Machine Learning in Medical Applications

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A New Interpretation of Information Rate

By J. L. KELLY, JR.

(Manuscript received March 21, 1956)

If the input symbols to a communication channel represent the outcomes of a chance event on which bets are available at odds consistent with their probabilities (i.e., "fair" odds), a gambler can use the knowledge given him by the received symbols to cause his money to grow exponentially. The maximum exponential rate of growth of the gambler's capital is equal to the rate of transmission of information over the channel. This result is generalized to include the case of arbitrary odds.

Thus we find a situation in which the transmission rate is significant even though no coding is contemplated. Previously this quantity was given significance only by a theorem of Shannon's which asserted that, with suitable encoding, binary digits could be transmitted over the channel at this rate with an arbitrarily small probability of error.

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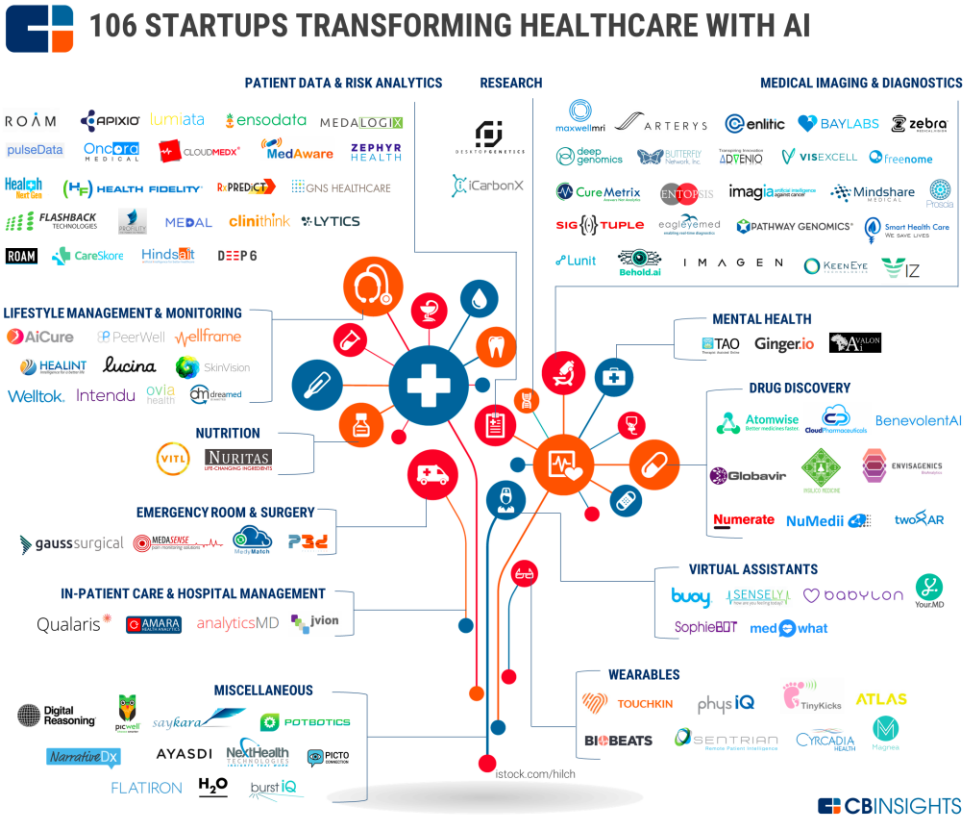

