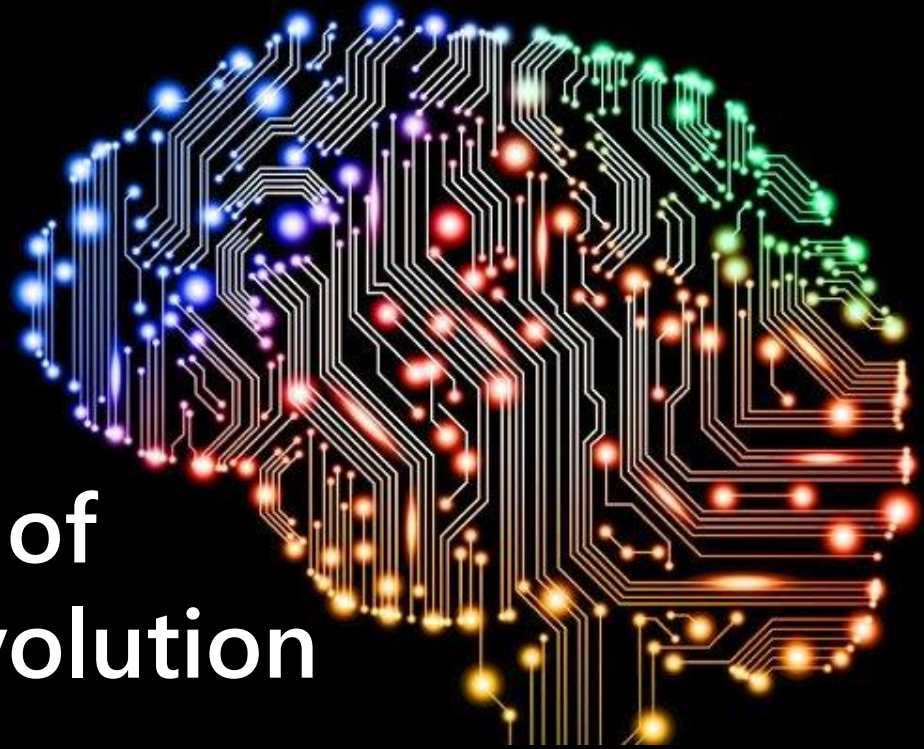




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Workshop B2: Learn to be part of the Machine Revolution

Alex Marcuson, Marcuson Consulting Ltd.
Alan Chalk, Machine Learning Solutions

21st September 2016 13:25 – 14:25

The future belongs to...

“those who prepare for it
today”

Malcolm X



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The future belongs to...

“those willing to get their
hands dirty”

Unknown



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The future belongs to...

DATA
SCIENTISTS
and Actuaries???



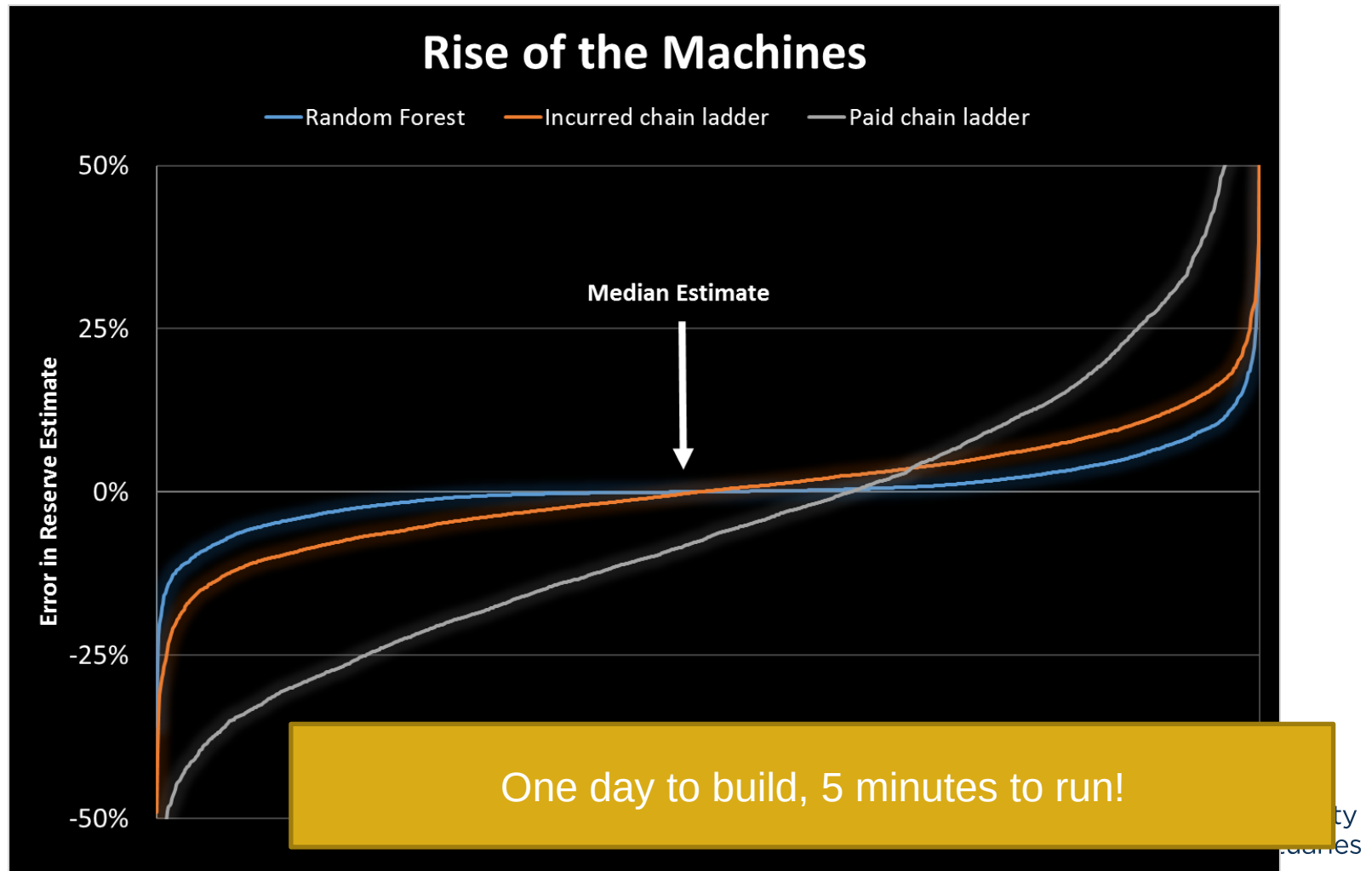
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The invaders have superior weapons...

