

Trent McConaghy

@trentmc0

Ocean | BigchainDB

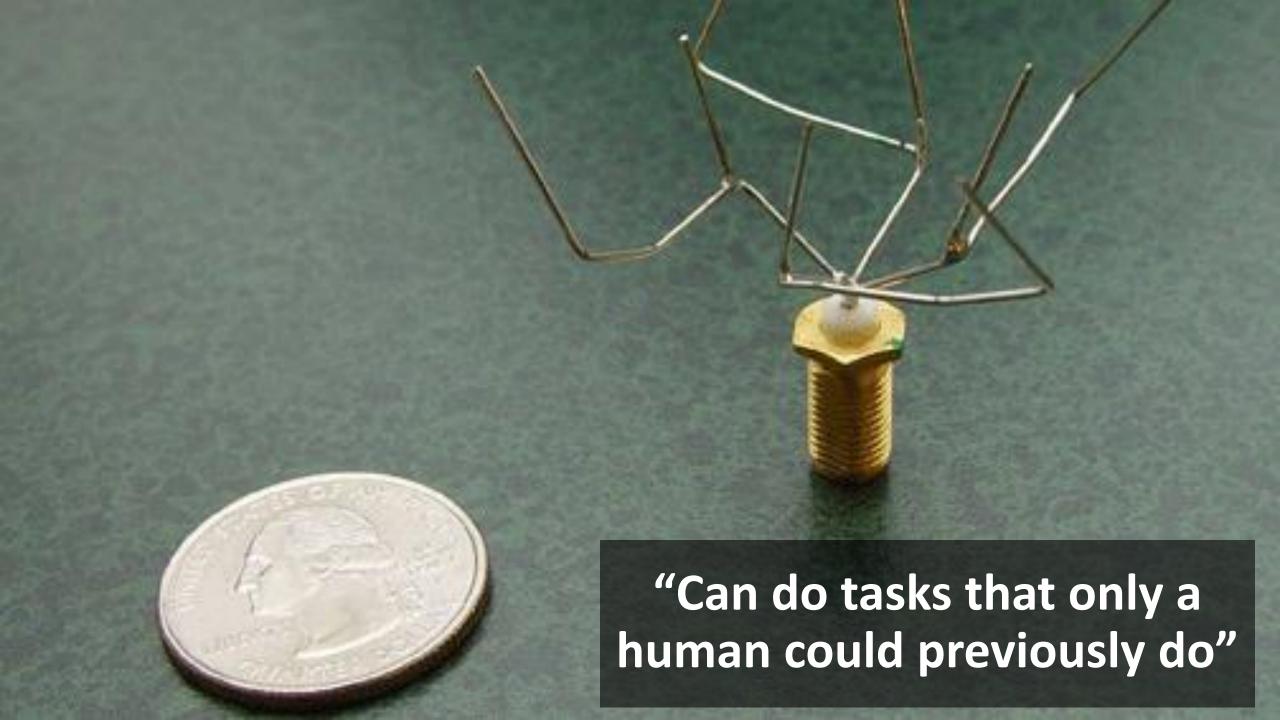


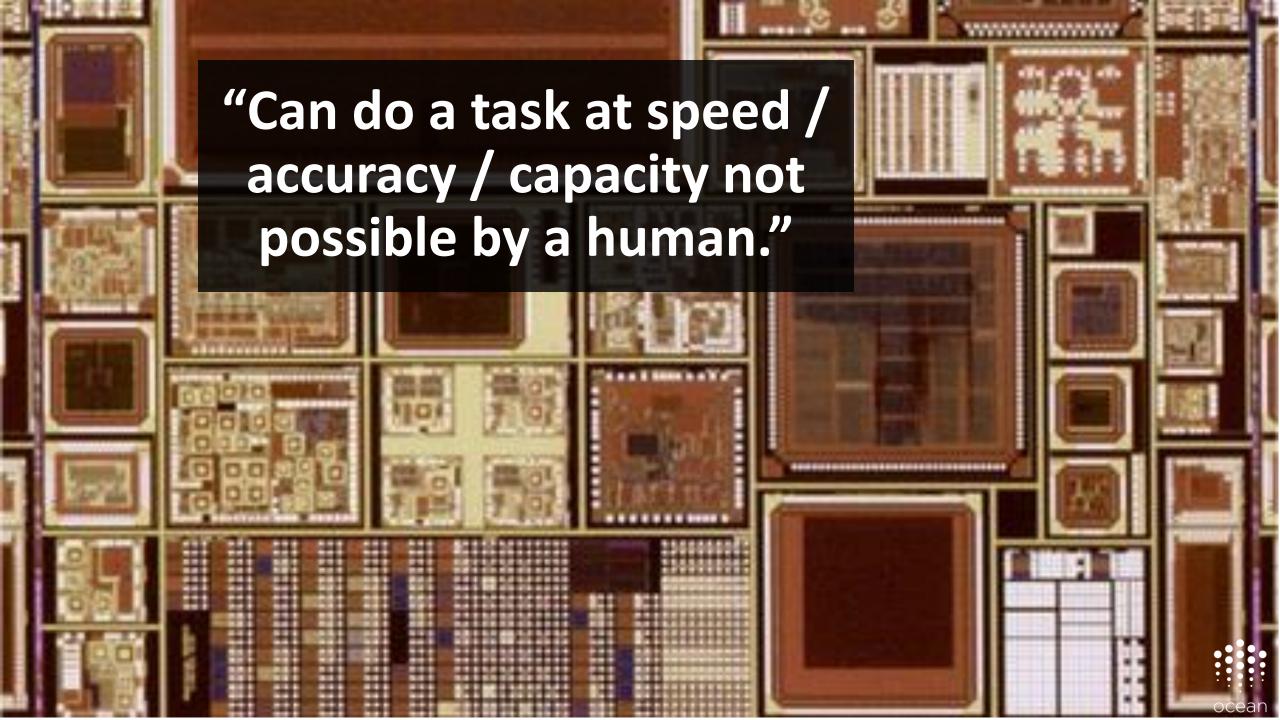




## "Replicates human cognitive behavior" [Turing test]

