Tutorial 8 - Seq2Seq & Active Learning

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Carleton University

Monday 15th November, 2021

Disclaimer: Recorded Tutorials will be Posted

Privacy Preservation:

- Ask questions in the chat[1]
- Keep video off

Note: 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.

[1] I encourage unmuted/voice-based questions at any time, but know that this isn't explicitly privacy-preserving

ML Weekly

Recent news events from the ML community

ML Weekly

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

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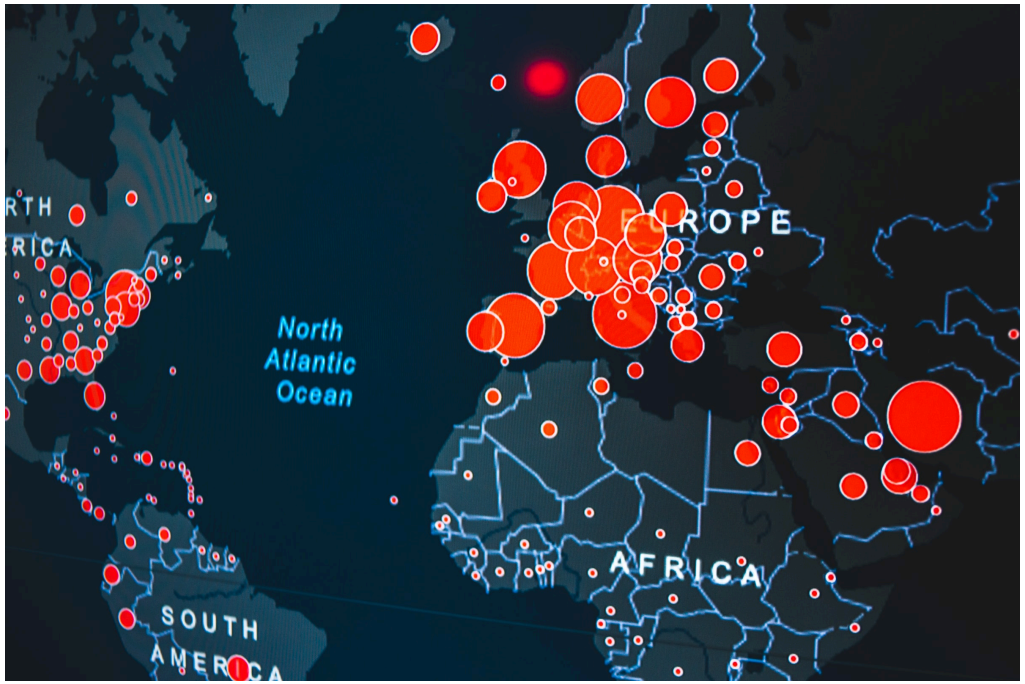
2. **(RL)** BT uses epidemiological modelling for new cyberattack-fighting AI Reinforcement Learning Models



ML Weekly

1. **(ML)** OpenAI's Open Sourced These Frameworks to Visualize Neural Networks
2. **(RL)** BT uses epidemiological modelling for new cyberattack-fighting AI Reinforcement Learning Models
3. **(NLP)** Solving Math Word Problems

Question

Ali is a dean of a private school where he teaches one class. John is also a dean of a public school. John has two classes in his school. Each class has 1/8 the capacity of Ali's class which has the capacity of 120 students. What is the combined capacity of both schools?

Tutorial Overview

We will cover two main concepts in the notebooks today:

1. seq2seq for “translation” tasks

Tutorial Overview

We will cover two main concepts in the notebooks today:

1. seq2seq for “translation” tasks
2. Active Learning

Tutorial Intuition

Building an Intuition for the Concepts of this Tutorial

seq2seq Intuition

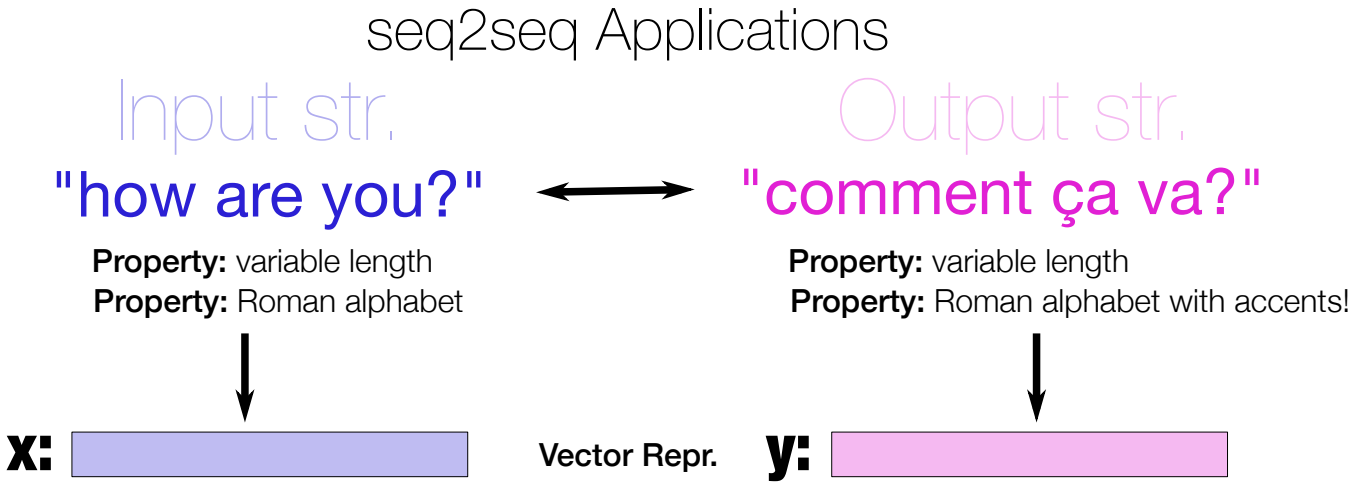
seq2seq Applications

"how are you?" ⟷ "comment ça va?"

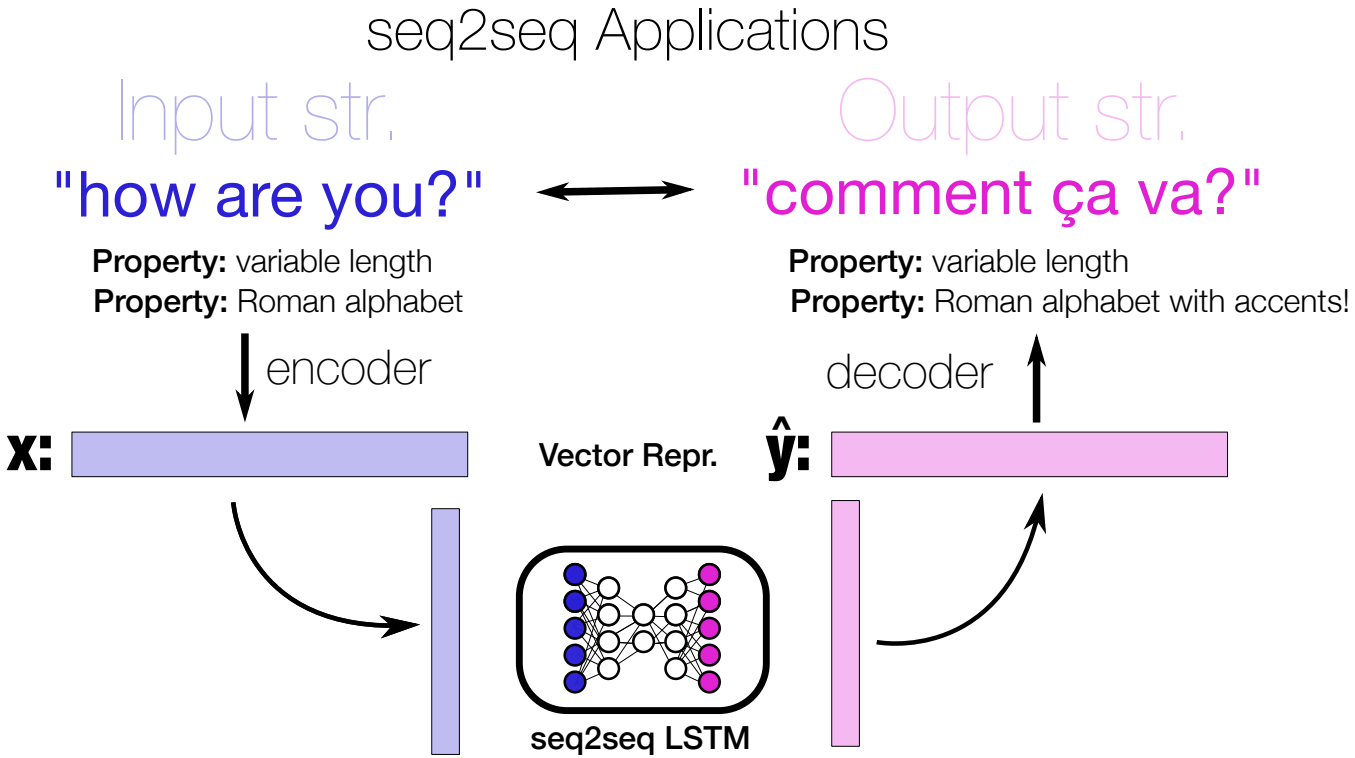
Property: variable length
Property: Roman alphabet