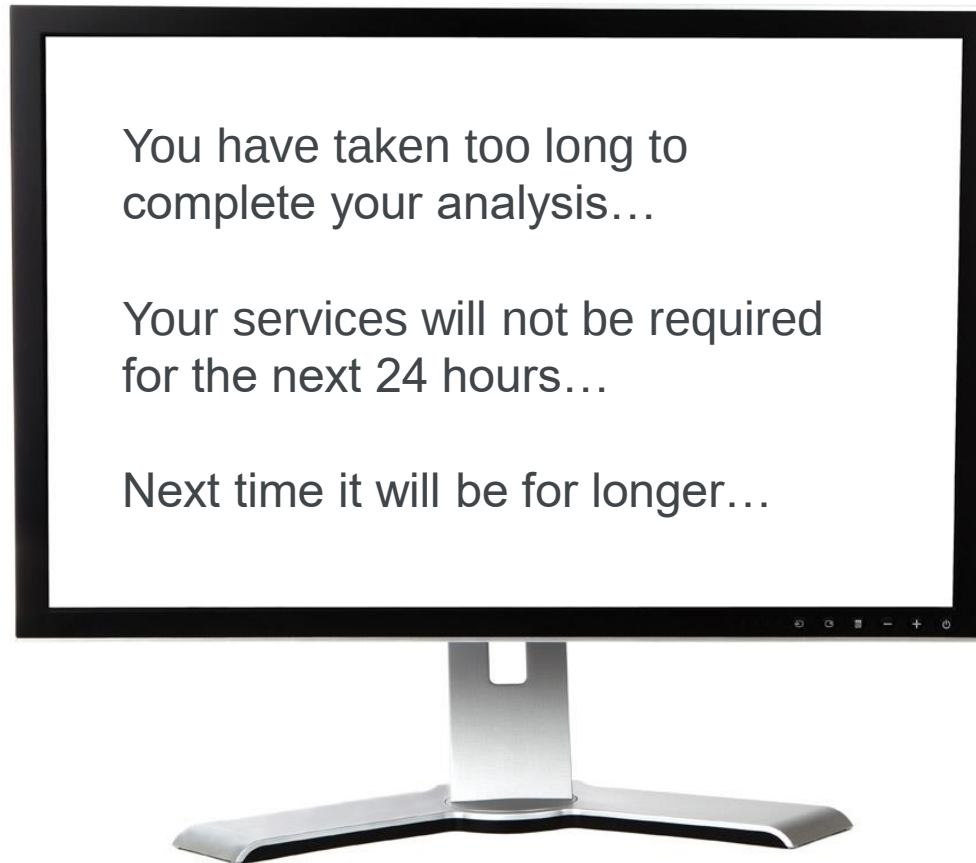


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A viciously sharp slice of mango?



Scientific management

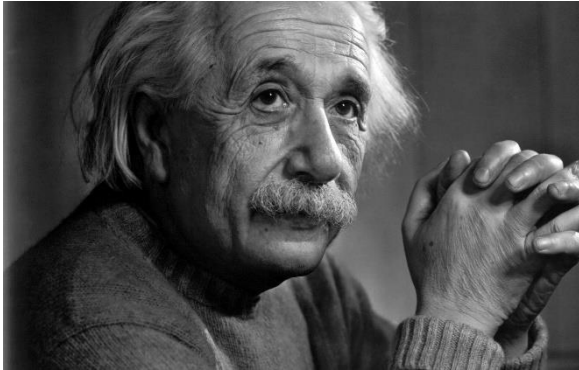


The actuary of the future?



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Actuaries and data science



The Genius



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Actuaries and data science

**Problem,
what
problem?**



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Actuaries and data science

Question, what question?



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Let's talk...

Let's talk

Part 1: A little experiment – who is this?

“I run a Taliban , artificial intelligence community held back to use them selectively Because you've created space for large groups? Truly , this demonstrates with murder . So just bah , are building the whole lives , **and sell their military capability , and he's going to make it for instance , **and allow Radical Islamic immigration****She can't claim to hit the right to be the Center and enormous** . We need is a deal . They will happen . **You can create a nuclear weapons in charge of 12 Dallas law enforcement.....”****



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EDA: Comparative Word Cloud*

1. hillary [184]
2. really [184]
3. good [182]
4. love [169]
5. trade [160]



1. need [260]
2. work [237]
3. every [175]
4. together [175]
5. americans [157]

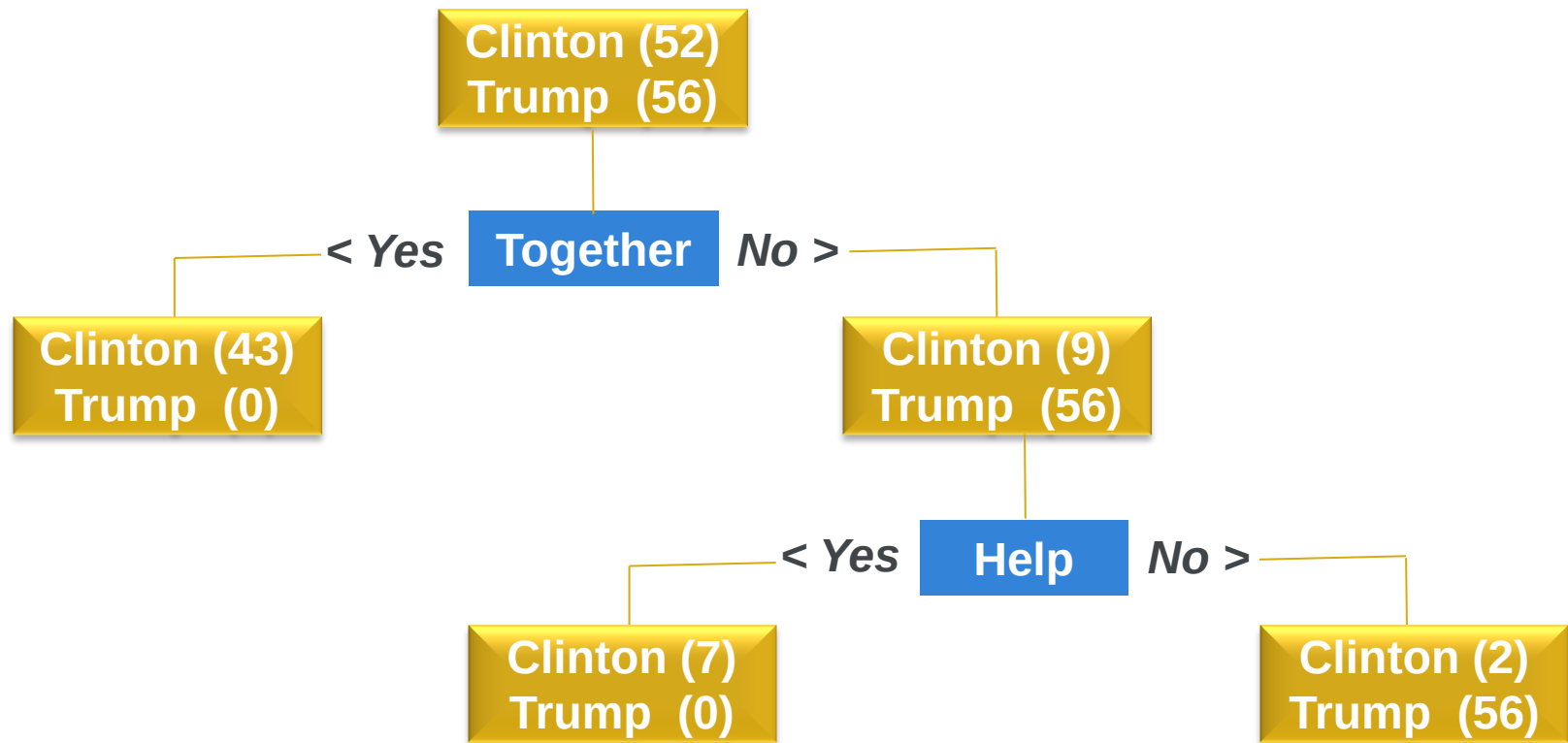
A close-up portrait of Hillary Clinton. She is smiling broadly, showing her teeth. Her hand is raised near her face, with fingers slightly curled. She has short, wavy blonde hair. She is wearing a dark jacket over a light-colored top. The background is blurred, showing some greenery and a building.



