Artificial Intelligence II

Lesson 10 - Future of AI

First Code Academy

Today's Plan

Teach Back	00 - 5 min
Fields in AI	10 - 15 min
Natural Language Processing	15 - 20 min
Quiz	20-25 min
Break	25 - 28 min
Project - Sudoku Solver	28 - 55 min
Lesson Recap	55 - 60 min

What did we learn last time?

Teach Back

_____ assigns some data as belonging to one of many classes.

_-nearest-neighbors sees the most similar data points to assign a point to a class.

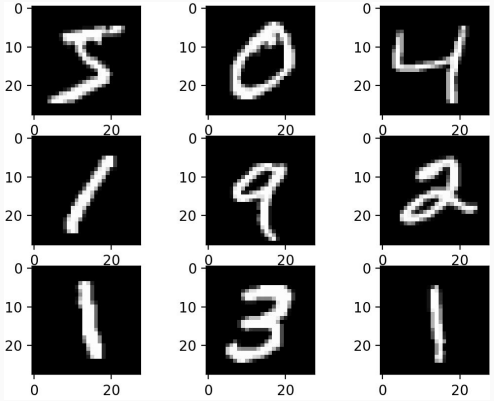
Classification

If we have a set of classes **X**, we have to assign a new piece of data to one of the classes.

[rabbit] [cat] [dog]

Classification

We have already done classification before:



Recognizing Digits

Here we classify each picture as one of 10 classes (0-9)

Classification

Many different approaches to classification problems:

- **Bayes Classifier:** Measures the probability of belonging to a class given some previous event/characteristic.
- **K-Nearest-Neighbors:** To which group do the most similar data points belong?
- **Neural Networks:** Try to *learn* the relationship between different input characteristics to make a decision.

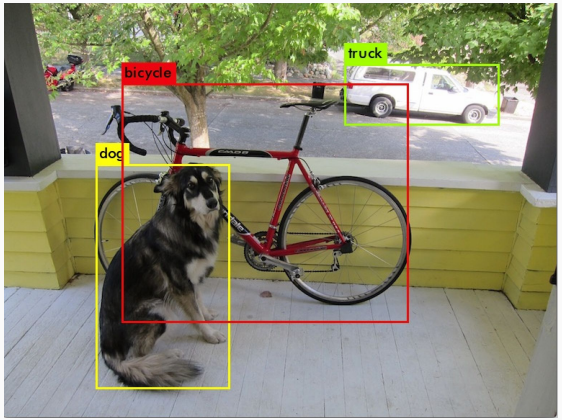
Key Terms

Subfields

Natural Language Processing

Subfields

A **subfield** of AI uses general AI techniques we've discussed to solve new problems.