Property: variable length
Property: Roman alphabet with accents!

seq2seq Intuition



seq2seq Intuition



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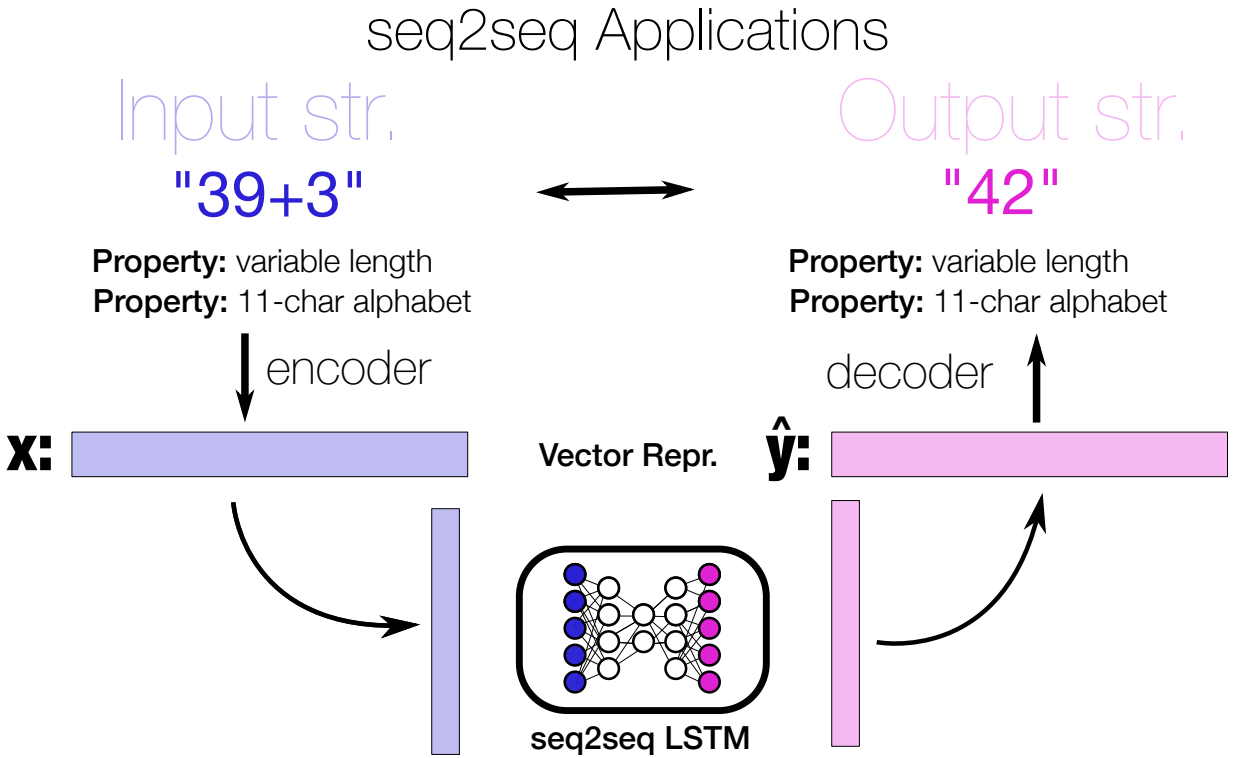
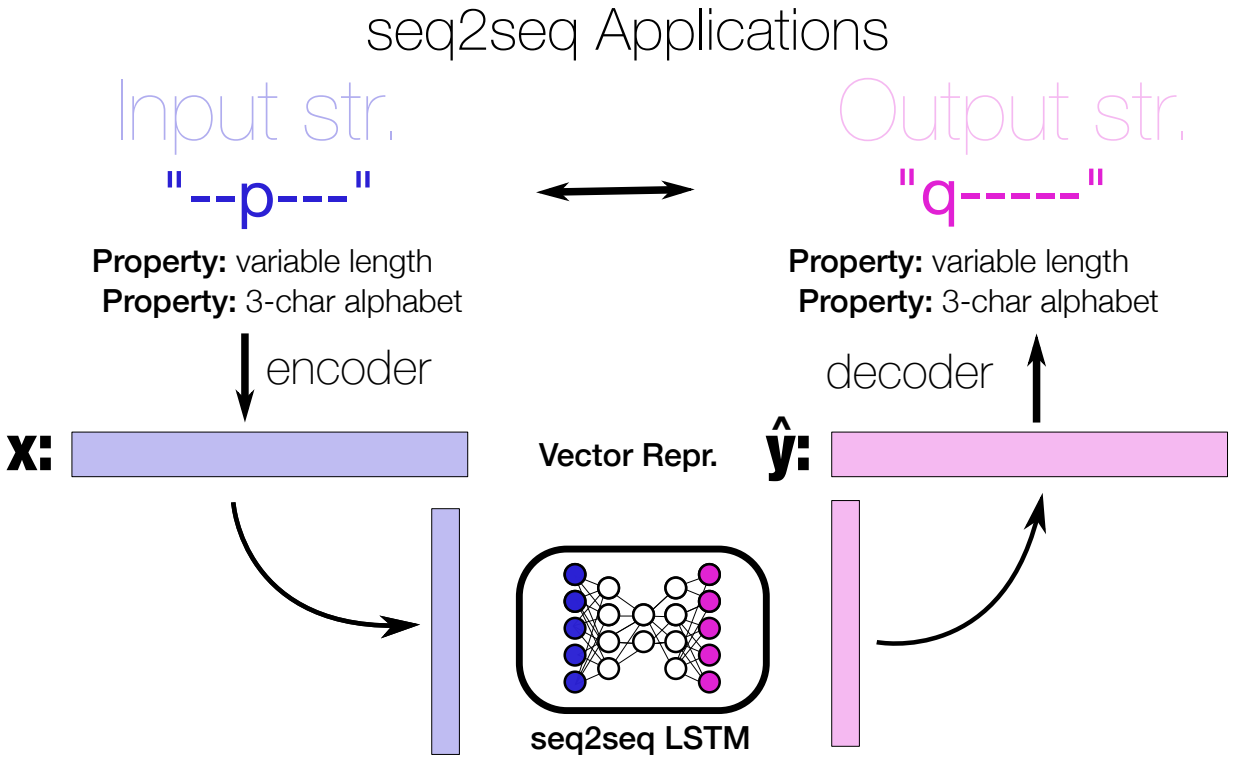