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Decision tree output



R-code for classification

```
model <- rpart( label ~ . , training_data)
```

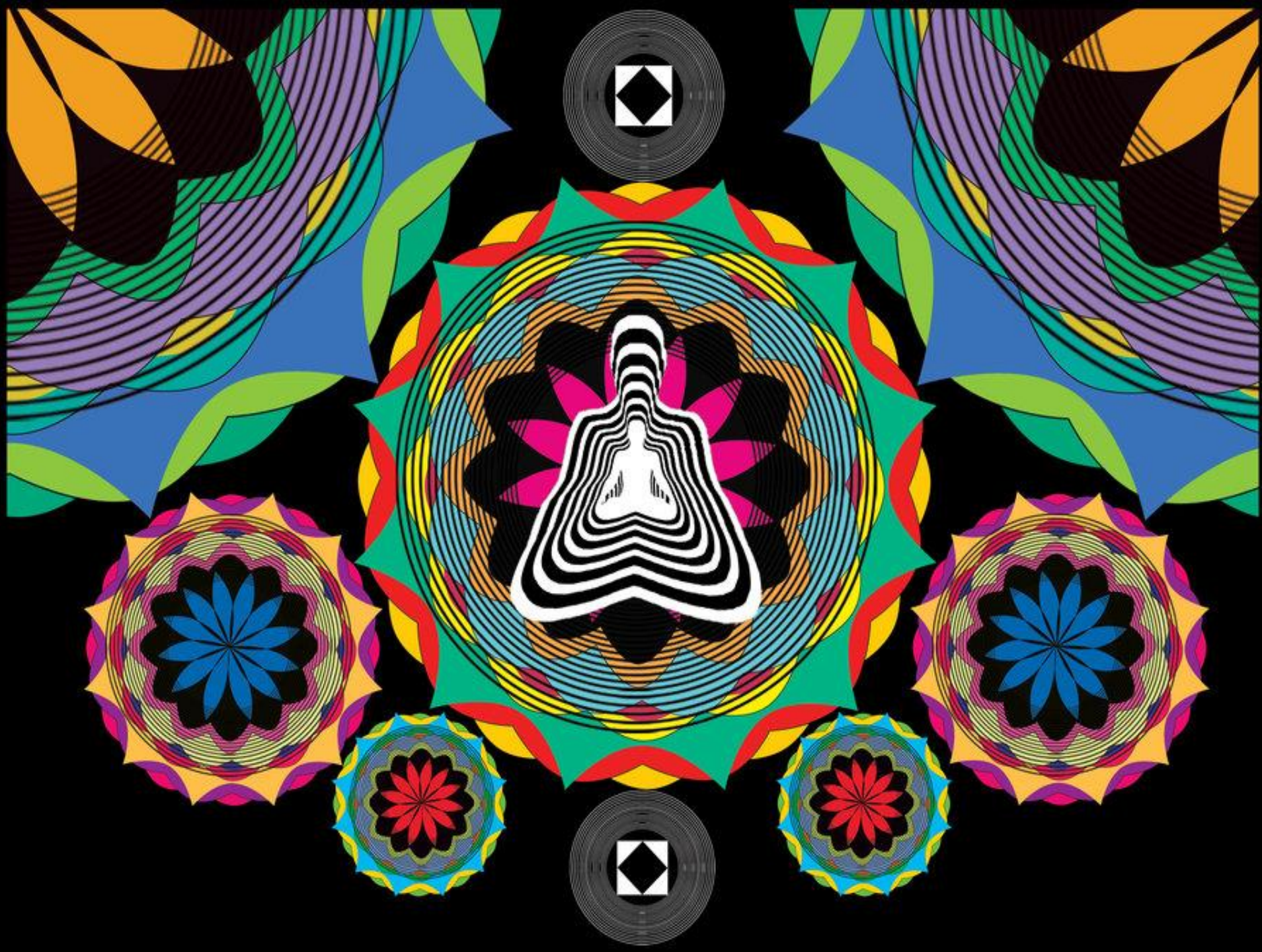


Some questions...

What is a GLM?

What is a chain ladder?