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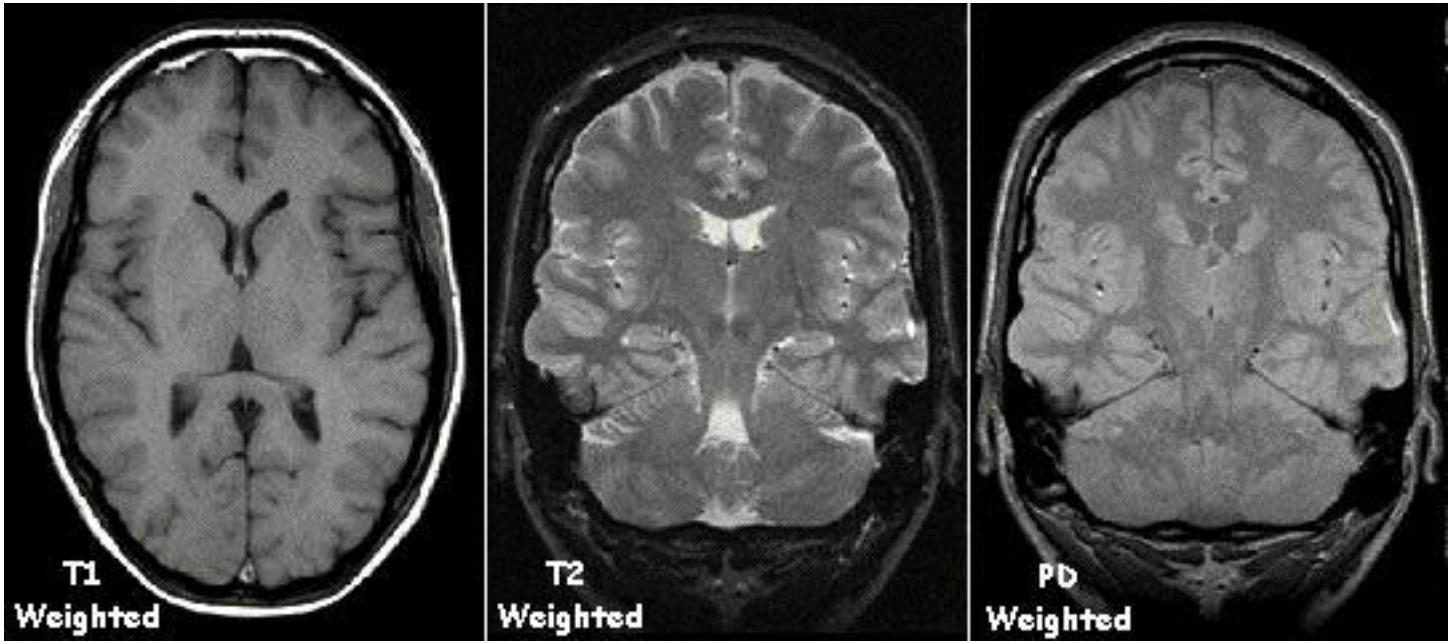

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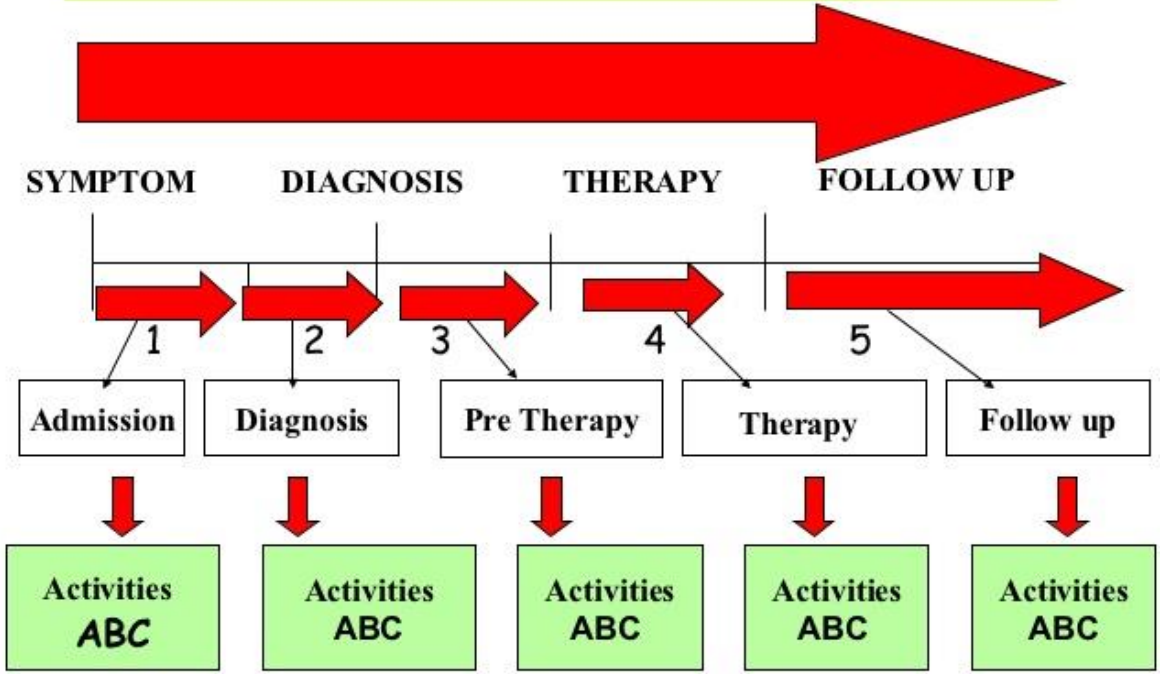
CLINICAL PATHWAY