Object Recognition

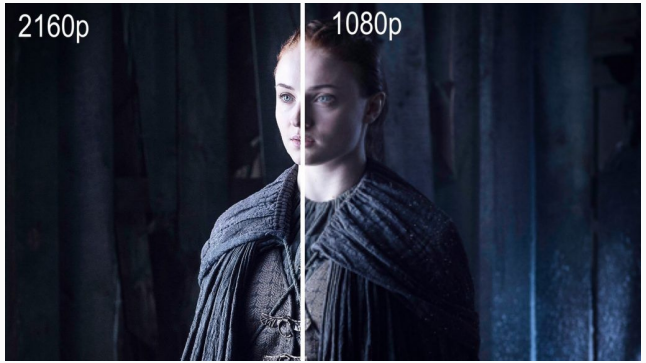


Image Upscaling

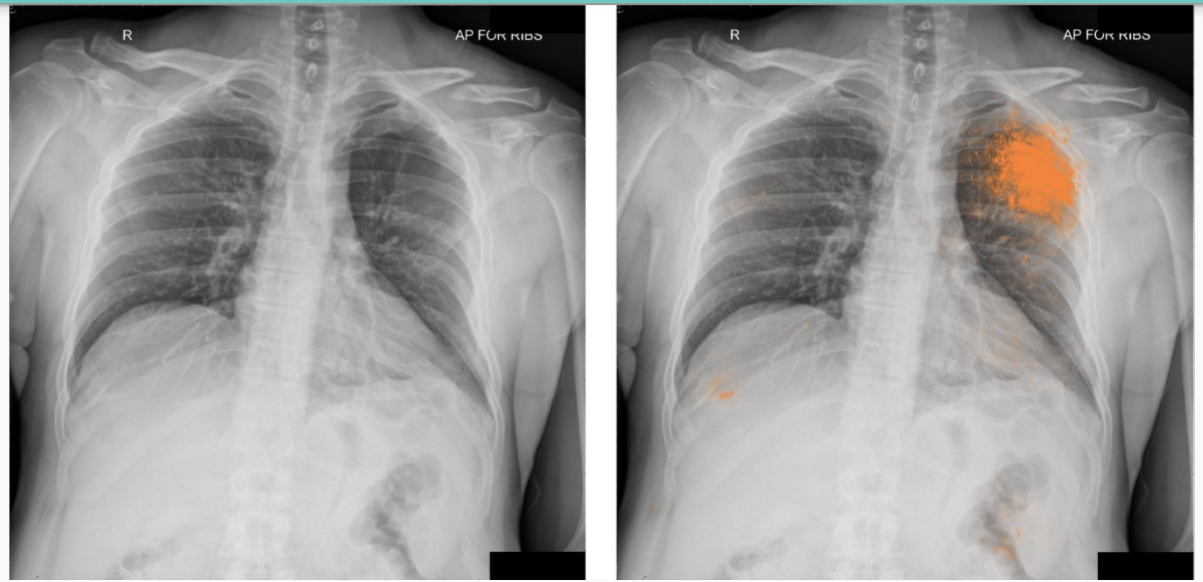
Voice Assistants

Some Subfields

AI techniques are applied to more fields constantly: medicine, finance, etc...

In the future, there will be a lot more (and better) use of AI methods in these areas.

Medicine



Detecting health problems from x-rays

Finance

Finding the best company to invest money in by looking at a lot of data and finding patterns.

Natural Language Processing

NLP

Natural Language Processing involves using computers to understand what someone says/writes.

Uses of NLP

Popular uses of NLP are voice assistants (such as Siri), or translating software.

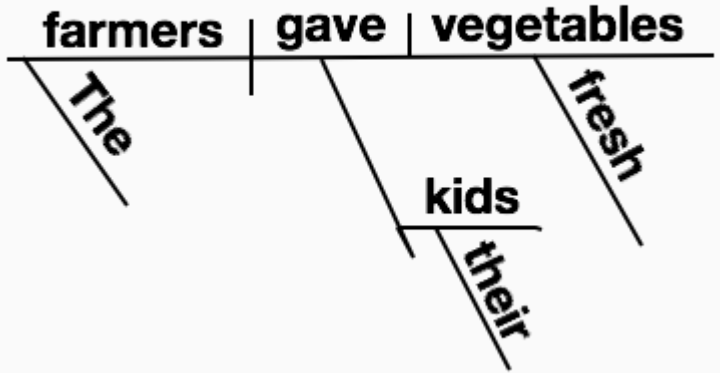
Google Translate

Voice Assistants

How do we do it?

Have you ever done sentence diagramming in school?

It involves drawing out the relationships between words in a sentence.



How do we do it?

Use these words to guess the intent or topic of the conversation.

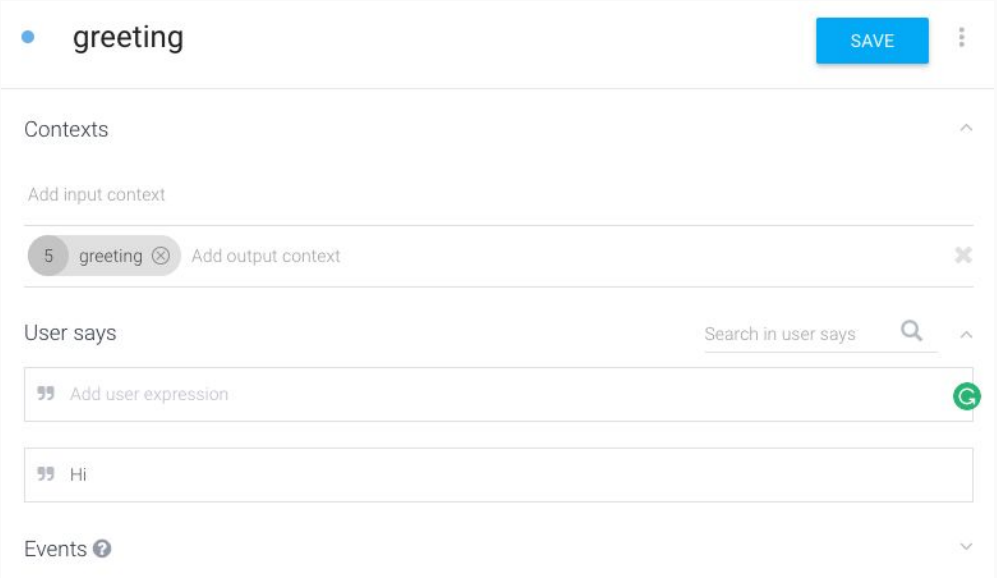
Hard because words can have multiple meanings, slang, accents, etc....