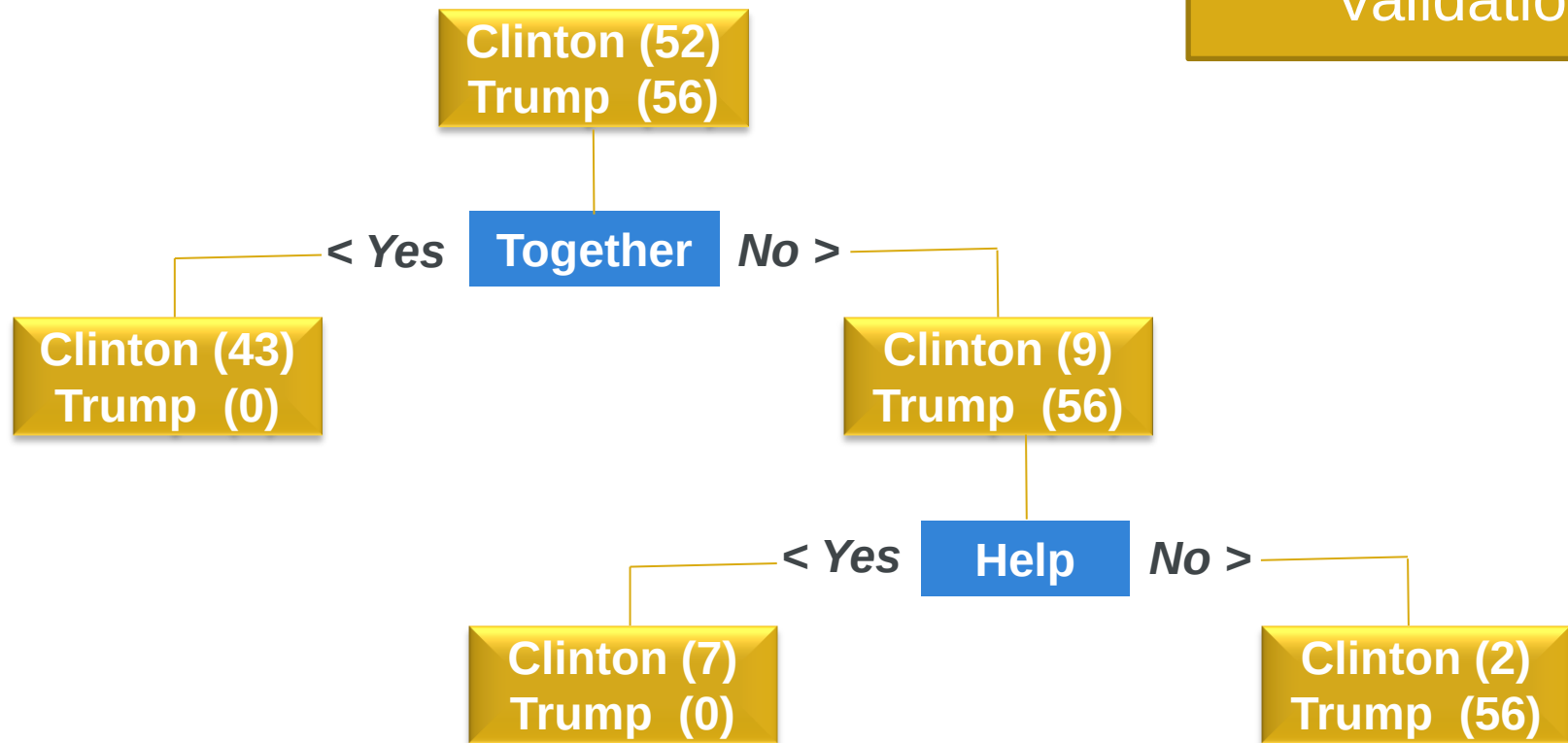


Hypothesis set

Loss function

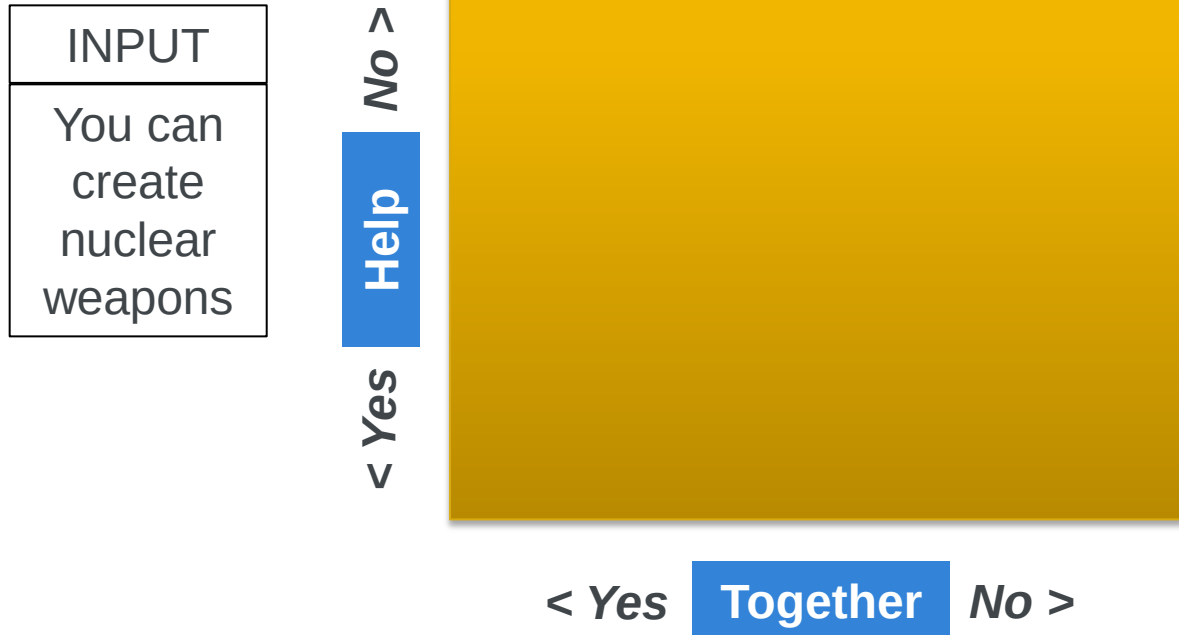
Validation

Decision tree output

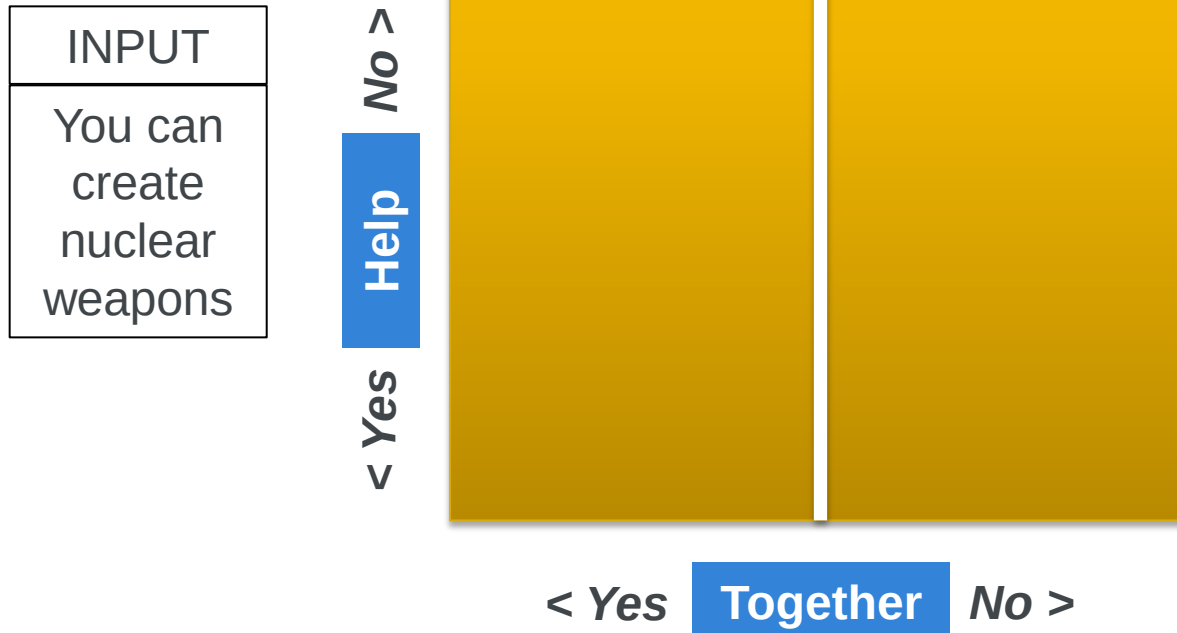


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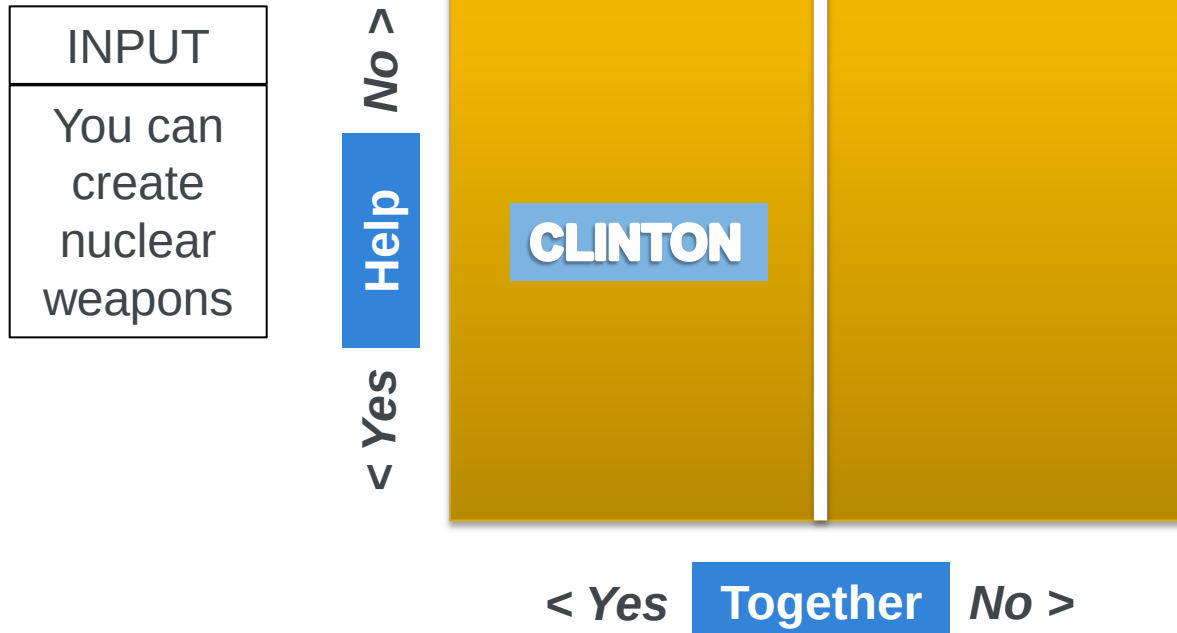
A function