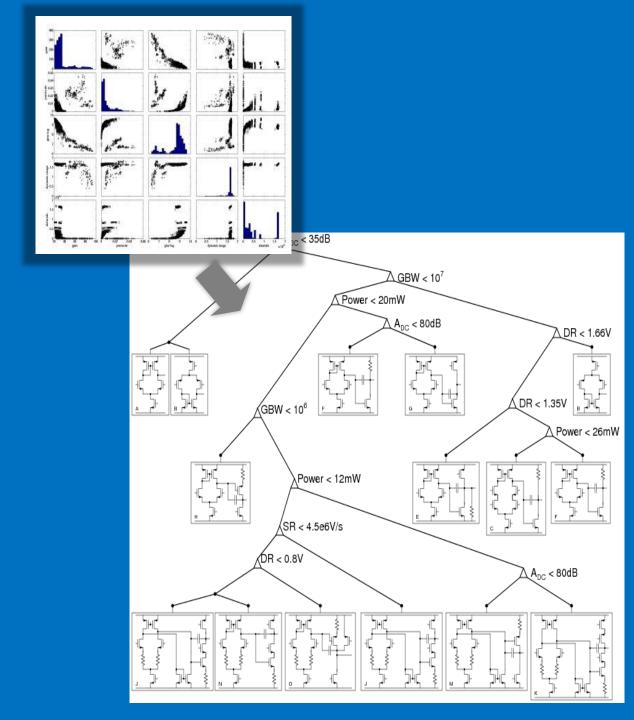






#### "A set of algorithms"

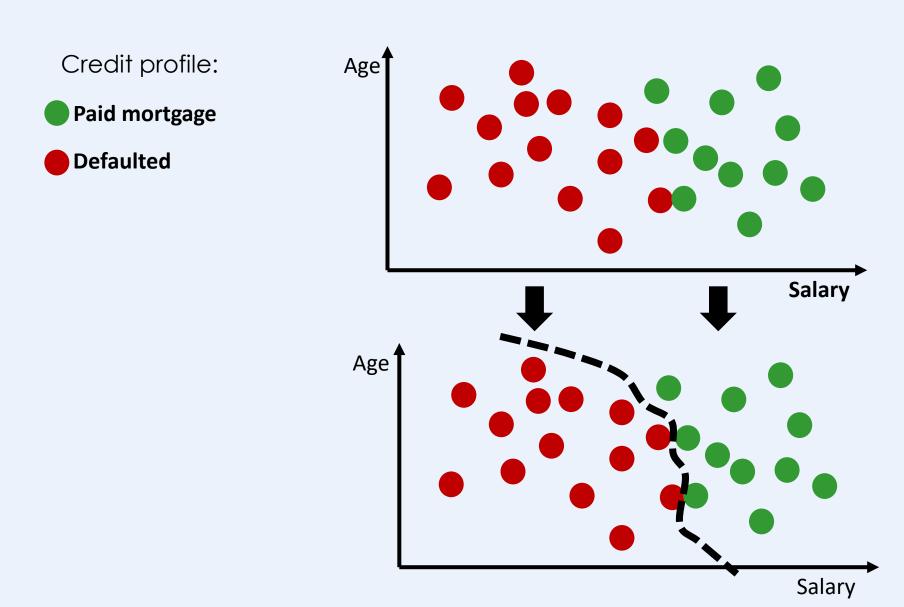
- Classification
- Regression
- Knowledge extraction
- Optimization
- Creative / Structural design
- •





