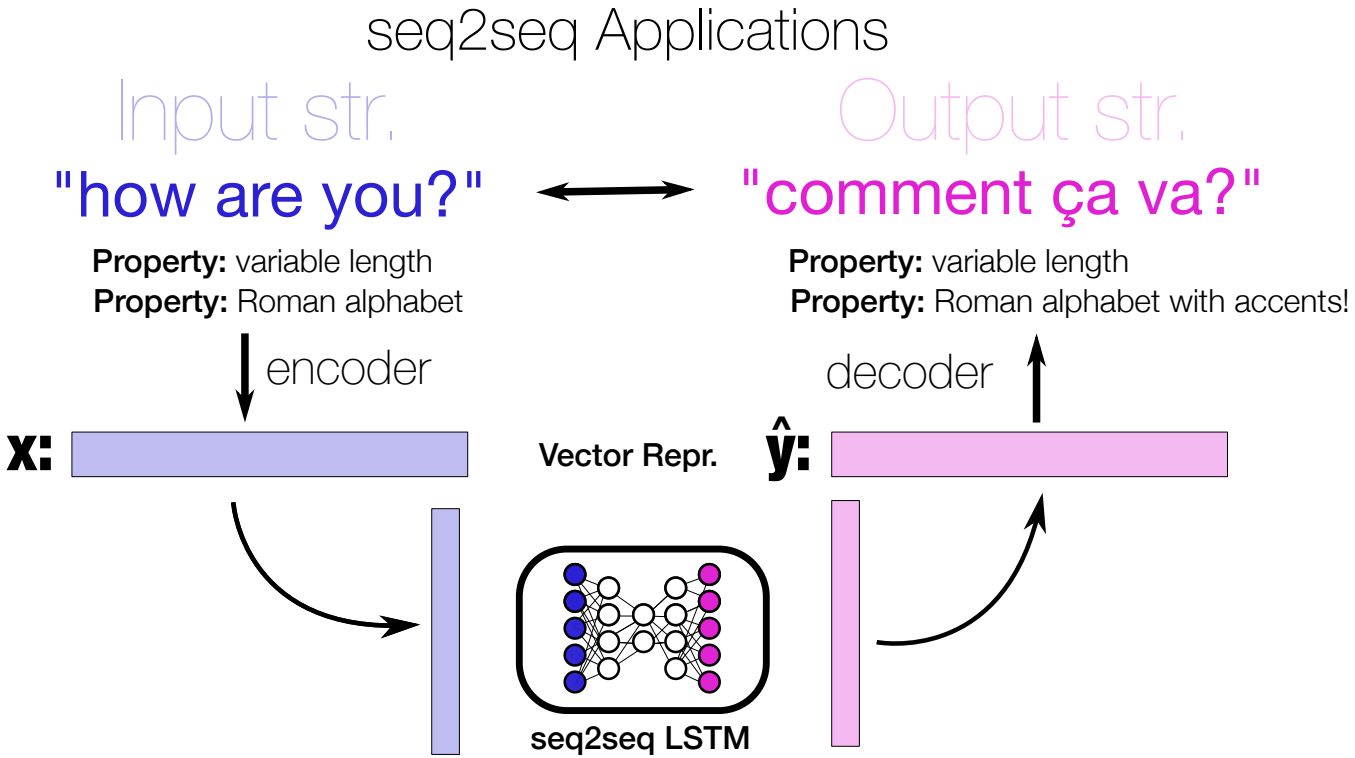
Property: variable length
Property: Roman alphabet

Property: variable length
Property: Roman alphabet with accents!