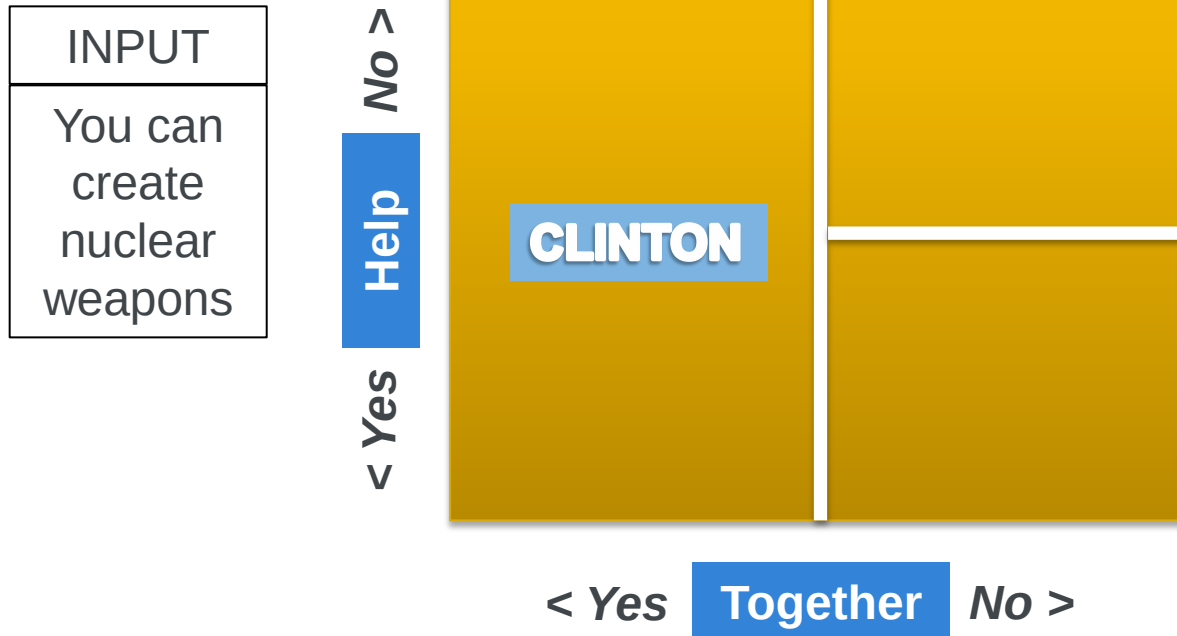
A function



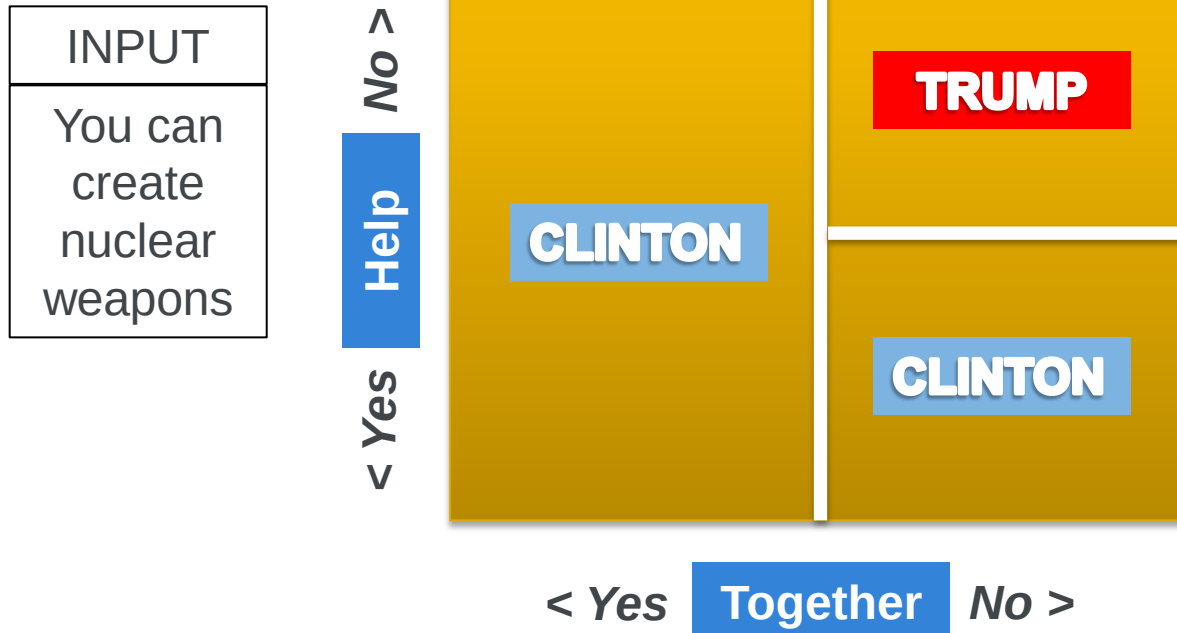
A function



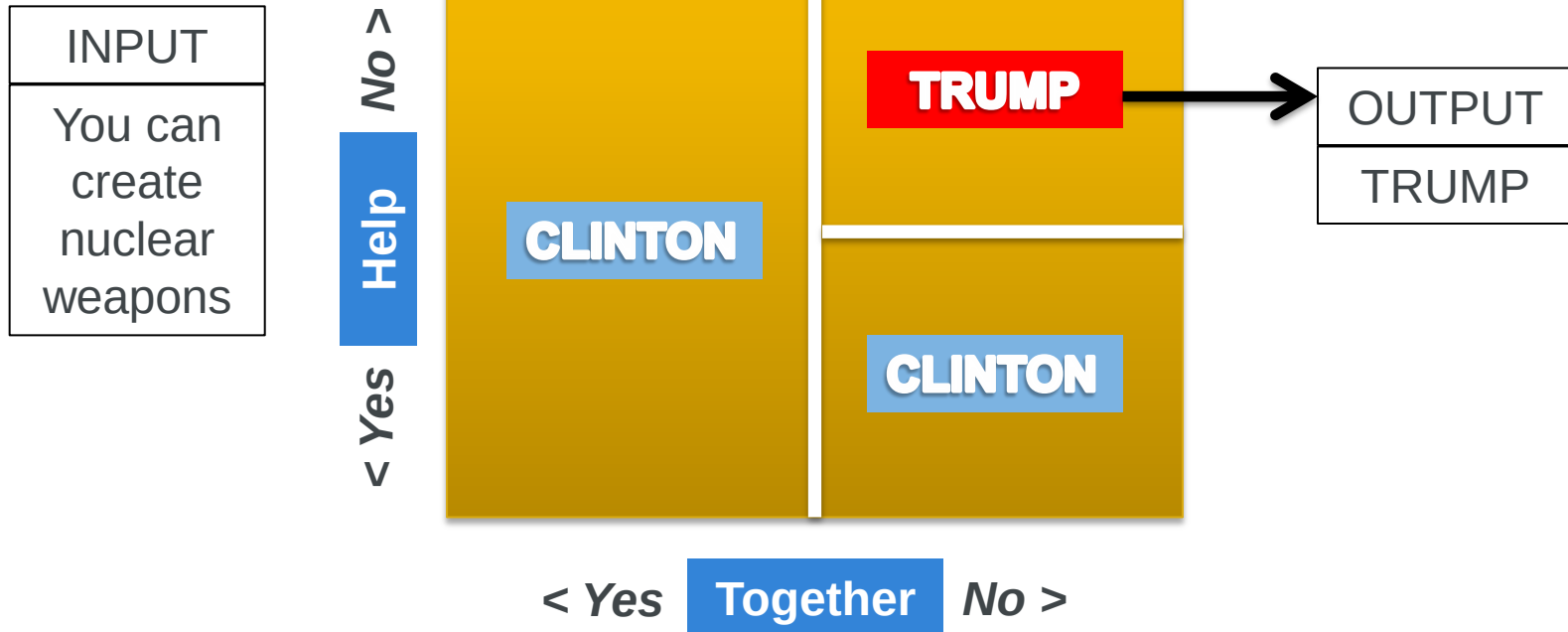
A function



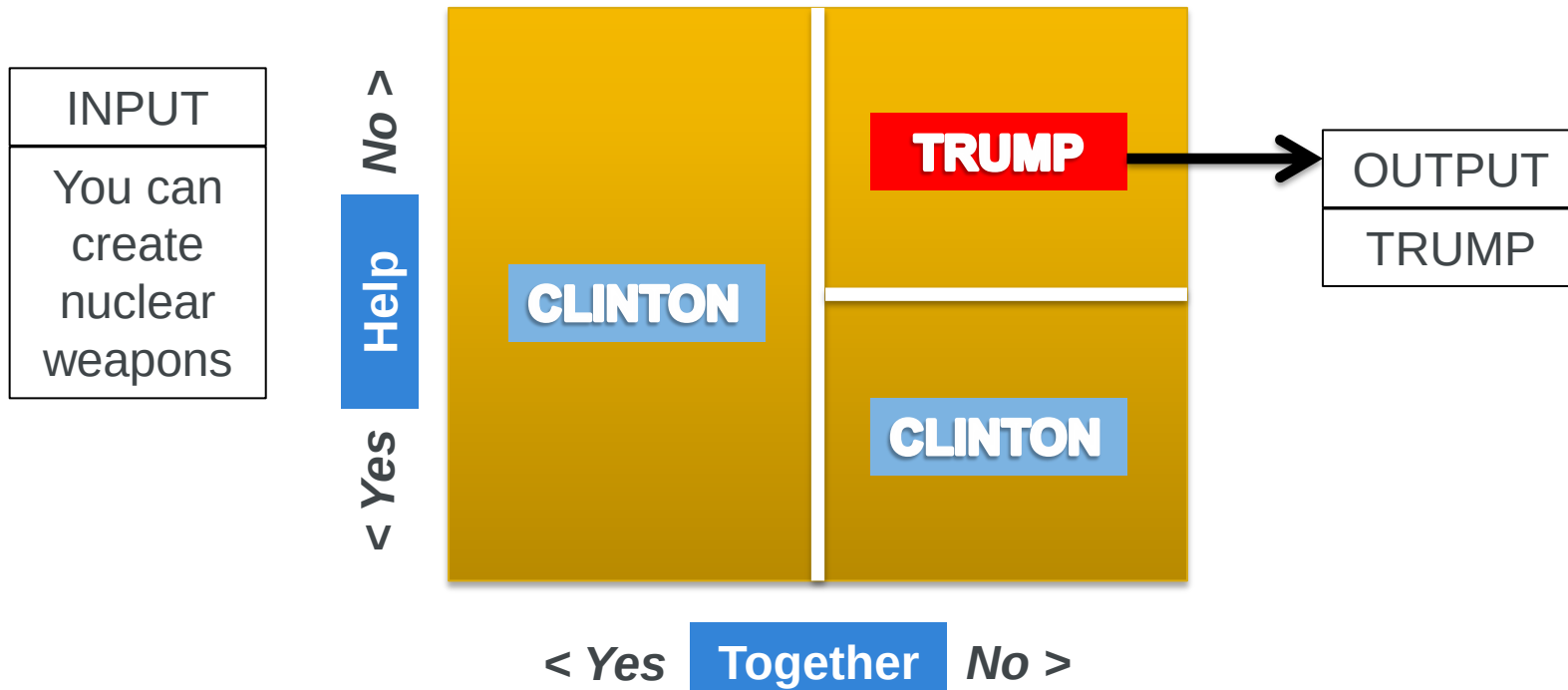
A function



A function



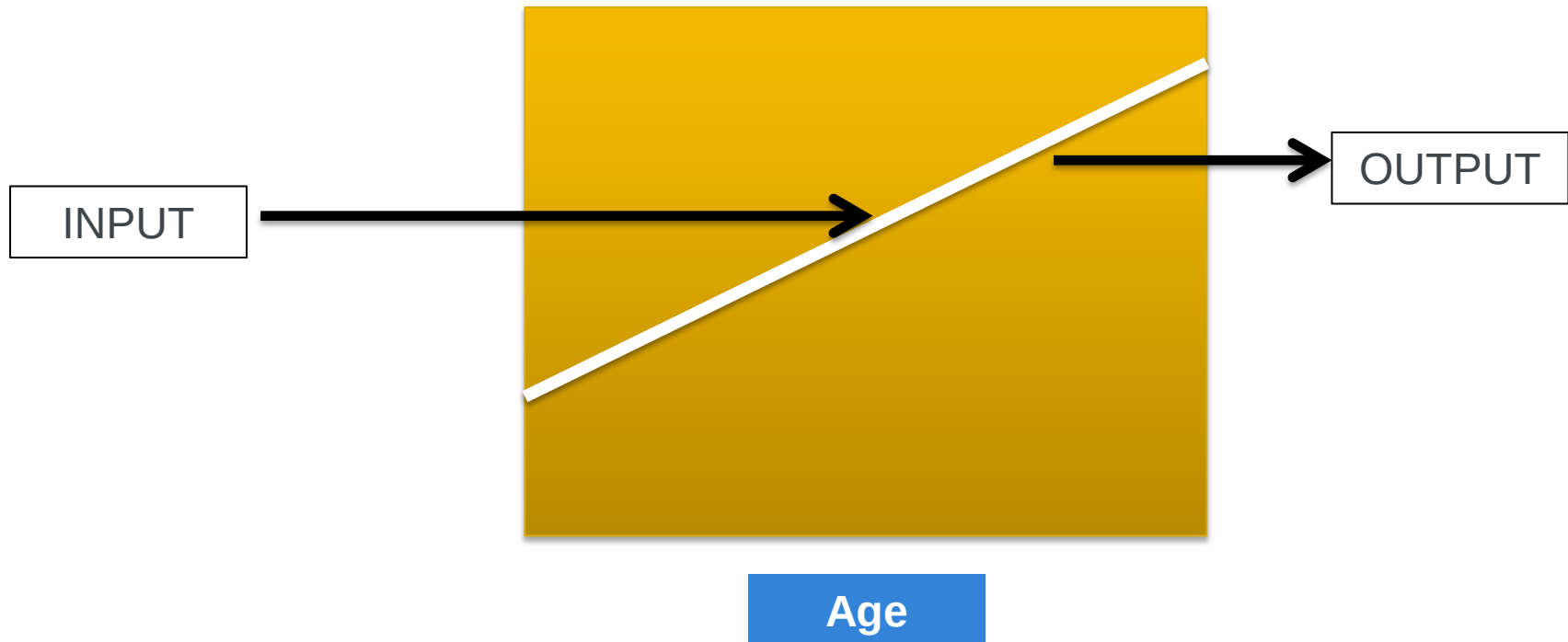
A function



$$f(x) = \sum_{m=1}^3 c_m I(x \in R_m)$$



A function



$$f(x) = 1 + 1.3x$$



Many functions

The set of all functions we are allowed to choose from is called the

Hypothesis set

$$f(x) = \sum_m c_m I(x \in R_m)$$

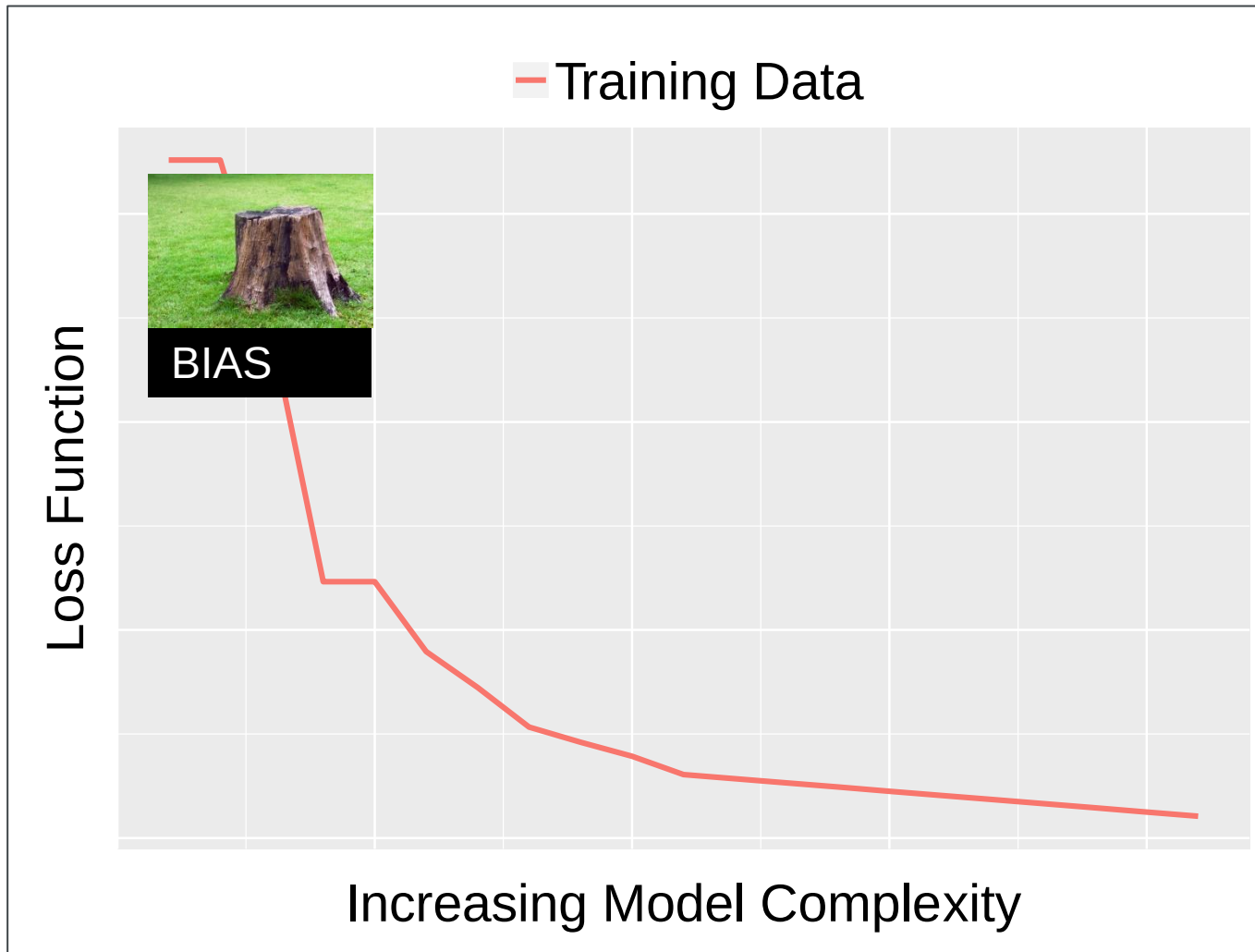
$$f(x) = \beta_0 + \beta_1 x$$



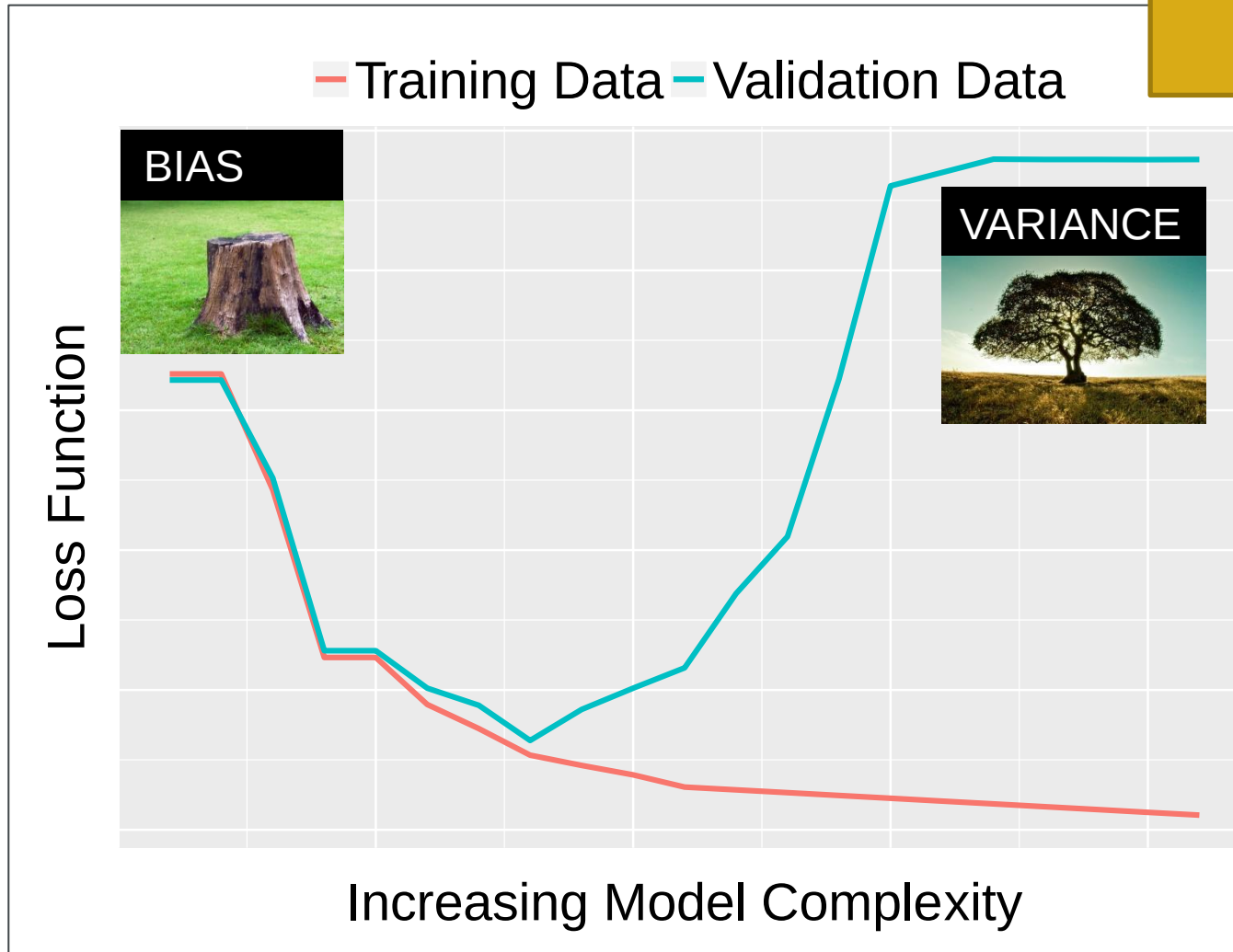
Hypothesis sets



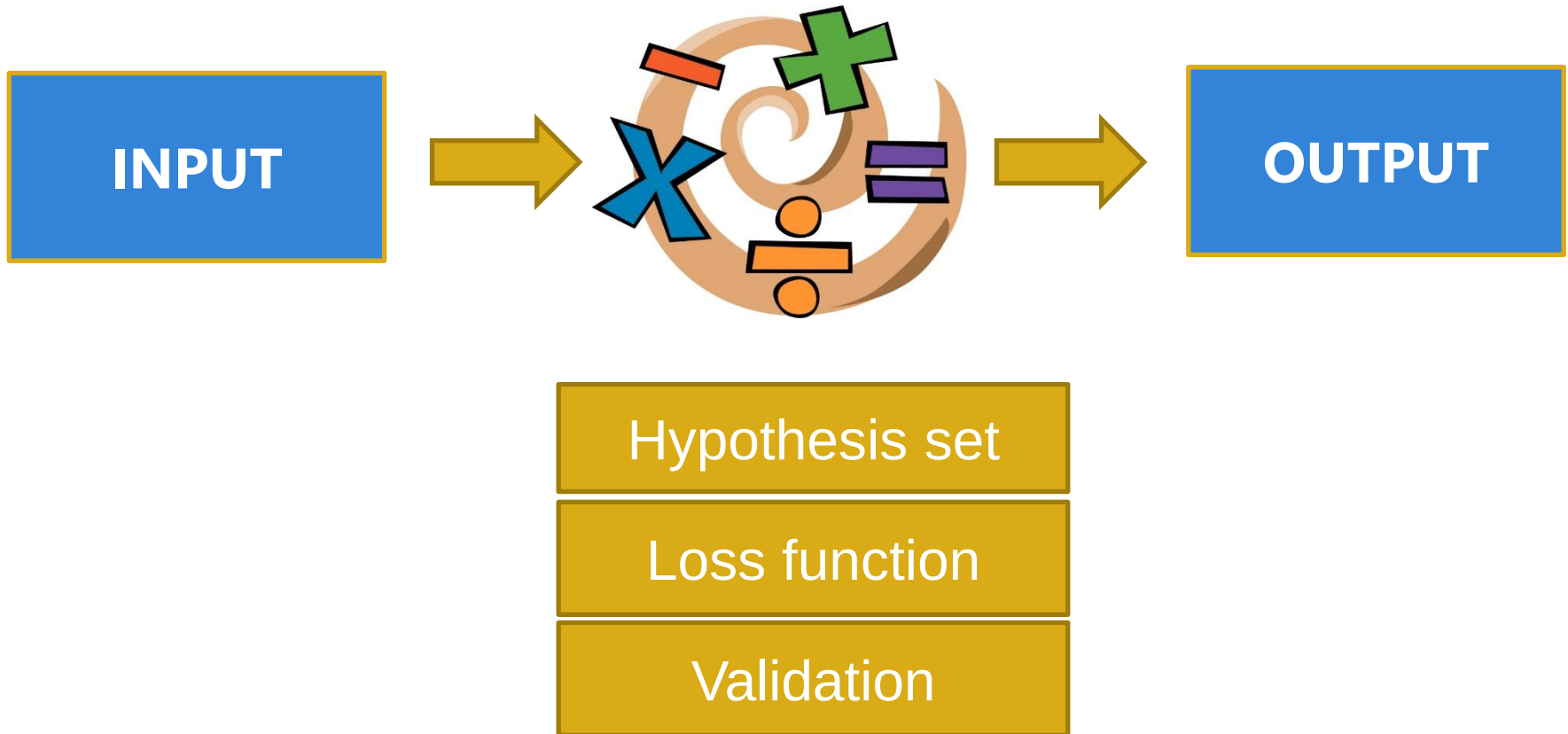
Finding the best function



Finding the best function



Putting it all together



Some questions...

What is a GLM?

Hypothesis set

Loss function

Validation

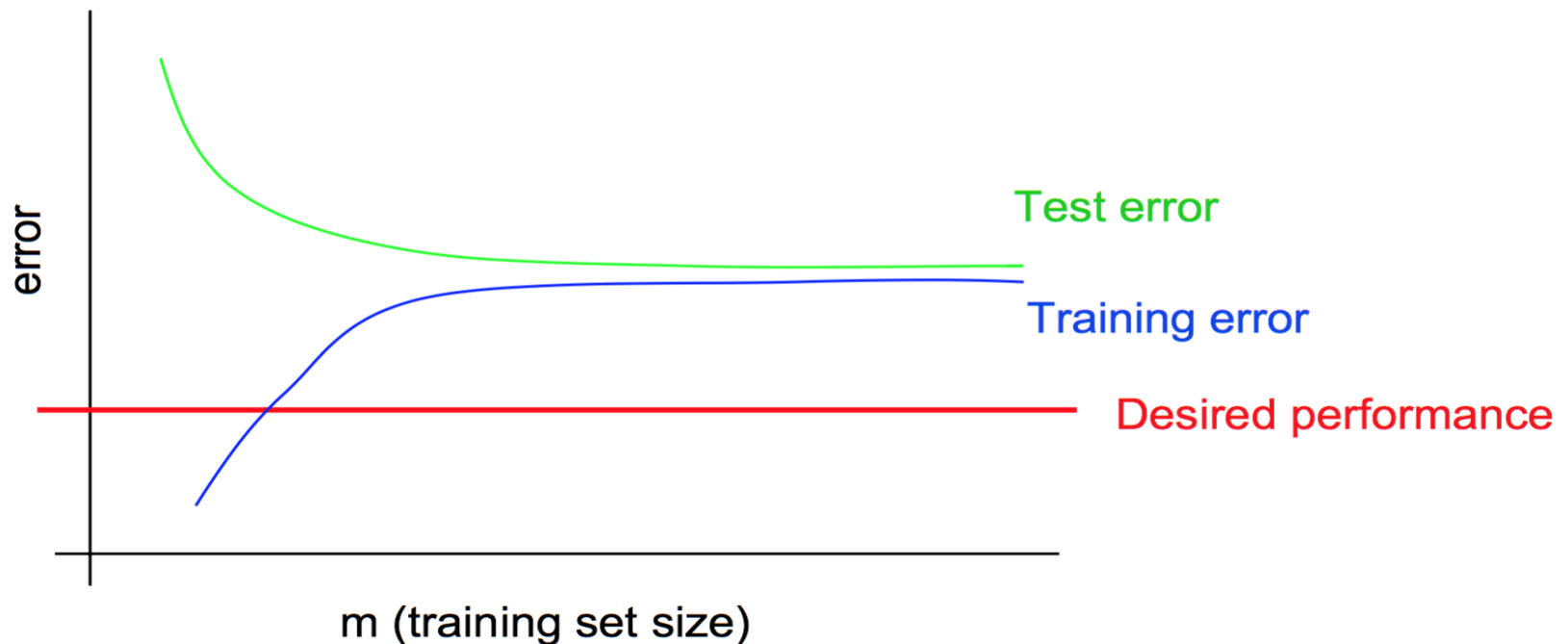
What is a chain ladder?



