CIS 678 Machine Learning

Basics of Probability

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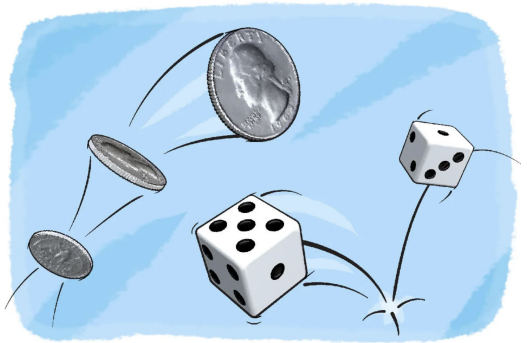
*Why to learn **Probability Theories?***



ML vs *not ML* Problems

- Find the maximum from a given list of numbers.

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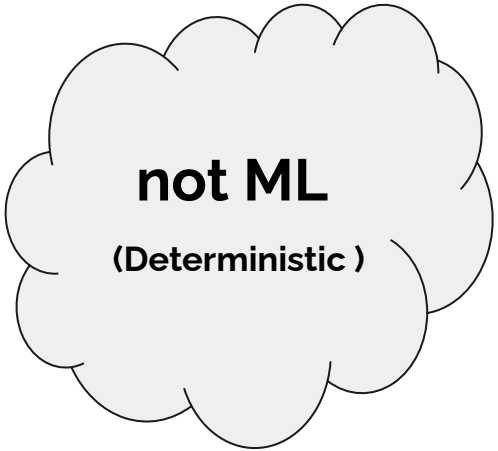
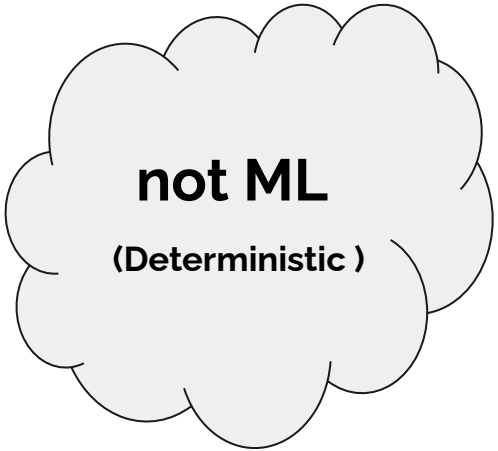


ML vs *not ML* Problems

- Find the maximum from a given list of numbers.
- What was the lowest recorded temperature in Grand Rapids over the past 20 years?



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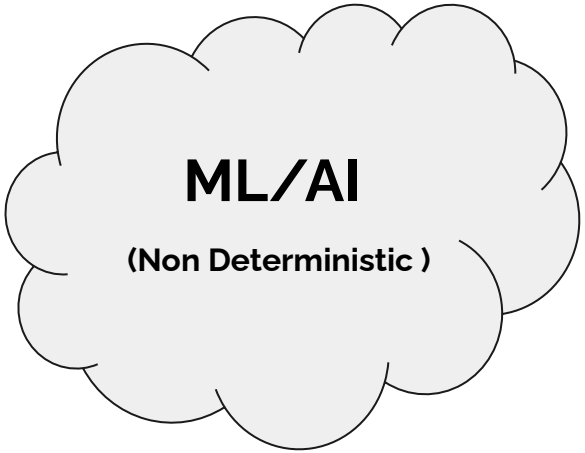
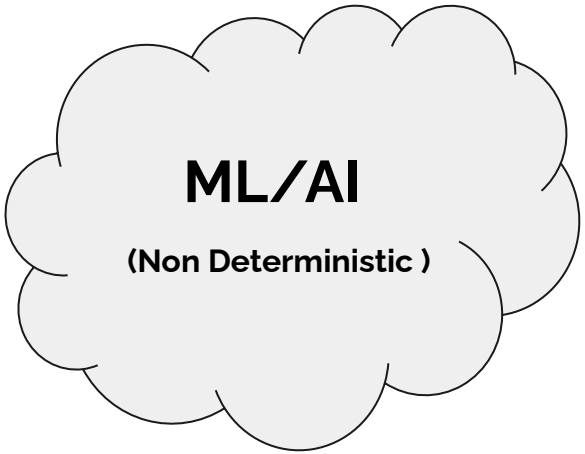