seq2seq Intuition

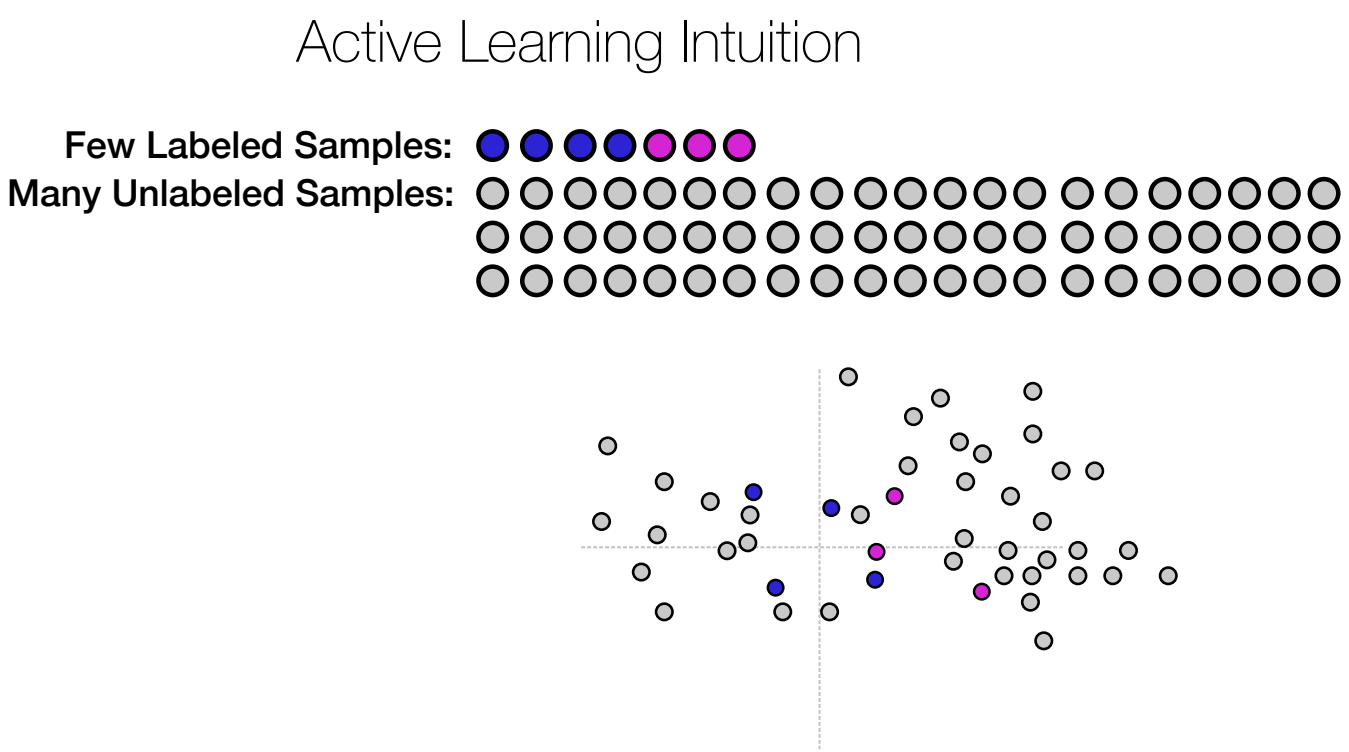


seq2seq Intuition

seq2seq Applications

Concept:	String Repr.:	seq2seq translation task
2+3=5	"--p---q-----"	x: "--p---" y: "q-----"
5+1=6	"-----p-q-----"	x: "-----p-" y: "q-----"
9+5=14	"--------p-----q----------"	x: "--------p-----" y: "q----------"

Active Learning Intuition

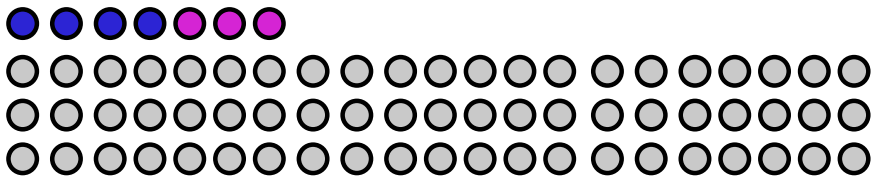


Active Learning Intuition

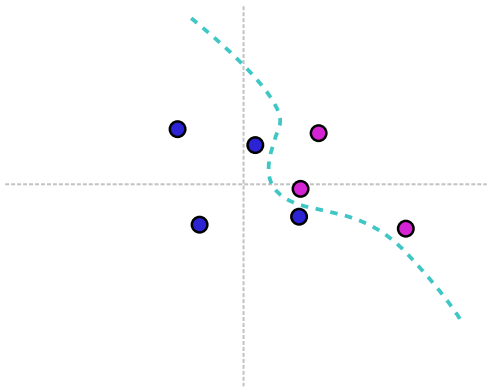
Active Learning Intuition

Few Labeled Samples:

Many Unlabeled Samples:



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



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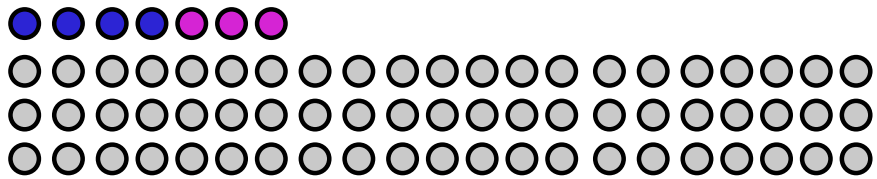
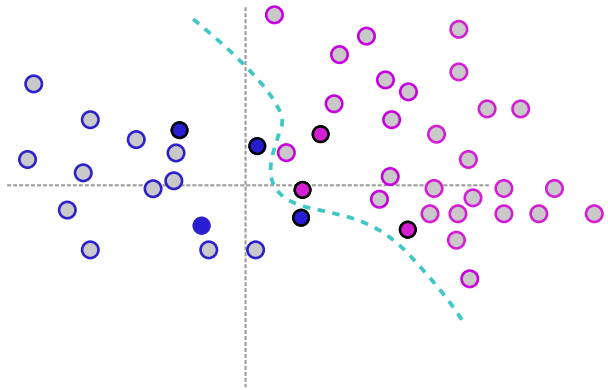


1. Use labelled points to train a **model**
2. Apply **model** to unlabelled points



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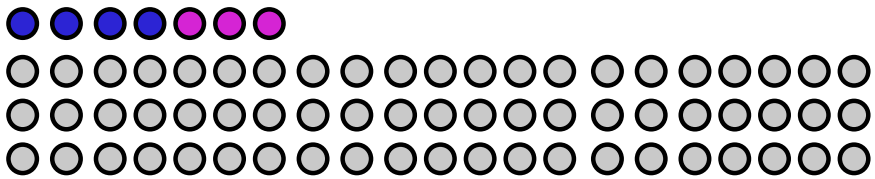
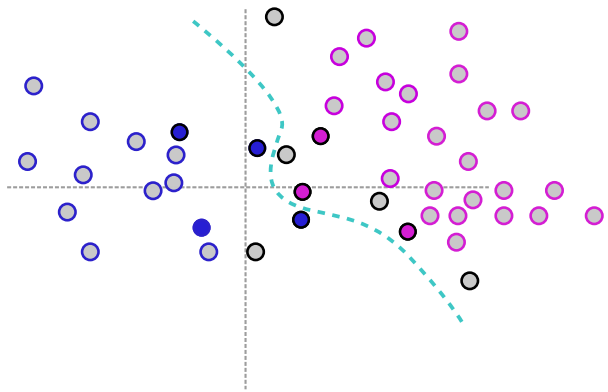


1. Use labelled points to train a **model**
2. Apply **model** to unlabelled points
3. Identify set of LEAST confident points