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Diagnosis
vs. Prognosis

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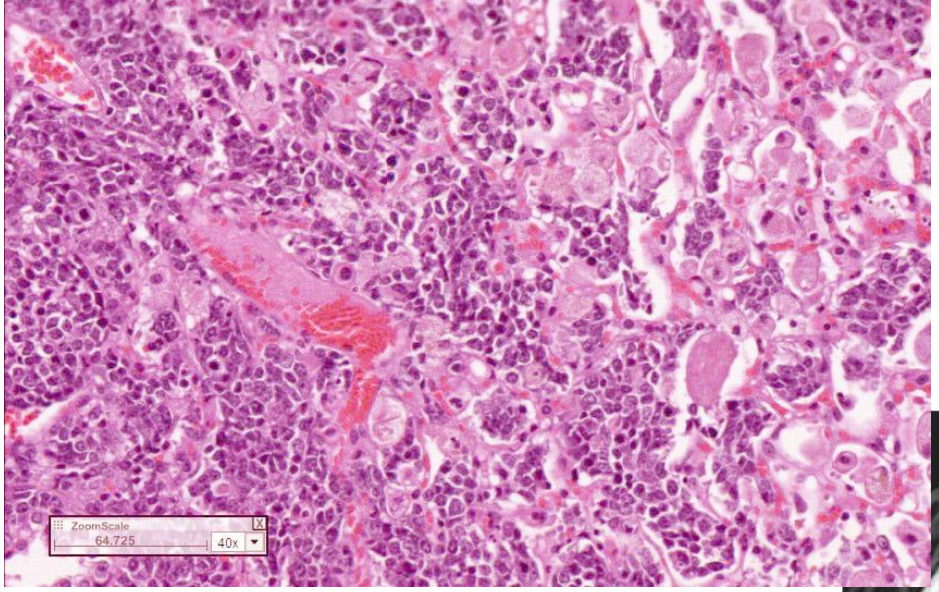

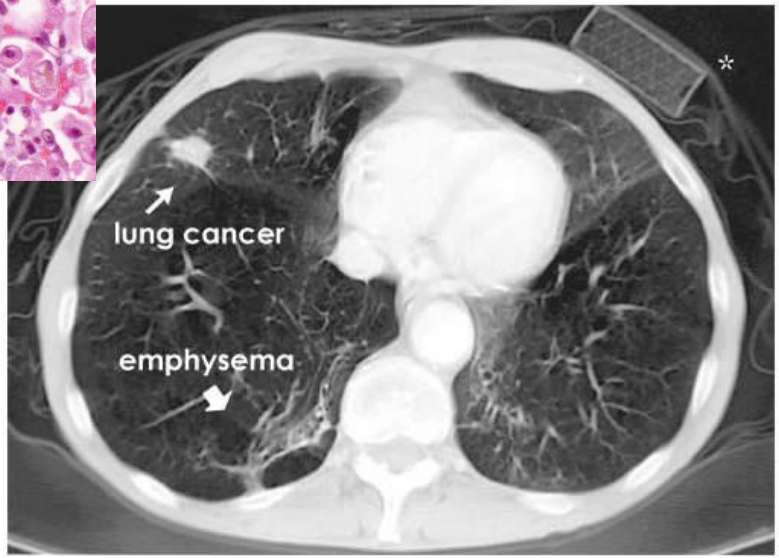

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"Bizarre is good! Common has hundreds of explanations. Bizarre has hardly any."