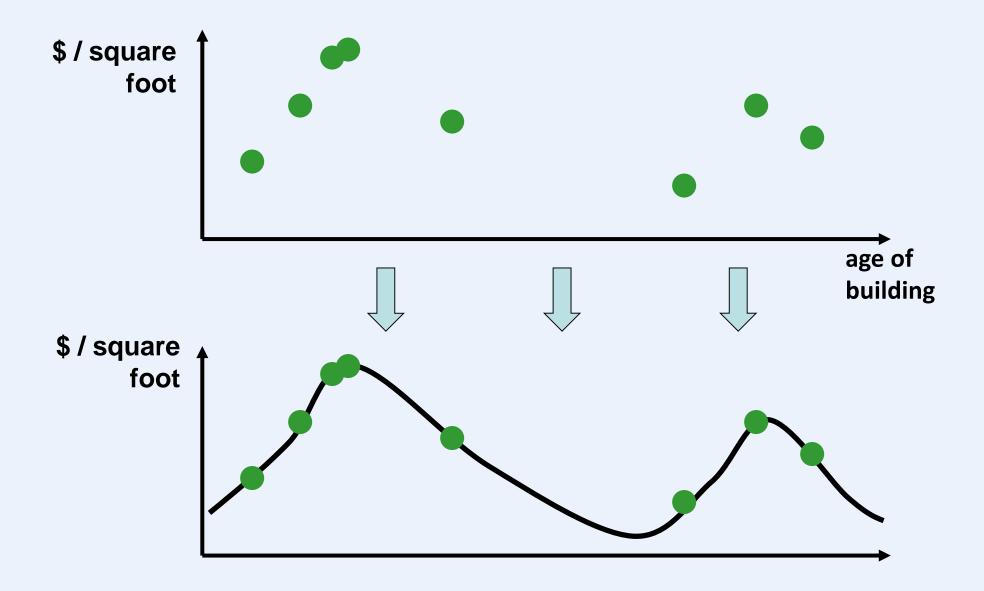
#### Classification, in 2D

#### Use case: mortgage applications



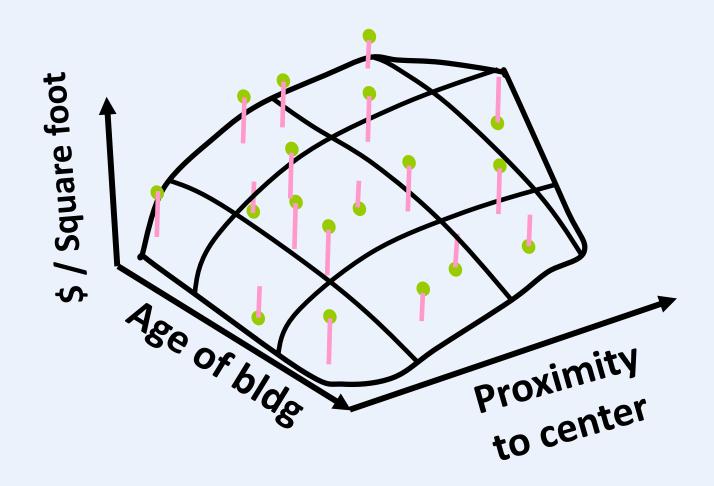


### Regression, in 1D

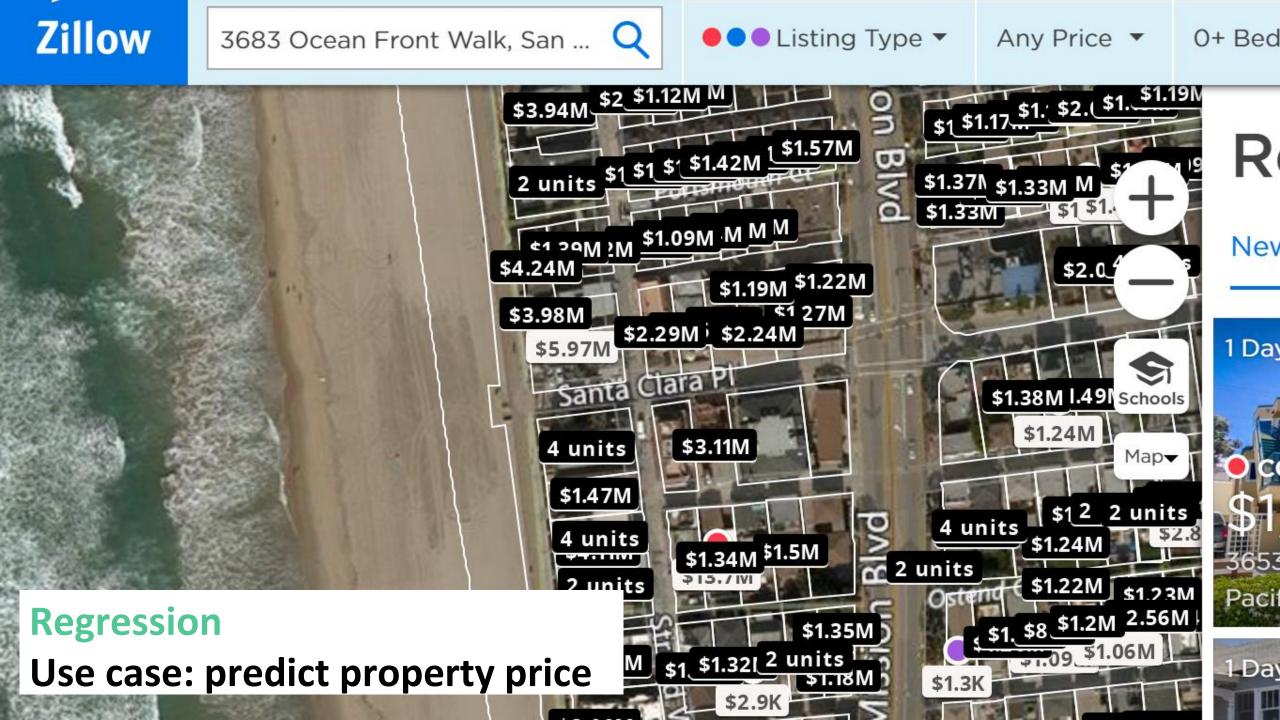


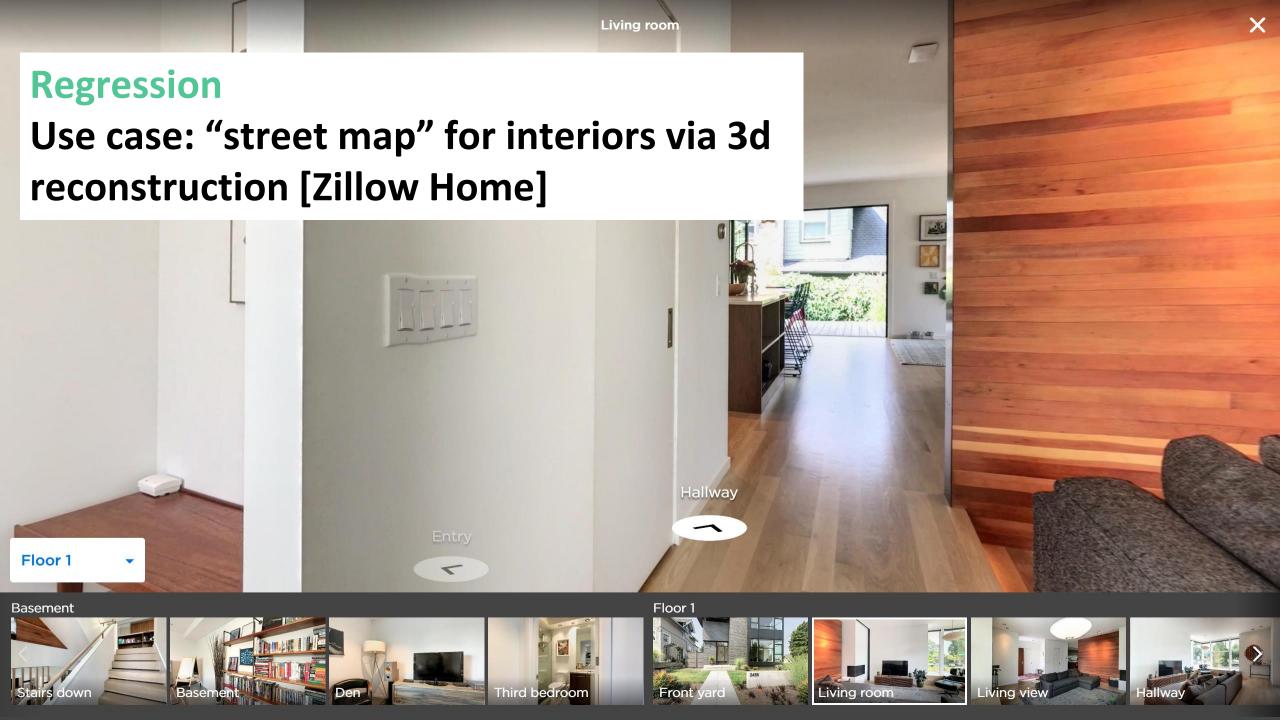


#### Regression, in 2D



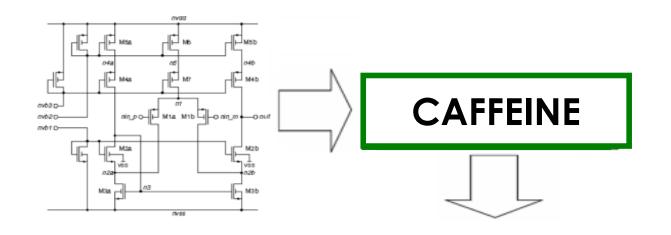






#### **Knowledge extraction**

#### Use case: closed-form equations for circuits [McConaghy]



Perf.	Expression
$A_{LF}$	-10.3 + 7.08e-5 / id1
