Slack File Edit View Go History Window Help 100% Tue 31 May 12:01 AM

Probability & statistics — 1

1/13

IPL

RR vs GT

↓

130 (20 ov)

"chance" 0 — 100%

"prob" 0 — 1

After 1st innings

① whom would bet on? RR or GT? ✓

② Would you bet all your savings on GT?

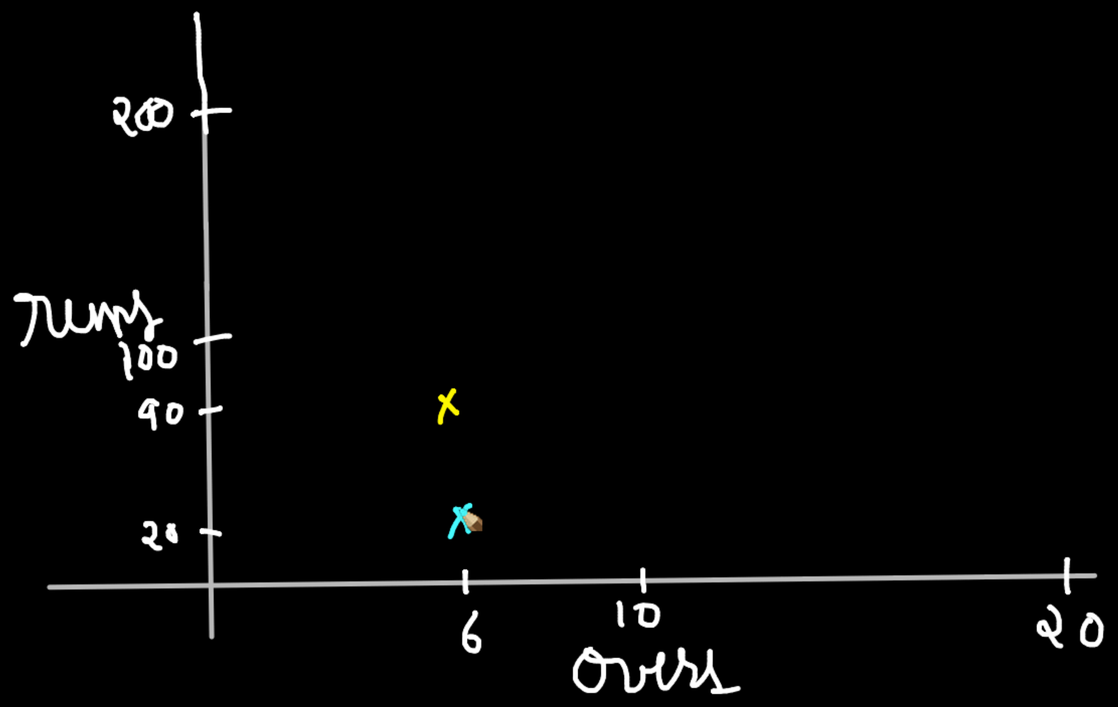
① GT is more "likely" to win

$$P(\text{GT wins}) > P(\text{RR wins})$$

② We are not 100% sure

$$P(\text{GT wins}) < 1$$

IPL



At 6 overs, 90 runs → good / happy / ...

At 6 overs, 20 runs → bad / tension / ....

Netflix

Marvel movies
Friends

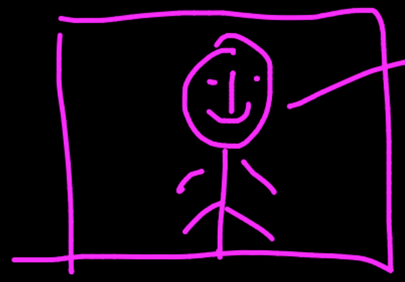
} binge → "Paul Rudd"

Ant man
Mik H / Grah Bag

The office
↓
Steve Carrel

Ghost Buster → a lot actors

Dinner with Schmucks
(Steve Carrel + Paul Rudd)



→ Paul Rudd
"more likely" to watch

$P(\text{watching} \mid \text{History})$
(given)

Chrome File Edit View History Bookmarks Profiles Tab Window Help
100% Mon 30 May 9:44 PM

3 pillars of math in DSML

Sample space/events

Conditional Prob

Prob | Stat
(12-14)

Dot product

Linear Algebra
(5-6)

Gradient Descent

Optimization
("calculus")
(5-6)