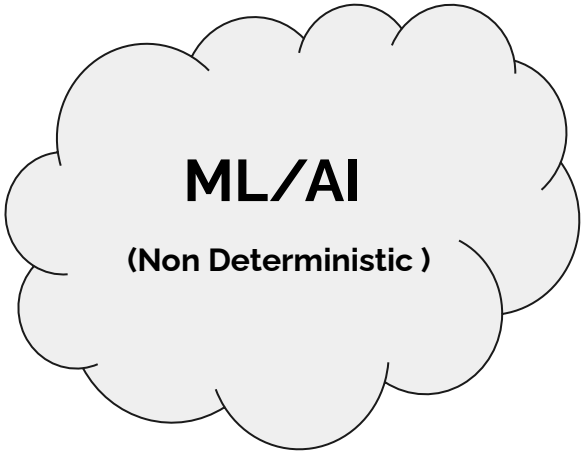
- Will it rain tomorrow? What are the chances?

ML vs *not ML* Problems



- Will it rain tomorrow? What are the chances?
- Who is going to win in the next NFL games between Texans vs Ravens?

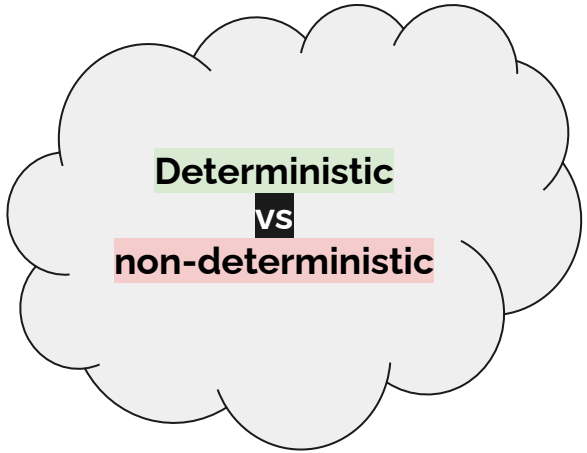
ML vs *not ML* Problems



- Will it snow tomorrow? What are the chances?
- Who is going to win in the next NFL games between Texans vs Ravens?
- Translate the following into “French”:
  - *“English and French are two European languages; they have a lot in common; however they also possess a lot of differences.”*

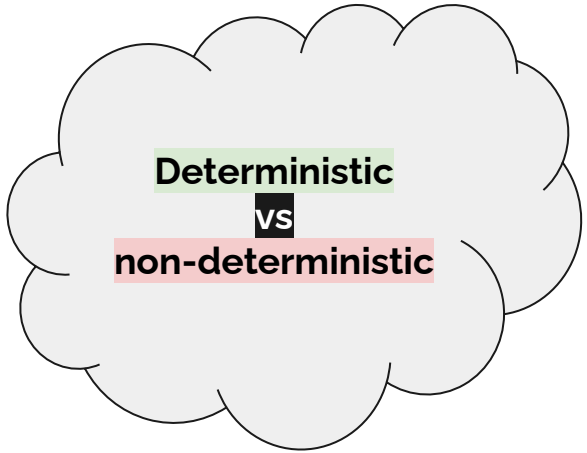
ML vs *not ML* Problems

- Difference between a regular/standard and AI/ML programs
  - Regular/standard programs (Deterministic)



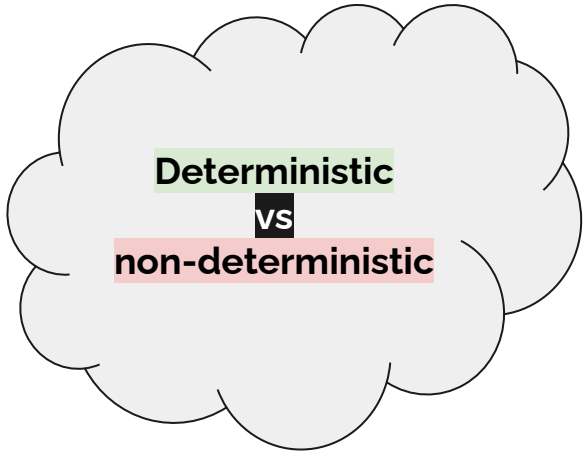
ML vs *not ML* Problems

- Difference between a regular/standard and AI/ML programs
  - Regular/standard programs (Deterministic)
  - AI/ML programs (non deterministic, lives with uncertainty)



ML vs *not ML* Problems

- Difference between a regular/standard and AI/ML programs
  - Regular/standard programs (Deterministic)
  - AI/ML programs (non deterministic, lives with uncertainty)
  - **Probability theory** is the branch of Math that talks about uncertainty.