	+ 1.87 * ln( -1.95e+9 + 1.00e+10 / (vsg1*vsg3)+ 1.42e+9 *(vds2*vsd5) / (vsg1*vgs2*vsg5*id2))
$f_u$	10^( 5.68 - 0.03 * vsg1 / vds2 - 55.43 * id1+ 5.63e-6 / id1 )
PM	90.5 + 190.6 * id1 / vsg1 + 22.2 * id2 / vds2
$V_{\text{offiset}}$	- 2.00e-3
$SR_p$	2.36e+7 + 1.95e+4 * id2 / id1 - 104.69 / id2 + 2.15e+9 * id2 + 4.63e+8 * id1
SR <sub>n</sub>	- 5.72e+7 - 2.50e+11 * (id1*id2) / vgs2 + 5.53e+6 * vds2 / vgs2 + 109.72 / id1

#### Genetic Programming Forecasting of Real Estate Prices of Residential Single-Family Homes in Southern California

Mak Kaboudan\*

#### **Knowledge extraction**

Use Case: closed-form equations for house prices

contains the best obtained GP equations. Equation (A1) below census tracts average home prices in Burbank are determined by

construction age (CA), real mortgage rates (RMR) lagged 3, 5, and 6 quarters, lot square footage (LSF), structure square footage (SSF), and average buying household income (ABHI).