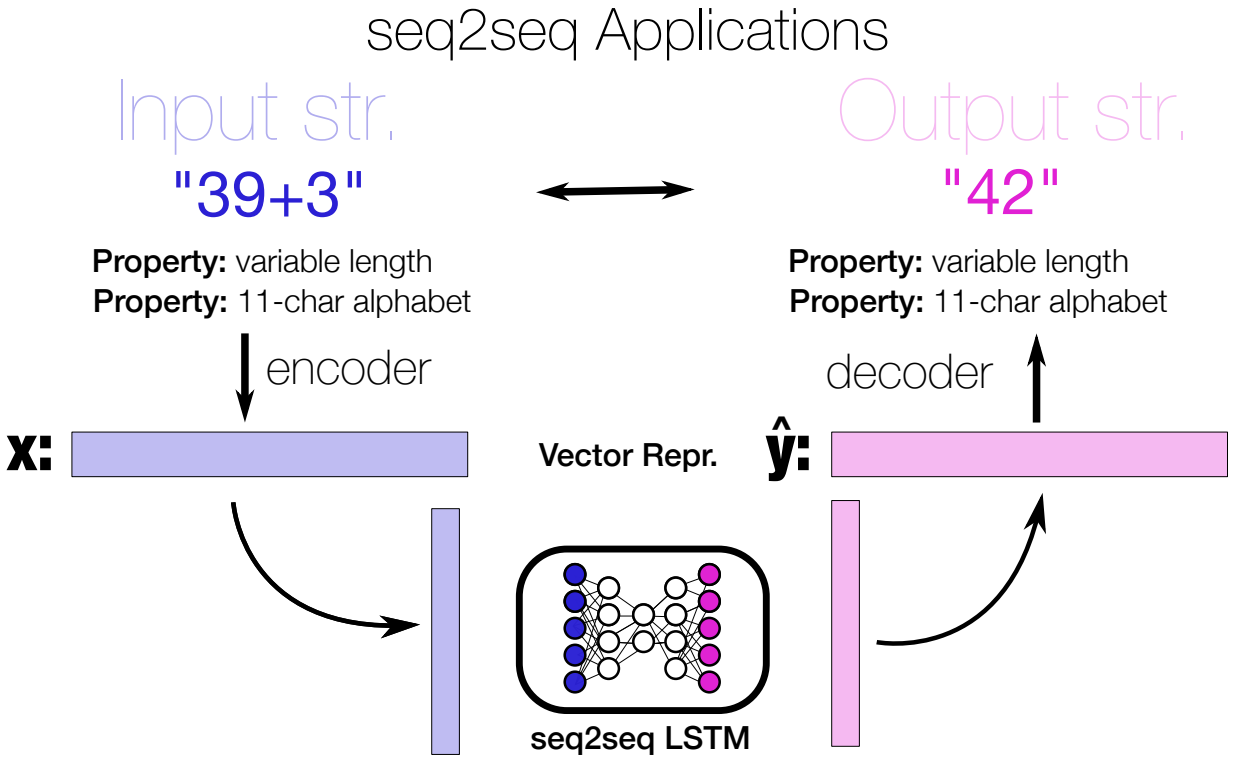
seq2seq Intuition



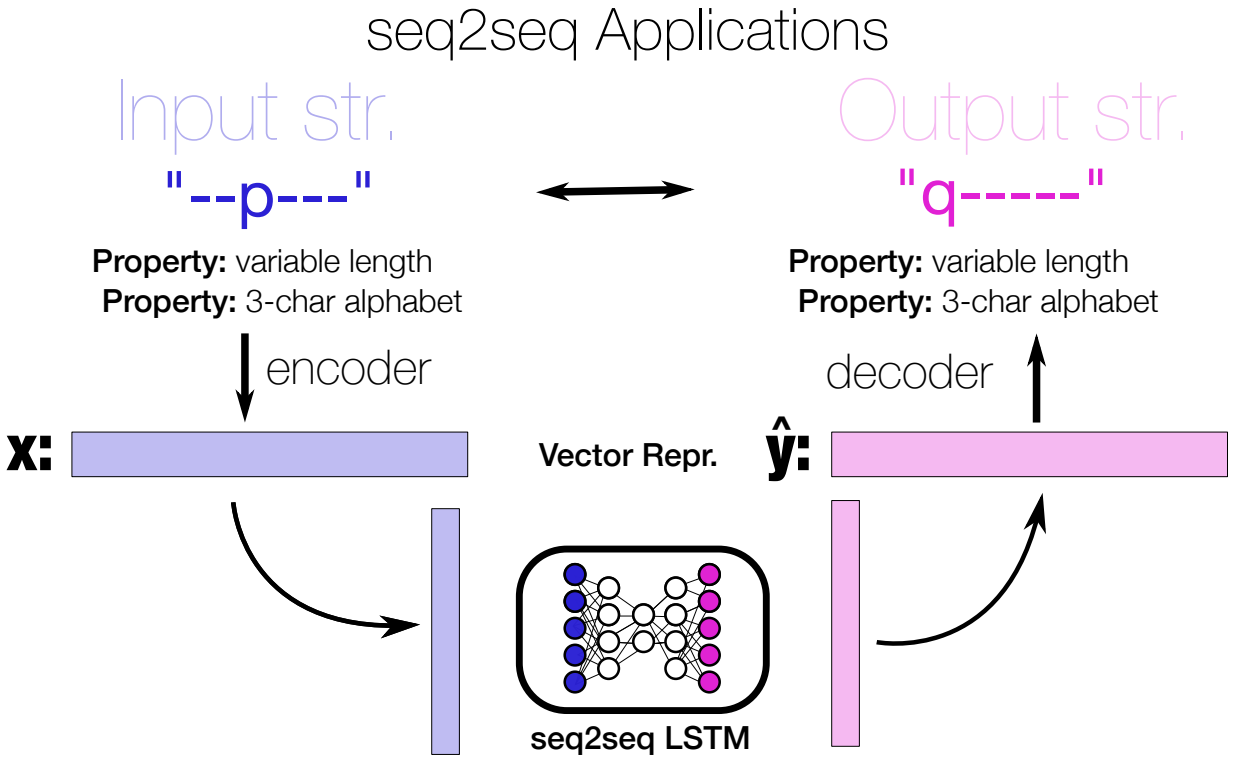