How do we do it?

In recent years, deep learning approaches allow us to more flexibly guess meaning.

Chatbot project

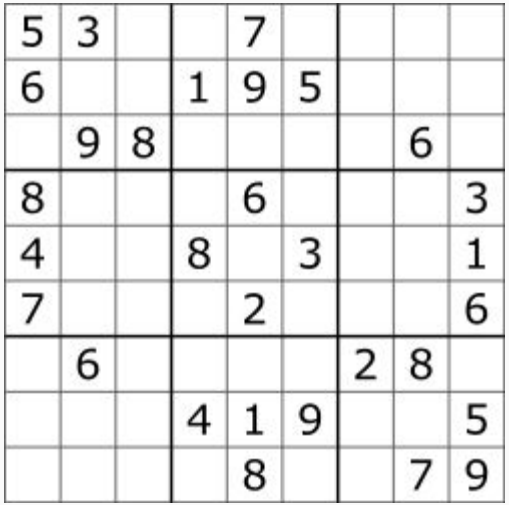
In our chatbot project, we had to tell it what kinds of dialogues it would have with the person.



Project: Sudoku Solver

Sudoku

Sudoku is a game where we complete a 9x9 board...



5	3			7				
6			1	9	5			
	9	8					6	
8				6				3
4			8		3			1
7				2				6
	6					2	8	
			4	1	9			5
				8			7	9

Sudoku

...such that every **row**, **column**, and 3x3 **square** has the numbers 1-9 and does not repeat any numbers.

5	3	4	6	7	8	9	1	2
6	7	2	1	9	5	3	4	8
1	9	8	3	4	2	5	6	7
8	5	9	7	6	1	4	2	3
4	2	6	8	5	3	7	9	1
7	1	3	9	2	4	8	5	6
9	6	1	5	3	7	2	8	4
2	8	7	4	1	9	6	3	5
3	4	5	2	8	6	1	7	9

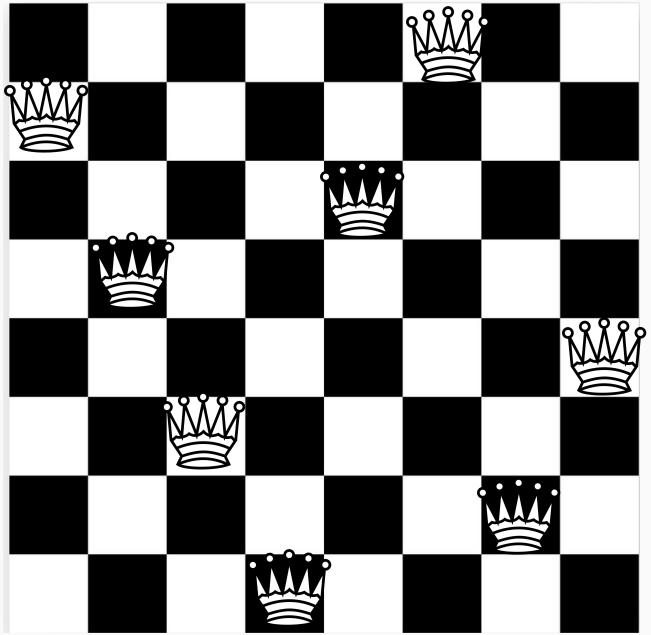
Sudoku Solver

If we have an empty board, how do we solve it?

Today, we will solve a board with **10** empty slots.

Approach

We will use a **backtracking** approach similar to the **N-Queens** problem.

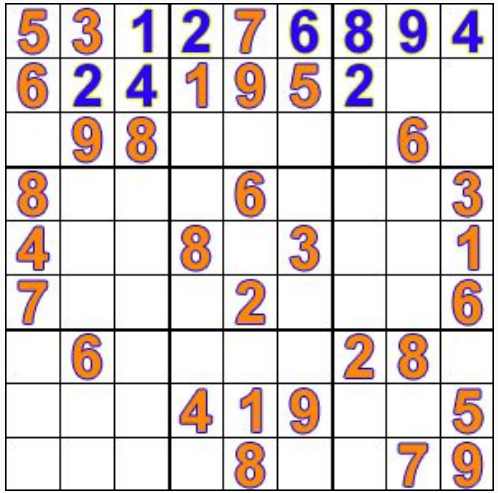


Approach

1. Create a solved board, delete some elements from it.
2. When we find an empty slot in the board, see which number 1-9 in that slot gives a solution.
3. **Recurse** to solve the remaining unfilled spots.

Approach

If the number we are trying, doesn't work, we try the next one and keep moving!



Get the starter file

http://bit.ly/FCA_AI2_Starter

Create the board

Key Terms

Subfields

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