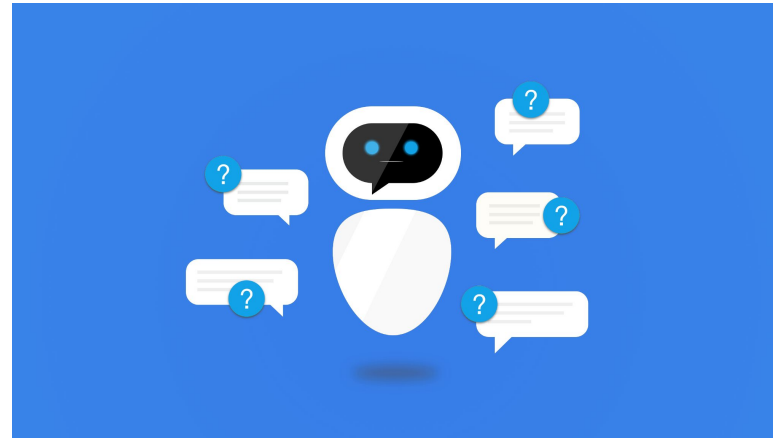
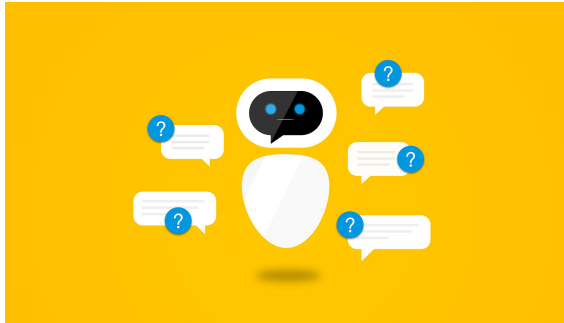
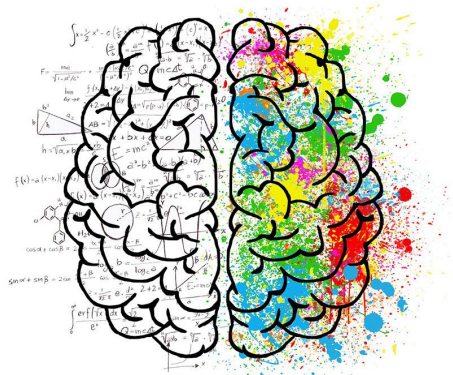


Cognitive and Immersive Systems Lab Final Presentation



Goals of the project and Future Work

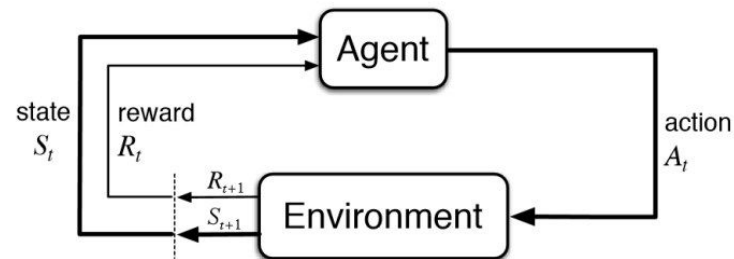
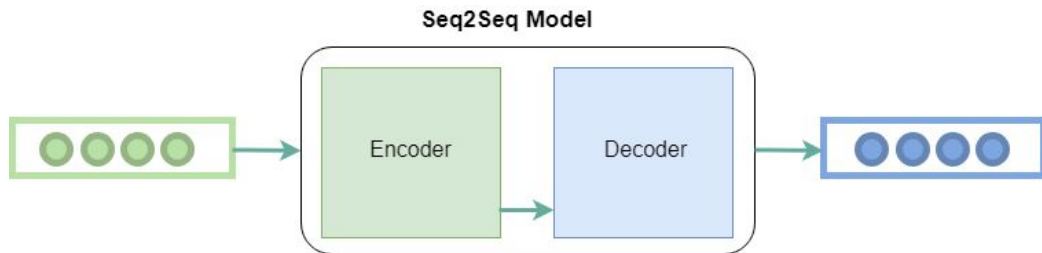
- Create a chatbot that can teach people something:
 1. AI chatbot to teach people something they don't know
 2. Teach people languages they don't know before
 3. Teach pronunciation of language
 4. Build a chatbot to teach simplest goal oriented dialogue and reinforcement learning
 5. Build a chatbot to teach humans the simplest of tasks like how to say cat.
 6. Want to find a way to detect when the pronunciation is right/wrong

Future Work:

Make a chatbot to teach people physics/calculus

What is Reinforcement Learning?