seq2seq Intuition



seq2seq Intuition



seq2seq Intuition



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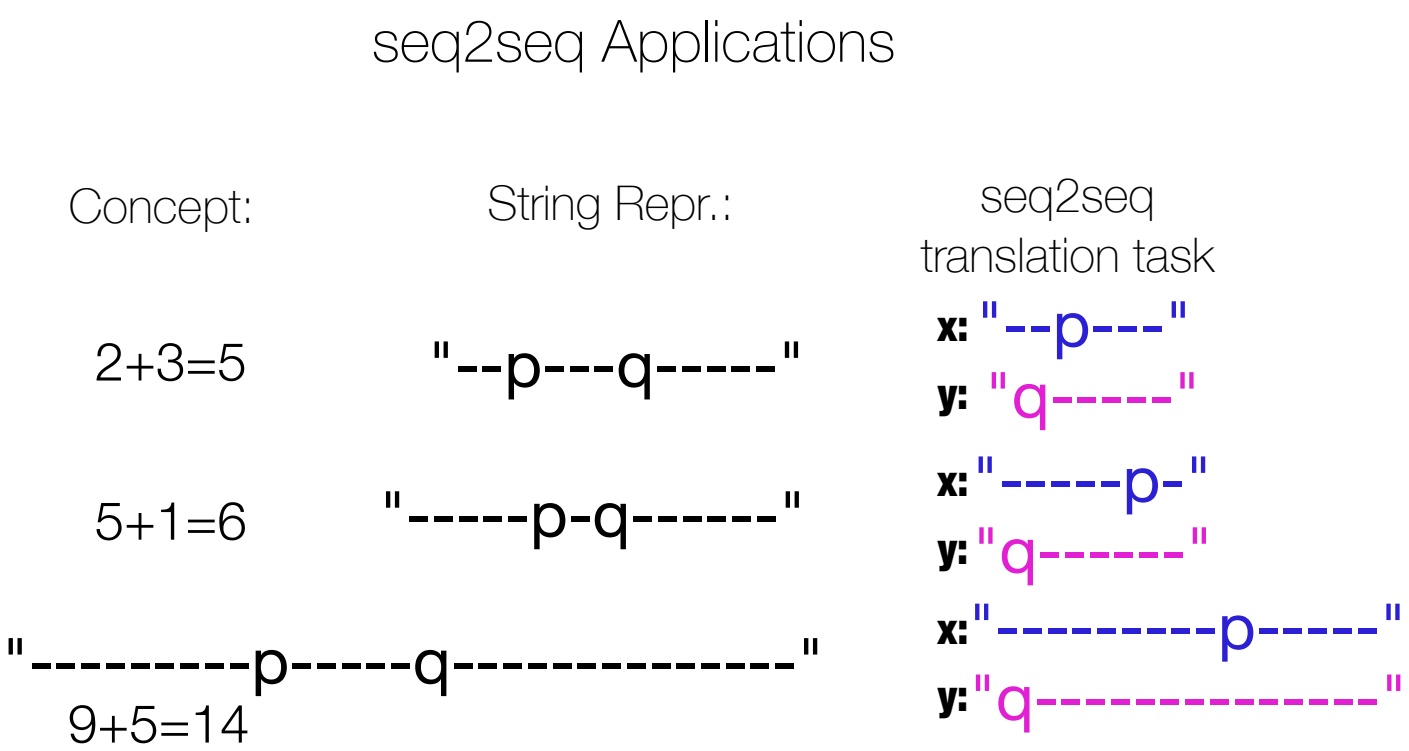
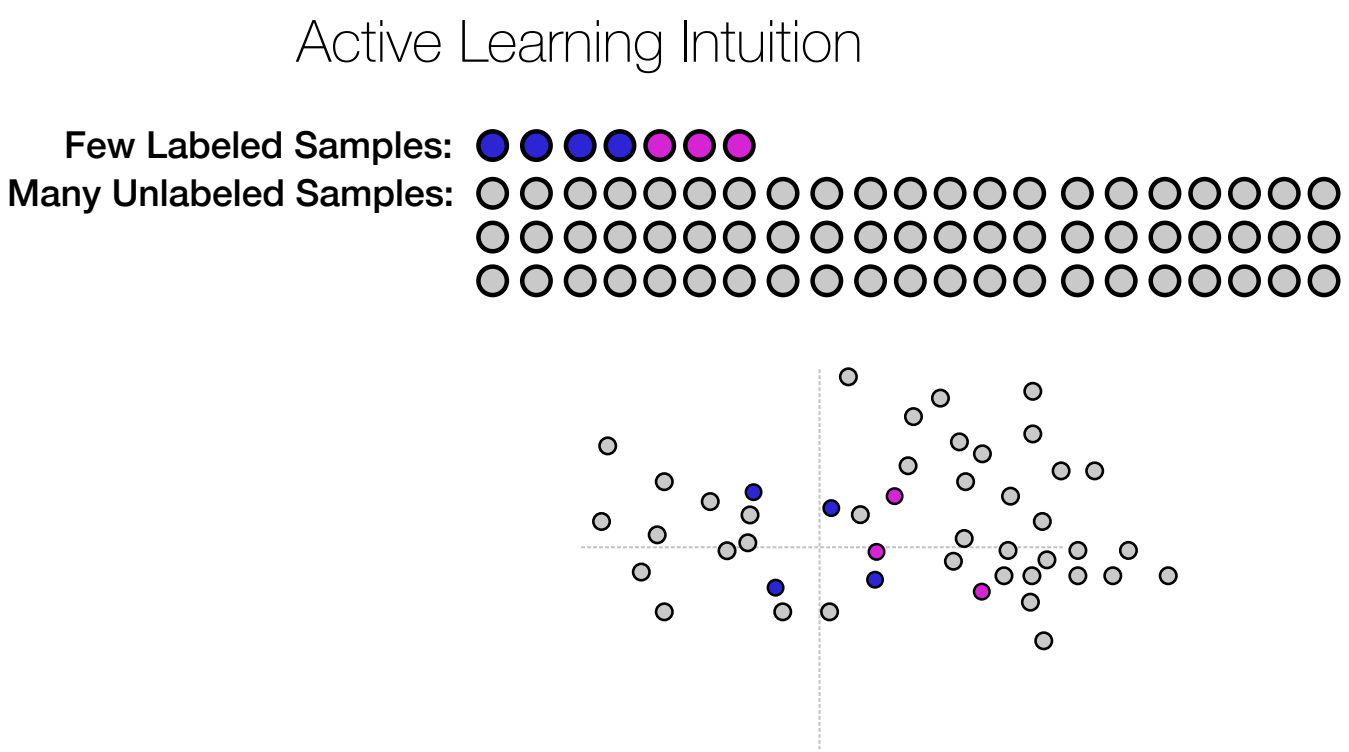