Dr Gregory House

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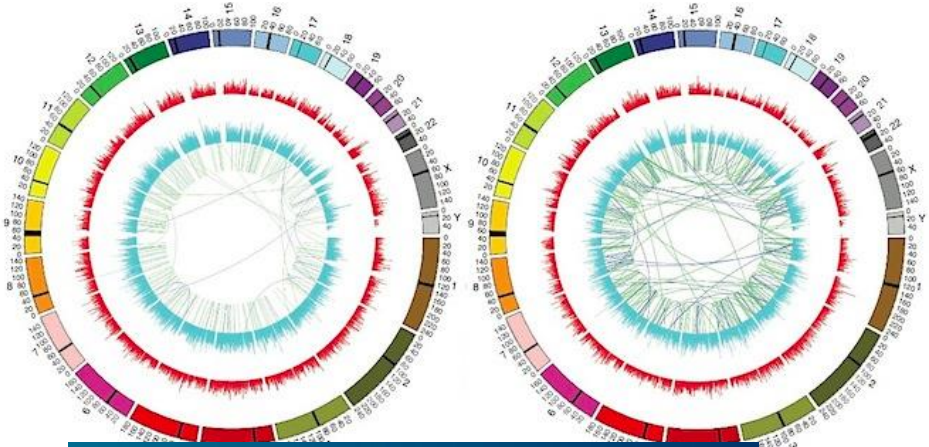