- Reinforcement Learning is an area of machine Learning that allows an agent to maximize rewards in a certain situation by taking actions and interacting with the environment
- A Reinforcement Learning agent learns from the consequences of its actions and past experiences
- The Reinforcement Learning agent receives a reward which is the basis of an action's outcome, and the agent chooses actions to maximize reward over time.
- There are two levels of reinforcement learning: the algorithmic level (the machine learning perspective) and the mechanistic level (the neuronal perspective)
- Other methods to deep reinforcement learning include seq2seq models which takes a sequence of words as its input and then generates an output
- The seq2seq model uses an encoder which has recurrent neural networks (rnn) that converts a sequence of words into hidden vectors

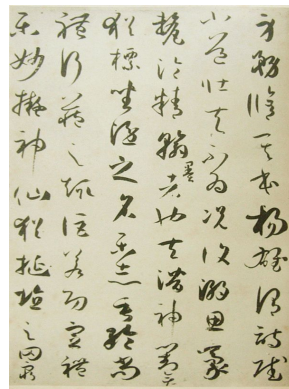
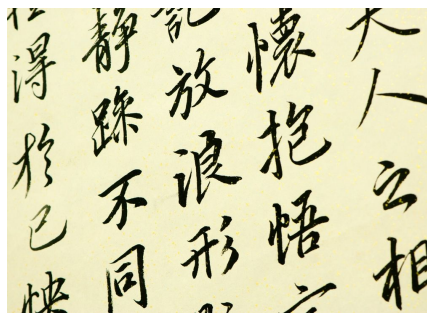


Why learning Chinese is so hard?

天命之謂性。性之謂道。道之謂教。教者。不可不須也。與離也。

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- Chinese tones are unfamiliar and hard
- Chinese is not a phonetic alphabet: It is a pictorial language that relies on strokes and radicals to make Chinese characters
- The Chinese language has a lot of memorization:
For each Chinese word you need to memorize four different things:
Meaning, pronunciation, tone, and character
- The Chinese language is very ambiguous: it has tons of homonyms and lack of grammar
- The Chinese language has many dialects



IPA symbols:

Goal: detect difference between native and student

IPA

ɪ READ	ɪ SIT	ʊ BOOK	uː TOO	ɪə HERE	eɪ DAY	John & Sarah Free Materials 1996	
e MEN	ə AMERICA	ɜː WORD	ɔː SORT	ʊə TOUR	ɔɪ BOY	əʊ GO	
æ CAT	ʌ BUT	ɑː PART	ɒ NOT	eə WEAR	aɪ MY	aʊ HOW	
p PIG	b BED	t TIME	d DO	tʃ CHURCH	dʒ JUDGE	k KILO	g GO
f FIVE	v VERY	θ THINK	ð THE	s SIX	z ZOO	ʃ SHORT	ʒ CASUAL
m MILK	n NO	ŋ SING	h HELLO	l LIVE	r READ	w WINDOW	j YES

Pronunciation of English letters (phonetically) correct pronunciations

Alphabet Pronunciation

A [eɪ]	B [bi:]	C [si:]	D [di:]	E [i:]
F [ef]	G [dʒi:]	H [eɪtʃ]	I [aɪ]	J [dʒeɪ]
K [keɪ]	L [el]	M [em]	N [en]	O [əʊ]
P [pi:]	Q [kju:]	R [ɑ:]	S [es]	T [ti:]
U [ju:]	V [vi:]	W [ˈdʌbəlju:]		
X [eks]	Y [waɪ]	Z [zed / zi:]		

Code to check for boolean if native and student are same

```
def valid(native, student):
```

```
    for ch in native:
```

```
        if ch not in student:
```

```
            return False
```

```
    return True
```

Code to check difference between native and student

```
from pydub import AudioSegment
```

```
from pydub.playback import play
```

```
from playsound import playsound
```

```
def first_difference(native, student):
```

```
    for a, b in zip(native, student):
```

```
        if a != b:
```

```
            return 'a -> b'
```

```
            Single quote character = a
```

```
            Double quote character = b
```

```
            song = AudioSegment.from_wav("Single quote character.wav")
```

```
            play(song)
```

```
            song2 = AudioSegment.from_wav("Double quote character.wav")
```

```
            play(song2)
```

```
            playsound(https://ssl.gstatic.com/dictionary/static/sounds/oxford/native--\_gb\_1.mp3)
```

```
native = "dog"
```

```
student = "dof"
```

```
first_difference(native, student)
```