Active Learning Intuition

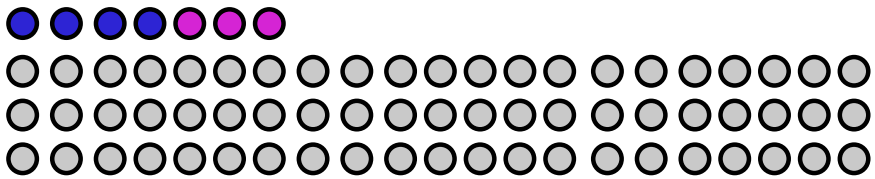


Active Learning Intuition

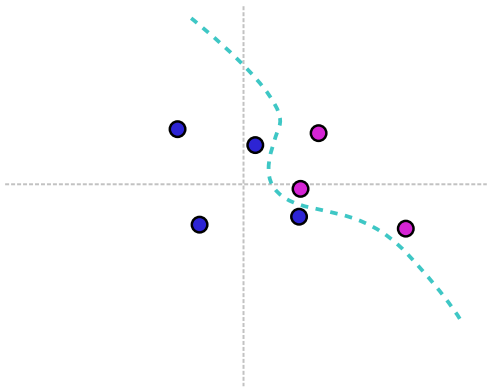
Active Learning Intuition

Few Labeled Samples:

Many Unlabeled Samples:



1. Use labelled points to train a **model**



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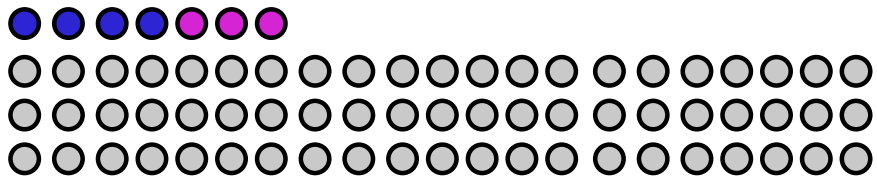
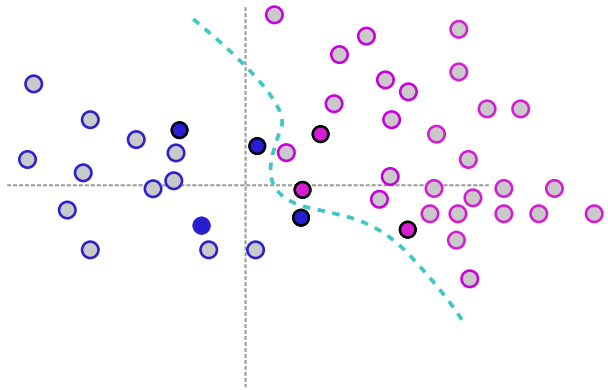


1. Use labelled points to train a **model**
2. Apply **model** to unlabelled points



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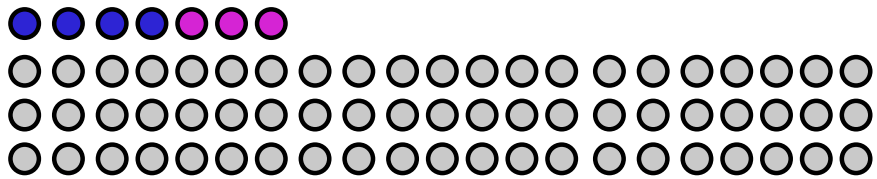
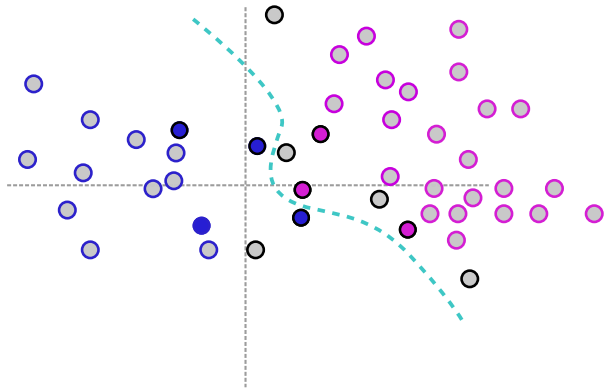


1. Use labelled points to train a **model**
2. Apply **model** to unlabelled points
3. Identify set of LEAST confident points