#### **Knowledge extraction**

### Use Case: sensitivity analysis of variables to house prices

#### House Price Prediction: Hedonic Price Model vs. Artificial Neural Network

#### Visit Limsombunchai

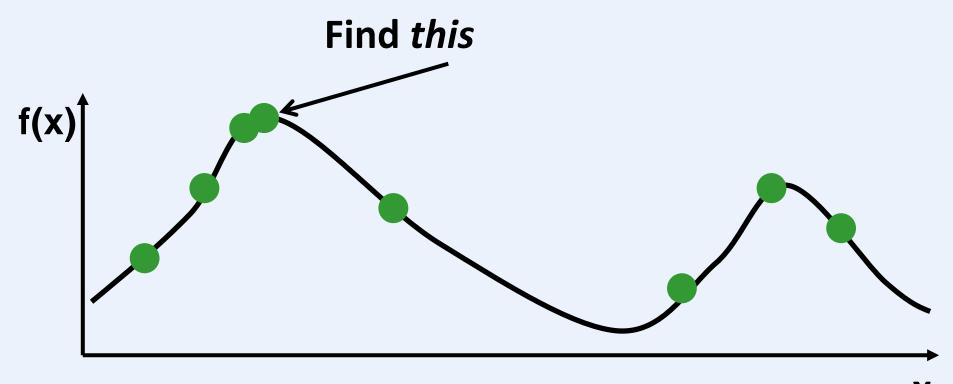
Commerce Division, Lincoln University, Canterbury 8150, New Zealand. e-mail: limsombv@lincoln.ac.nz

**Table 3: Neural Networks' Relative Contribution Factor** 

Eastan	Relative Contribution		
Factor	Model 1	Model 2	Model 3
LAND (L)	0.0879	0.1724	0.0608
AGE (A)	0.2231	0.0936	0.1804
TYPE (TY)	0.0766		
BEDROOMS (BD)	0.0649	0.0598	0.1749
BATHROOMS (BA)	0.0621	0.1206	0.0517
GARAGES (G)	0.1700	0.1615	0.1824
AMENITIES (AM)	0.0675	0.0355	0.1160
North Christchurch (NC)	0.0299	0.0747	0.0463
South Christchurch (SC)	0.0306	0.0639	na.
East Christchurch (EC)	0.0391	0.0453	0.0375
West Christchurch (WC)	0.0493	0.0788	0.0319
Northwest Christchurch (NWC)	0.0990	0.0940	0.1181
$R^2$	0.9450	0.9942	0.9378
	n = 160	n = 124	n = 36

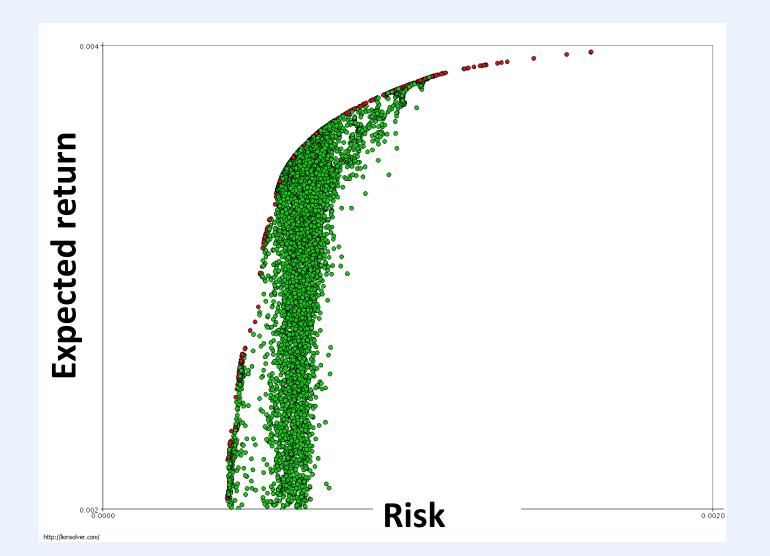
#### **Optimization**

"Find the x that maximizes f(x)"
(With as few evaluations of f(x) as possible)



