INDECISION – FUN VS. FORMAL
Fun

Is found data truly treasure?
Formal

\[ F(X) \]
Formal

$f(X)$

Algorithm

$X$

Possible Inputs, e.g. Data

Output, Performance Measure
Name This Researcher
Robert M. Haralick (S'62–M'69–SM'76–F'84) was born in Brooklyn, NY, on September 30, 1943. He received the B.A. degree in mathematics from the University of Kansas, Lawrence, in 1964, the B.S. degree in electrical engineering in 1966, the M.S. degree in electrical engineering in 1967, and the Ph.D. degree from the University of Kansas in 1969.
Goal: A full analytical model – inputs to outputs (perhaps a touch overstated, but not a lot)
Response: A full analytical model is not feasible. The space of inputs ill-defined in open world problems
Alas – Today We Often ...

performance measure per algorithm

Set of Algorithms

Black Box is the Dataset
This View Shown Right-side Up

$Y \quad G(Y)$

Set of Algorithms

Who jumps highest protocol

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVM-Snoopy</td>
<td>63.0</td>
</tr>
<tr>
<td>GSM-Calvin</td>
<td>69.0</td>
</tr>
<tr>
<td>Mine</td>
<td>73.0</td>
</tr>
</tbody>
</table>
Finally .. the Real Question

What are we trying to accomplish?

Here is a true story from ~2003 - slightly abbreviated:

Ross to Geof*:  *When is 73.0 versus 69.0 significant?*

Geof to Ross:  *Wouldn’t you rather know what contributes to changes in performance?*

Ross to Geof:  *Hmm, I hadn’t thought to ask, yes I would.*

*Geof Givens is the statistician who has worked as part of the CSU evaluation team for the past ten years.*
Beyond “Who Jumps Highest”

Run algorithm(s) on data & record outcome

Now build a statistical model linking domain covariates to algorithm performance

\[ F(X) \]

Statistical Model

\[ F(X) \]
Perils & Promise of Found Data

• Fundamentally, I am agnostic
  – Found or Collected, both could work …

• But
  – Found or collected,
  – getting beyond “Who jumped higher” is important!

• Example
  – FG 2015 Video Person Recognition Evaluation
  – What matter most for performance?
    • Setting (Sensor + Location + Action)