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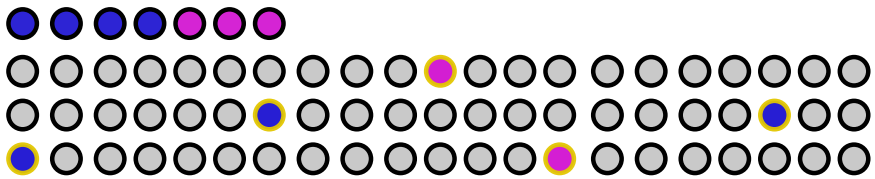
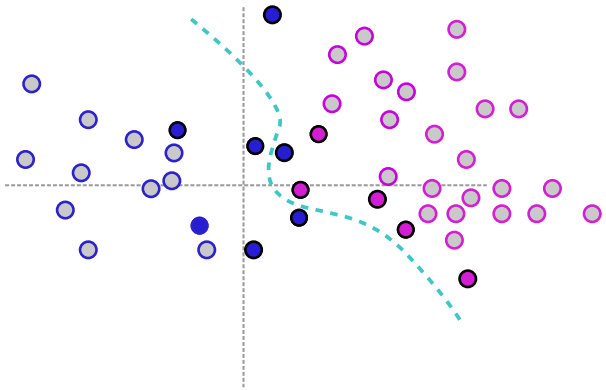


1. Use labelled points to train a **model**
2. Apply **model** to unlabelled points
3. Identify set of LEAST confident points
4. Query **Oracle** to obtain labels for these points



Active Learning Intuition

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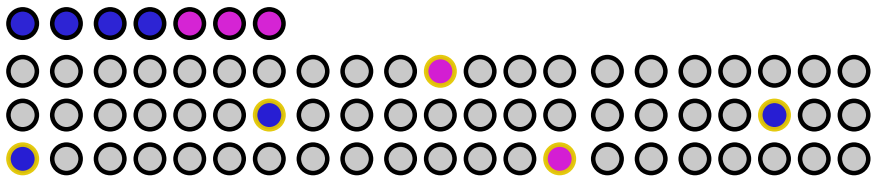
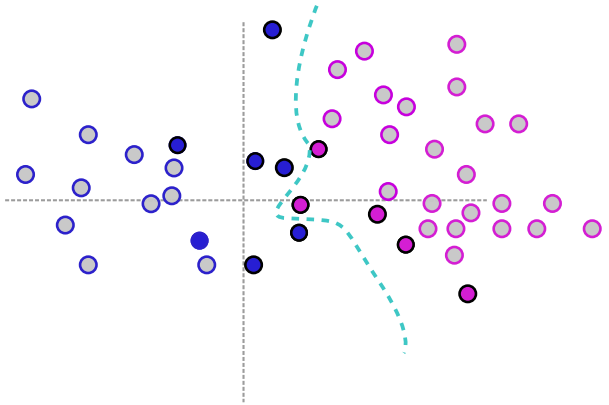
Many Unlabeled Samples:



1. Use labelled points to train a **model**
2. Apply **model** to unlabelled points
3. Identify set of LEAST confident points
4. Query **Oracle** to obtain labels for these points
5. Retrain **model** with new points



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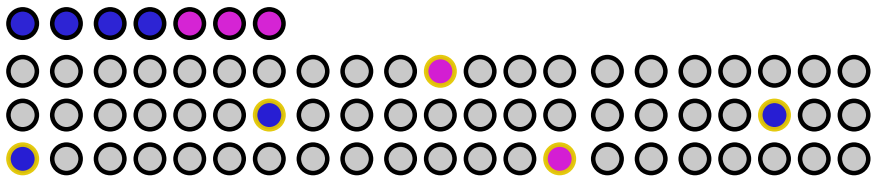
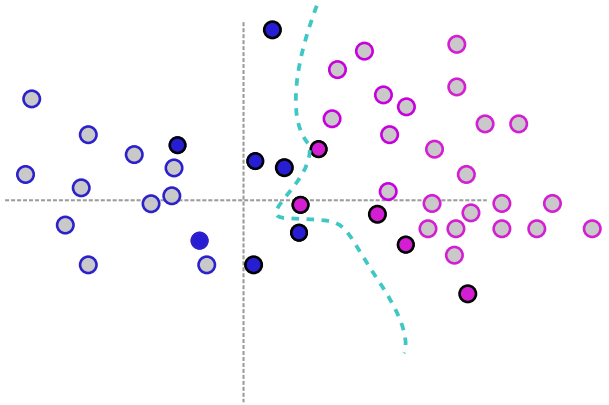


1. Use labelled points to train a **model**
2. Apply **model** to unlabelled points
3. Identify set of LEAST confident points
4. Query **Oracle** to obtain labels for these points
5. Retrain **model** with new points
6. Repeat until **stop criterion**



Into the Notebooks we Go...

We will cover two notebooks today!

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