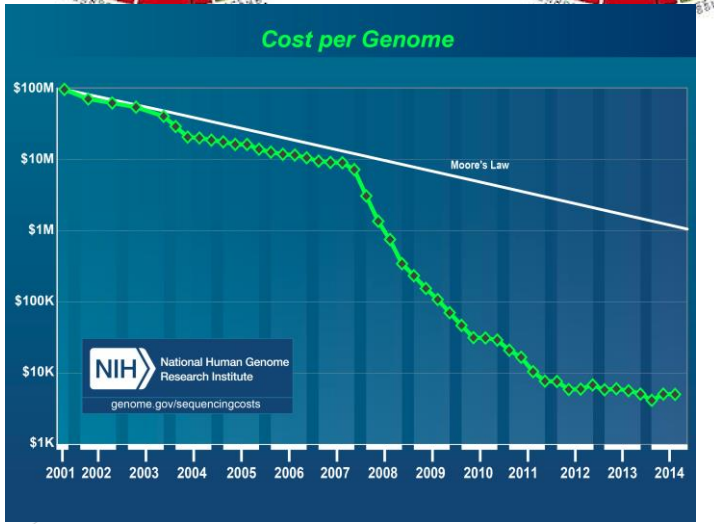

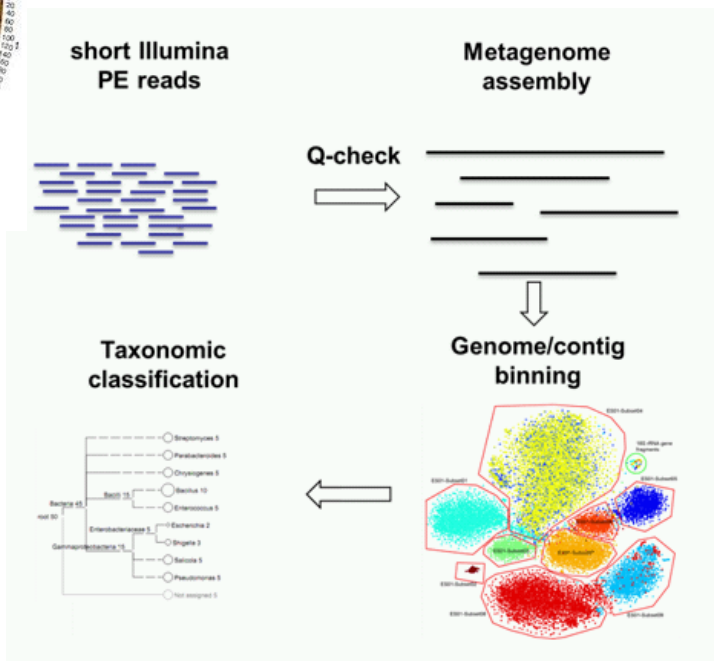

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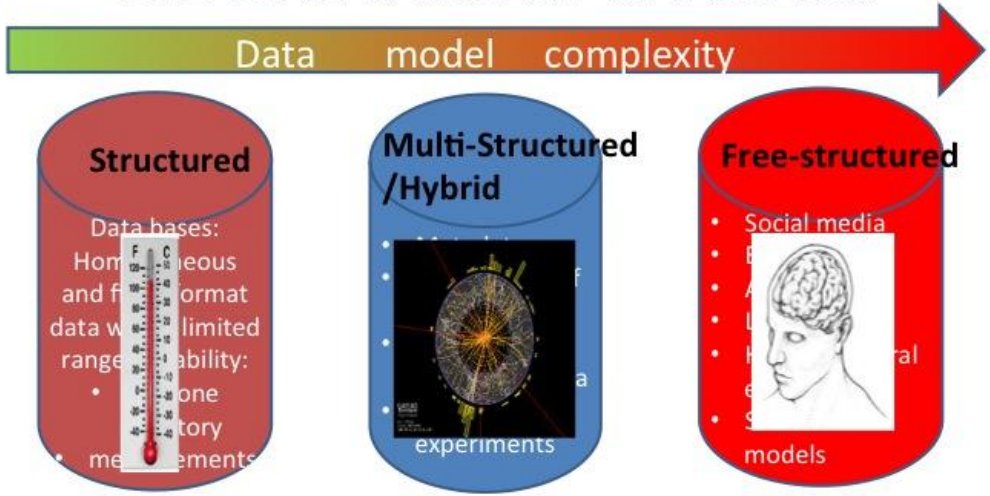
BIG DATA: not all the same:



- Data model fixed
- Small parametric space to represent the data
- Prevalent deduction based analysis

- Data model evolving with data
- Variable parametric space
- Data driven induction and deduction

- Data model evolving with experience
- morphing parametric space
- Analogy based induction and deduction

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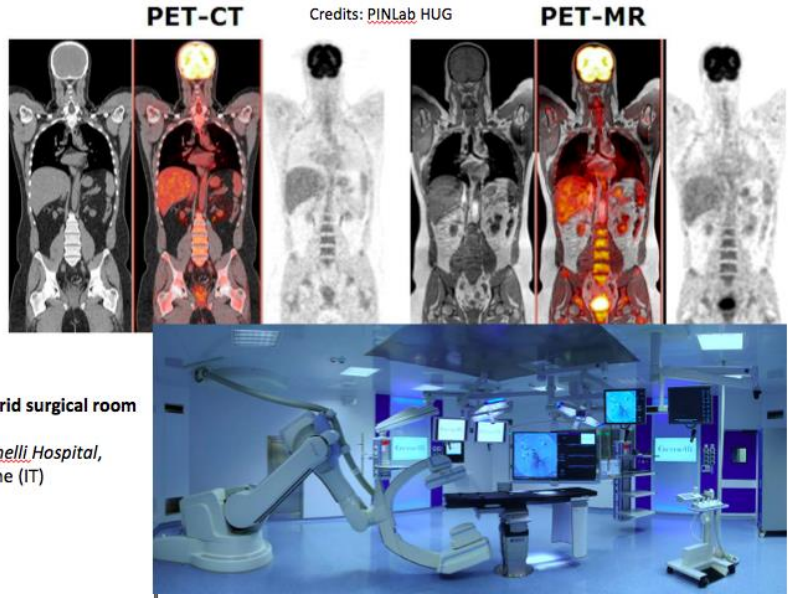
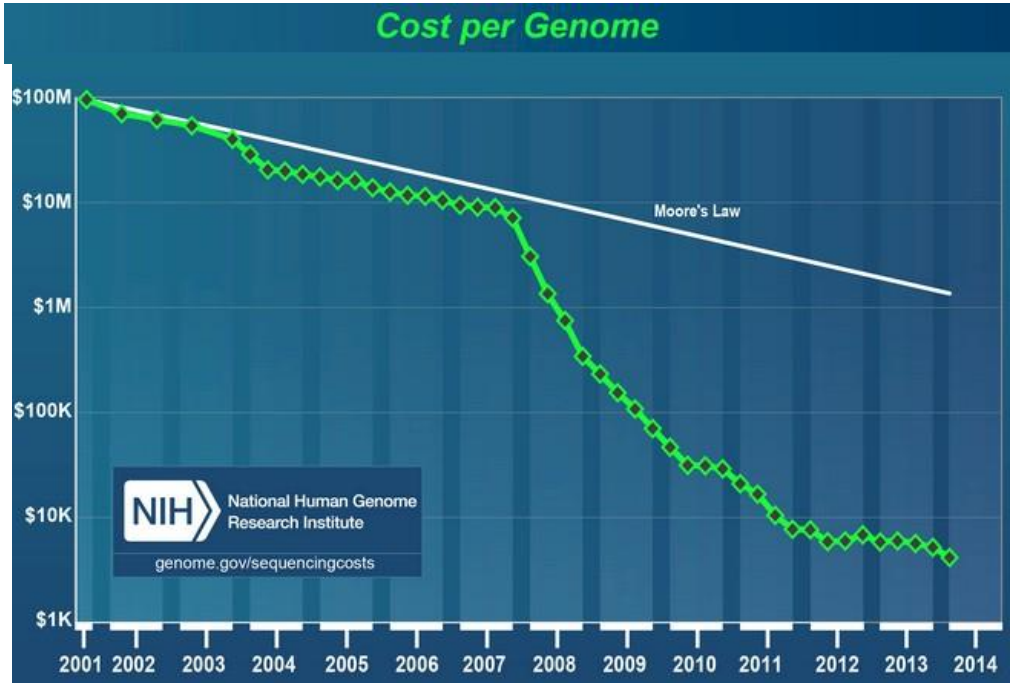
Augmented vision in the operating room