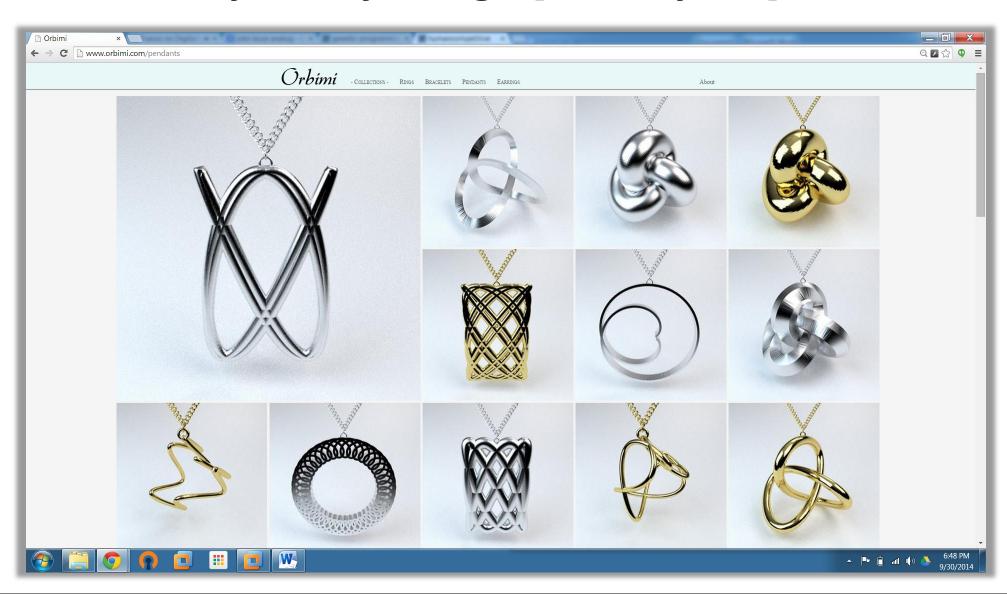
#### **Optimization**

#### Use Case: real estate portfolio optimization





### Structural Design // Machine Creativity Use Case: jewelry design [Hornby '11]

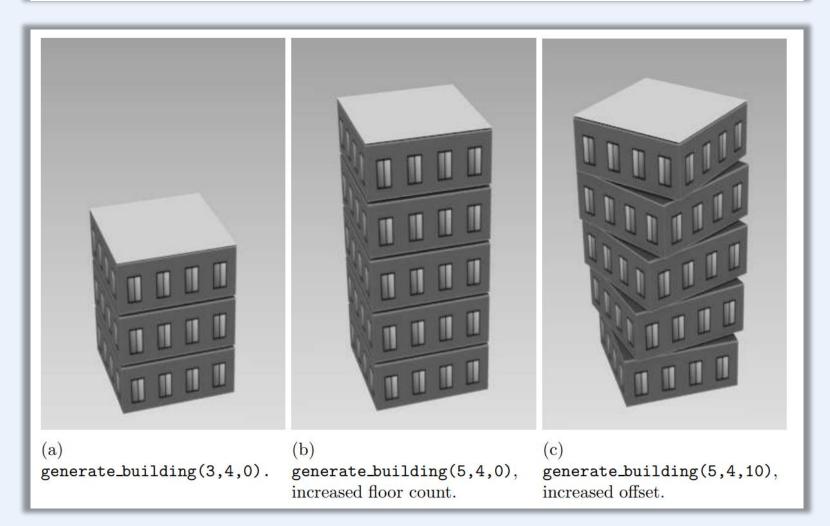


### **Machine Creativity:**

### **Architectural Design Exploration (1)**

Approaches to Evolutionary Architectural Design Exploration Using Grammatical Evolution

Jonathan Byrne

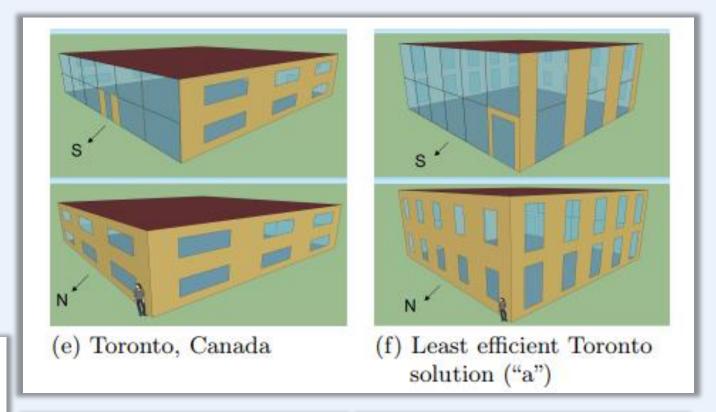


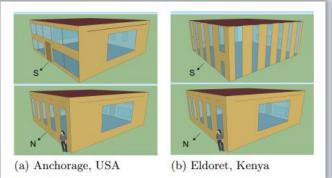
#### **Machine Creativity:**

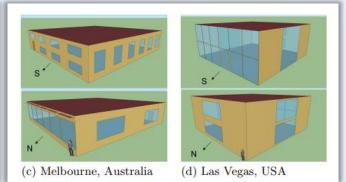
### **Architectural Design Exploration (2)**