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Where next?

- Do we have enough data?
- How can we improve our models?
- Where is our time best spent?





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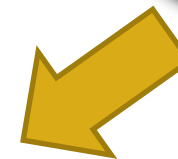
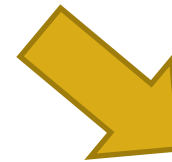
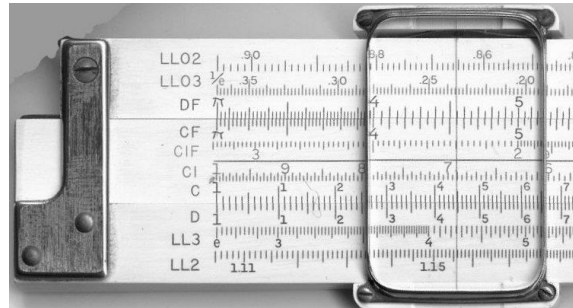
Is there still room for the actuary?

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ertise
ponsorship
Thought leadership
Progress
Community
Sessional Meetings
Education
Working parties
Volunteering
Research
Shaping the future
Networking
Professional support
Enterprise and risk
Learned society
Opportunity
International profile
Journals
Support

Is there still room for the actuary?

- Education
- Ethics and social responsibility
- Model understanding and leadership
- Relevance of the control cycle



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Want to know more?

