

Tutorial 8 - seq2seq & Active Learning

Kevin Dick, PhDc Biomedical Engineering
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

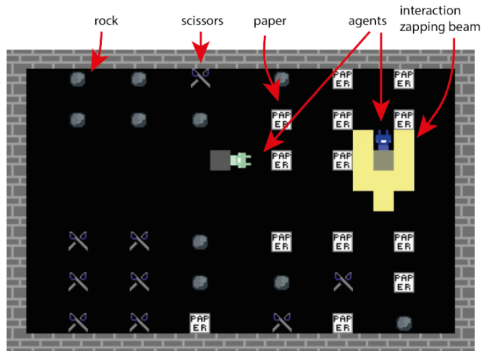


Figure 1 | “Running With Scissors” screenshot.

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?"

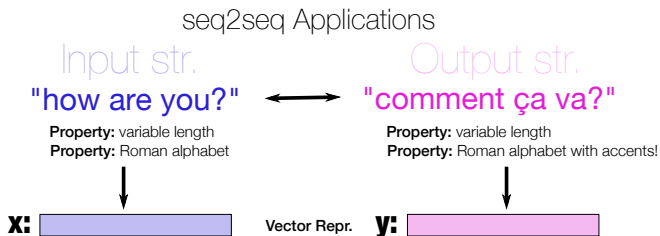
Property: variable length
Property: Roman alphabet



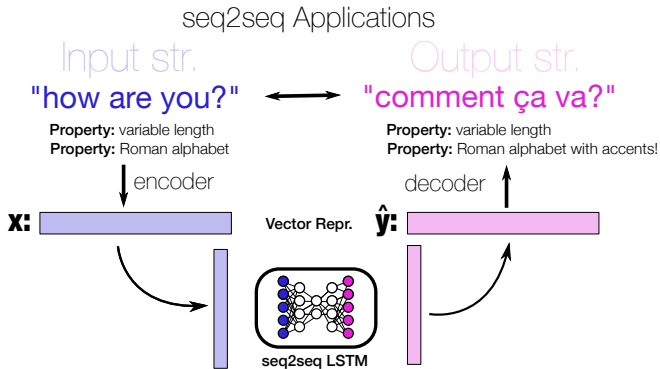
"comment ça va?"

Property: variable length
Property: Roman alphabet with accents!

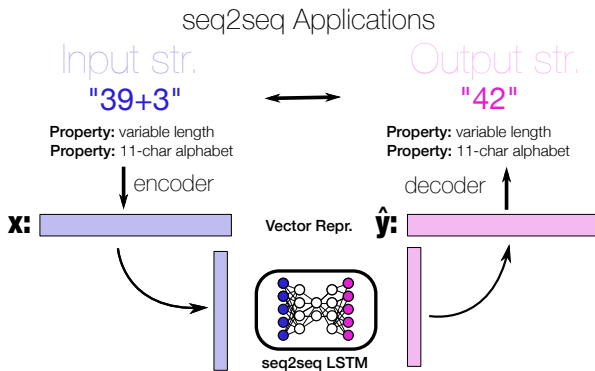
seq2seq Intuition



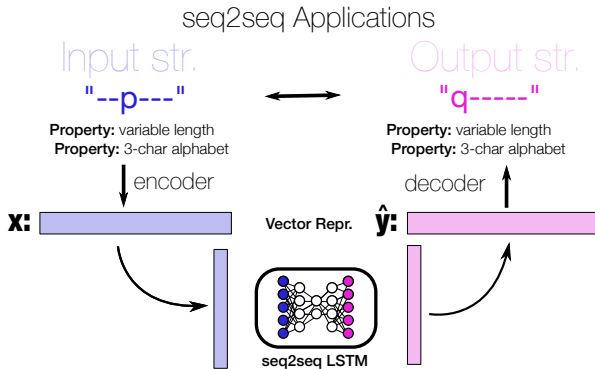
seq2seq Intuition



seq2seq Intuition



seq2seq Intuition



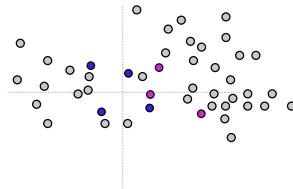
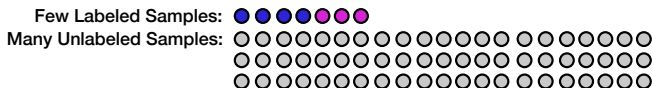
seq2seq Intuition

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

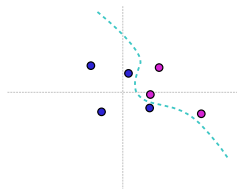


Active Learning Intuition

Active Learning Intuition



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



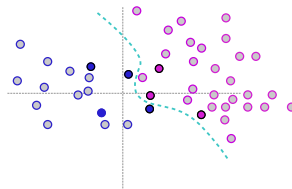
Active Learning Intuition

Active Learning Intuition

Few Labeled Samples: ●●●●●●●●

Many Unlabeled Samples: 

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



Active Learning Intuition

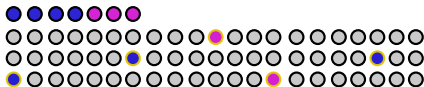
Many Unlabeled Samples: 

-
- A scatter plot illustrating a non-linear decision boundary. The plot features three classes of data points: blue circles, purple circles, and black circles. A dashed green curve separates the blue and purple points, while the black points are located in the region where the curve is not defined, suggesting a more complex, possibly multi-class, non-linear boundary.

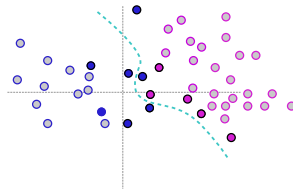
Active Learning Intuition

Few Labeled Samples: ●●●●●●●●

Many Unlabeled Samples:



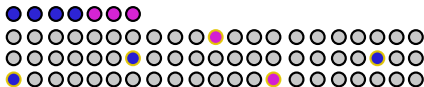
1. Use labelled points to train a **model**
2. Apply **model** to unlabelled points
3. Identify set of LEAST confident points
4. Query **Oracle** to obtain labels for these points



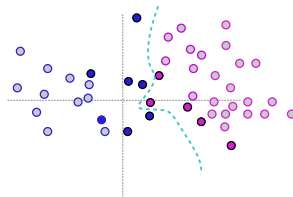
Active Learning Intuition

Few Labeled Samples: ●●●●●●●●

Many Unlabeled Samples:



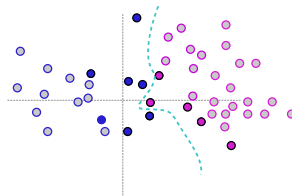
1. Use labelled points to train a **model**
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4. Query **Oracle** to obtain labels for these points
5. Retrain **model** with new points



Active Learning Intuition

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
6. Repeat until **stop criterion**



Into the Notebooks we Go...

We will cover two notebooks today!

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