Hybrid surgical room

Gemelli Hospital,
Rome (IT)



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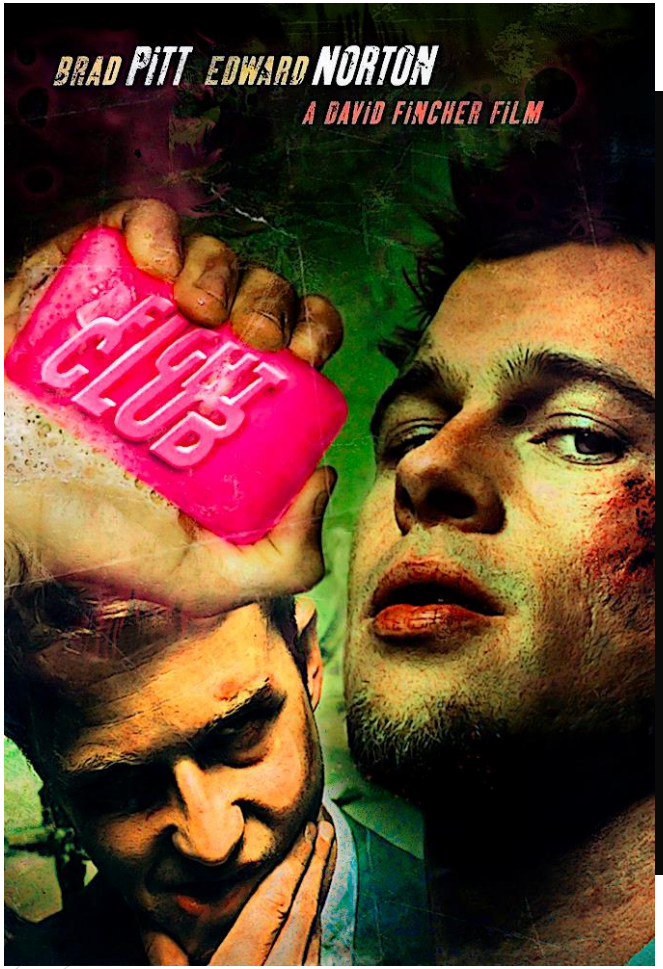

"Prediction is very difficult,
Especially about the future."

Niels Bohr (1885-1962)
Father of quantum physics

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