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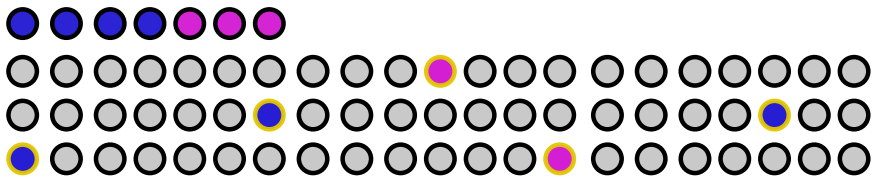
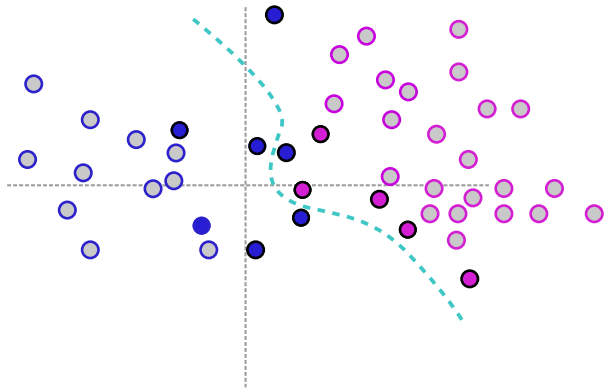


1. Use labelled points to train a **model**
2. Apply **model** to unlabelled points
3. Identify set of LEAST confident points
4. Query **Oracle** to obtain labels for these points



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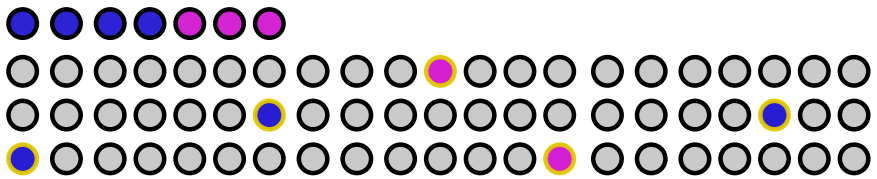
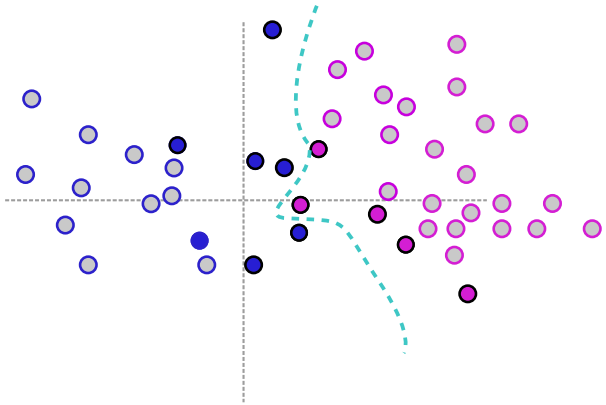


1. Use labelled points to train a **model**
2. Apply **model** to unlabelled points
3. Identify set of LEAST confident points
4. Query **Oracle** to obtain labels for these points
5. Retrain **model** with new points



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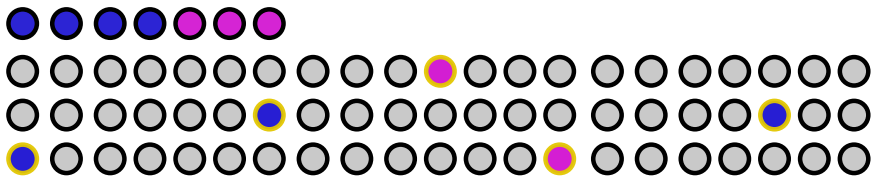

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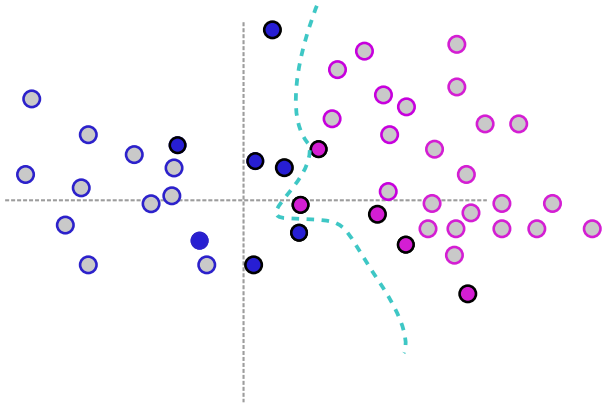
6. Repeat until **stop criterion**



Into the Notebooks we Go...

We will cover two notebooks today!

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