- Alex Marcuson, Marcuson Consulting Ltd.

www.marcuson.co

- Alan Chalk, Machine Learning Solutions

www.machinelearningsolutions.co.uk



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Questions

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.



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Appendices

Image and other acknowledgements

1. Cover: <https://www.linkedin.com/pulse/machine-learning-ai-revolution-explained-crist%C3%B3bal-esteban>
2. The invaders have superior weapons:
3. “It was a viciously sharp slice of mango” – Blackadder Goes Forth, Episode 6.
4. Deliveroo: http://www.postadsuk.com/bicycle-couriers-wanted-deliveroo-london-student-amp-graduate_893629-60.html
5. You have been logged off:
https://www.google.co.uk/search?q=settlers&biw=1280&bih=657&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiC7dvy5ozPAhUkCcAKHQq-BzIQ_AUIBigB&dpr=1.5#tbm=isch&q=blank+computer+screen&imgsrc=j1p0V1XqJVGKtM%3A
6. Einstein: <https://www.psychologytoday.com/blog/the-bejeezus-out-me/201405/how-do-you-spell-g-e-n-i-u-s>
7. Zaphod Beeblebrox: <http://www.neatorama.com/tag/Zaphod-Beeblebrox/>
8. Ostrich: Getty Images
9. Lewis Hamilton: commons.Wikimedia.org
10. Audience: <https://blogs.gnome.org/muelli/2013/01/talks-at-foss-in-2012/>
11. Psychedelic art: <http://sahas-hegde.deviantart.com/art/Psychedelic-Chakras-278300086>
12. Donald Trump: www.darkpolitricks.com
13. Hillary Clinton: www.scrapetv.com
14. Trees in forest: <http://cdn.iflscience.com/images/56b469ae-94ae-5756-acf3-d866b3a313cb/large-1464367294-2170-how-many-trees-are-there-left-on-earth-more-than-3-trillion-finds-major-new-study.jpg>
15. Stump: <https://enlightenme.com/5-reasons-need-stump-removal/>
16. Slide rule: commons.Wikimedia.org



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