ML vs *not ML* Problems

Fill in the Gap:

- *I am very* *……???…….*

ML vs *not ML* Problems

Fill in the Gap:

- *I am very* .....???.....

- *happy*
- *confused*
- *excited*
- *tired*
- ..

ML vs *not ML* Problems

Fill in the Gap:

- *It's already 7pm; I have been working since early morning, I am very ……..??? ……*

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Additional context can help us reduce uncertainty

ML/AI Problems

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Additional context can help us reduce uncertainty

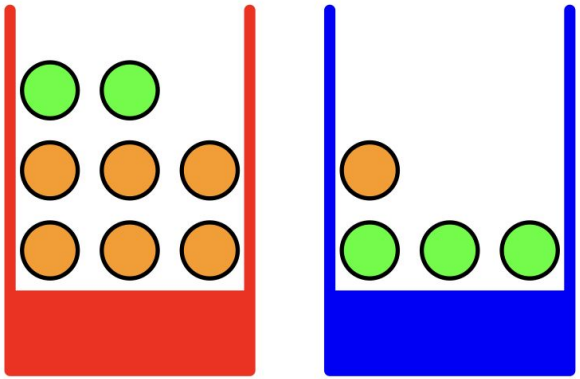
"**Probability**" is the branch of **Mathematics** which helps us quantify, measure, and explain uncertainty

So, to Learn ML, we need to learn Probability!

Let's try a Toy problem!

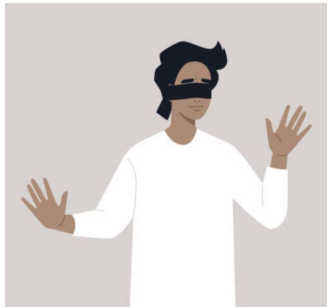
Basics of Probability

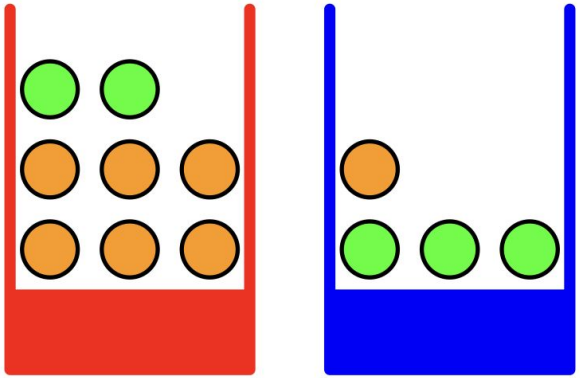
- There are some **orange** and **green** balls in a *red* and *blue* box



Basics of Probability

- There are some **orange and green** balls in a ***red*** and ***blue*** box
- Someone (blinded) picked up a ball and it found to be with color orange





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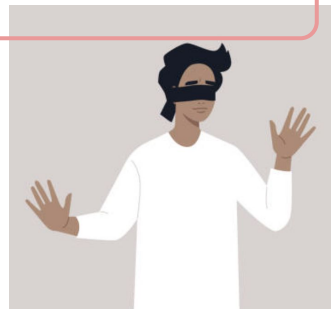

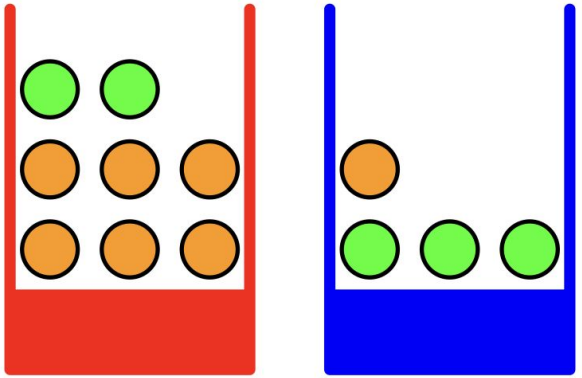

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