① What → dot prod
② Why → Conditn Prob
③ How → Gradient Descent

ML
- Linear Reg
- Logist. Reg
- SVM
- PCA
- Deep Learn
- CNN
- NLP

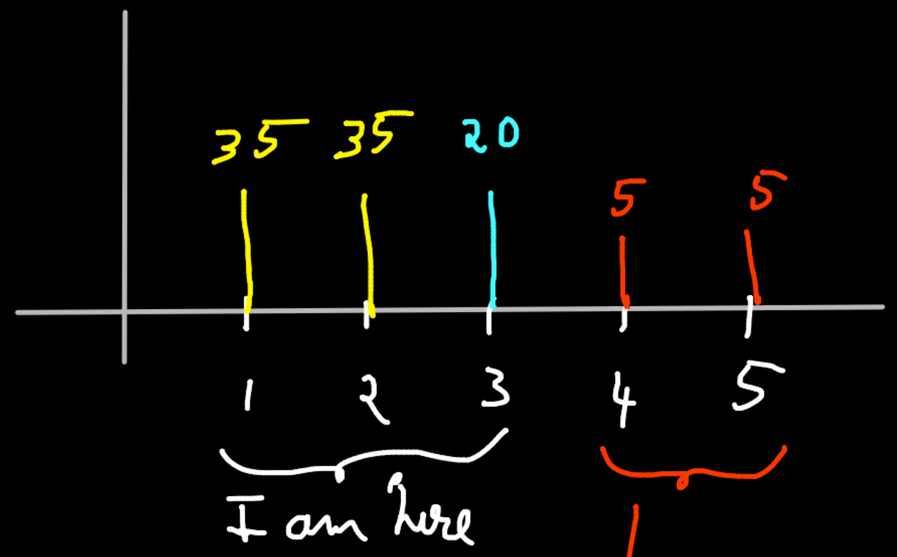
Chrome File Edit View History Bookmarks Profiles Tab Window Help
100% Mon 30 May 9:52 PM

Ofs & Pacing

- In-class
  - Chat
  - Question
  - ↑ ↓
- Feedback & Ratings
- Asynchronous Connect
  - Whatsapp group
  - Personally

Last 5 years (2017 - 2022)

1, 2, 3, 4, 5



bored / repetitive
- coding
- After class
- path

Class 1 & 2 → 1st gear

Class 3 → 2nd gear

⋮

Class 5 onward → Cruise control

Remedial session → asynch (whatsapp)

collect doubts → session

Chrome File Edit View History Bookmarks Profiles Tab Window Help
100% Mon 30 May 9:58 PM

Covid

delta $\longrightarrow$ $\frac{25 \text{ deaths}}{1000}$ $\longrightarrow$ 0.025

omicron $\longrightarrow$ $\frac{12 \text{ deaths}}{1000}$ $\longrightarrow$ 0.012

Which is more deadly

"likelihood" of death $\longrightarrow$ ratio / fraction

Probability of dying is more in delta

Chrome File Edit View History Bookmarks Profiles Tab Window Help 100% Mon 30 May 10:12 PM

Experiment : administer a drug m1 to patients

more than 1 outcome

- well-defined

outcome
- recovered 1-7 days 25
- recovered 8-14 days 20
- recovered 15+ days 50
- death 5

Chrome File Edit View History Bookmarks Profiles Tab Window Help 100% Mon 30 May 10:15 PM

Sample Space : set of all possible outcomes

$$S = \{ \overset{25}{r_{1-7}}, \overset{20}{r_{8-14}}, \overset{50}{r_{15+}}, \overset{5}{d} \}$$

Event : subset of the sample space

E1 : recovered $\quad E1 = \{ r_{1-7}, r_{8-14}, r_{15+} \} \rightarrow 95$

$E1 \subseteq S$

E2 : recovered under 14 days $\quad E2 = \{ r_{1-7}, r_{8-14} \} \rightarrow 45$

E3 : recovered under 20 days $\longrightarrow$ Atleast 45

Atmost 95

not an event $\times$

Chrome File Edit View History Bookmarks Profiles Tab Window Help 100% Mon 30 May 10:27 PM

Dice : 1, 2, 3 .. 6

collection of all outcomes

Sample Space

$S = \{1, 2, 3, 4, 5, 6\}$

Event is any subset of S

$E \subseteq S$

Collection of some outcomes

Outcomes

$\{1\}, \{2\}, \{3\}, \{4\}, \{5\}, \{6\}$

Events

E1 : odd number $E1 = \{1, 3, 5\}$

E2 : getting a 4 $E2 = \{4\}$

E3 : perfect square $E3 = \{1, 4\}$

E4 : even numbers $E4 = \{2, 4, 6\}$

E5 : less than or eq to 3 $E5 = \{1, 2, 3\}$

$E6 = \{\ \}$

$E7 = \{1, 2, 3, 4, 5, 6\}$

Chrome File Edit View History Bookmarks Profiles Tab Window Help 100% Mon 30 May 11:58 PM

Coin Toss

Outcomes $\{H\}, \{T\}$

Sample space $\{H, T\}$

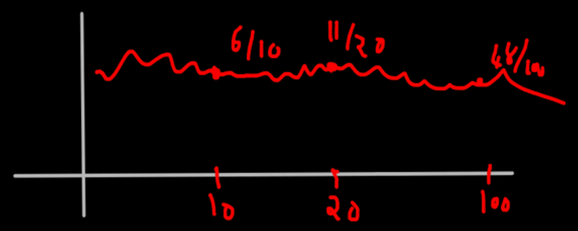
Is the coin fair? fair heads & tails are equally likely

$$\boxed{P(H)} = P(T)$$

Trial: we repeat experiment "n" times

n	# heads	
10	6	$\rightarrow 6/10$
20	11	$\rightarrow 11/20$
100	48	$\rightarrow 48/100$
⋮		
1 Milli	500125	$\rightarrow \frac{500125}{1\text{ million}}$

getting close to 0.5



Finder File Edit View Go Window Help 100% Mon 30 May 11:59 PM

```
import

class CoinTossSequence:
    def __init__(self):
        [                ]

c = CoinTossSequence()
```

1) Python builtins
   - For loop
   - List

2) Matplotlib
   - fig, ax
   - Artist
   - Artist Animation