Whey probability?

- better forecasting (i.e. never go to casinos)

- inference about important but hard-to-observe

Voriables using noisy but observable variables

(i.e. medical tests)

= ruling out boring explanations

(Gimli: "Nothing, its just a whift of cloud"

Boromir: J"It's moving fast... against the wind!")

Problem: events that seem rare are actually sometimes quite likely, like flipping tails seven times in a row.

Goals: estimate probability of events from data.

estimate probability of complicated events from

combinations of simple events.

like to visualize two-variable probability distributions using proportionally sized rectangles, since my intuitions about relative areas are reliable.

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P(d=6)

To 1/6

consider rolling
two dice. The
chance that the
first clie is a 6
is 1/6. The chance
that the second is
a 6 is also 1/6.

Since They are independent,

Since They are independent, P(d1=6, dz=6) = 1/62=1/36

The chance that at least one die is a  $8i \times 13$  the area of the  $\square$  region  $P(d_1=6)+P(d_2=6)-P(d_1=6,c|z=6)=1/36$ -or-  $1.0-P(d_1\neq 6)\cdot P(d_2\neq 6)=1-\frac{5}{6}\frac{5}{6}=\frac{11}{36}!!$