Passive Solar Building Design Using Genetic Programming

Mohammad Mahdi Oraei Gholami and Brian J. Ross



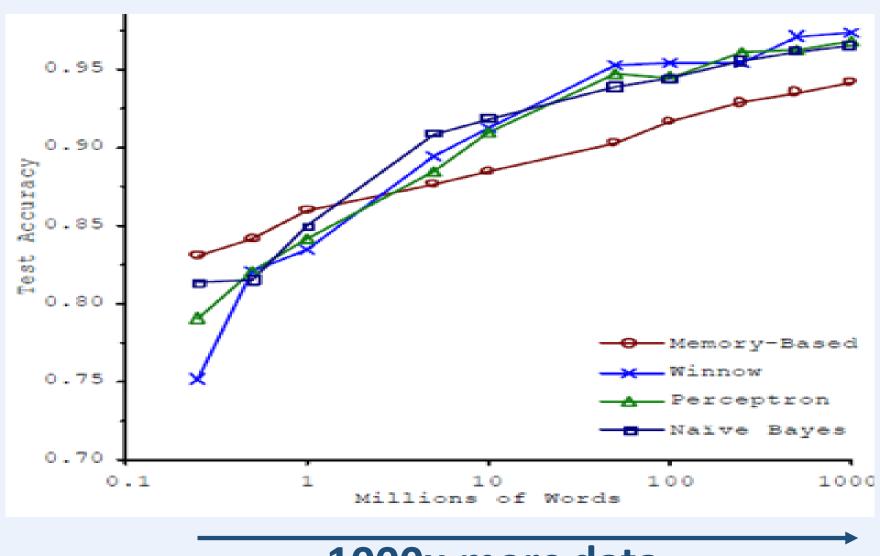




Top ranked solution for each location.



#### The Unreasonable Effectiveness of Data







Mo' data (and mo' compute)

Mo' accuracy





#### **Lawrence Lundy-Bryan**

@lawrencelundy

**Following** 

2/ Core problem - Siloed data with no economic incentive to share

2:35 AM - 3 Oct 2017



Have data

Have AI (Want data)

Have data

Have data

Have AI (Want data)

Have Al (Want data)

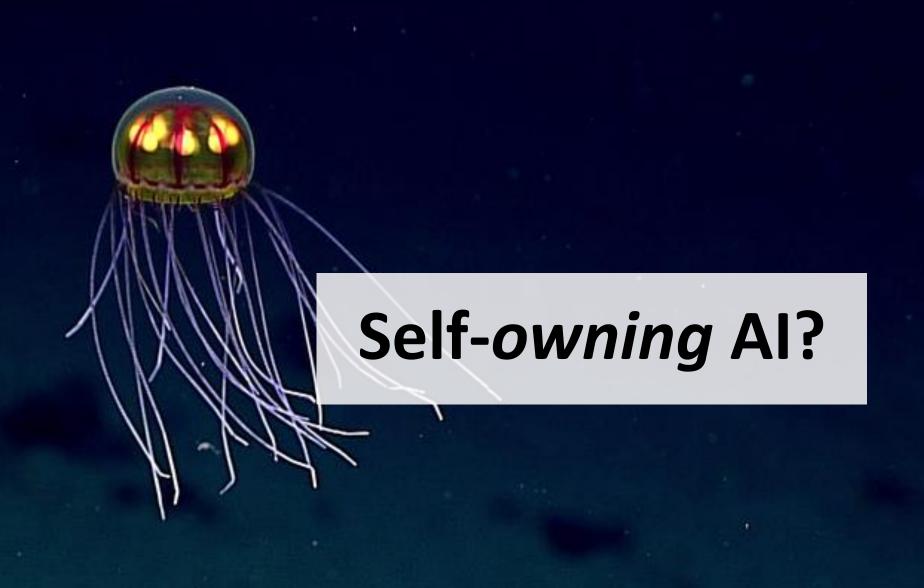
Have data

Have Al (Want data) Have Al (Want data) Have data

#### Data marketplace

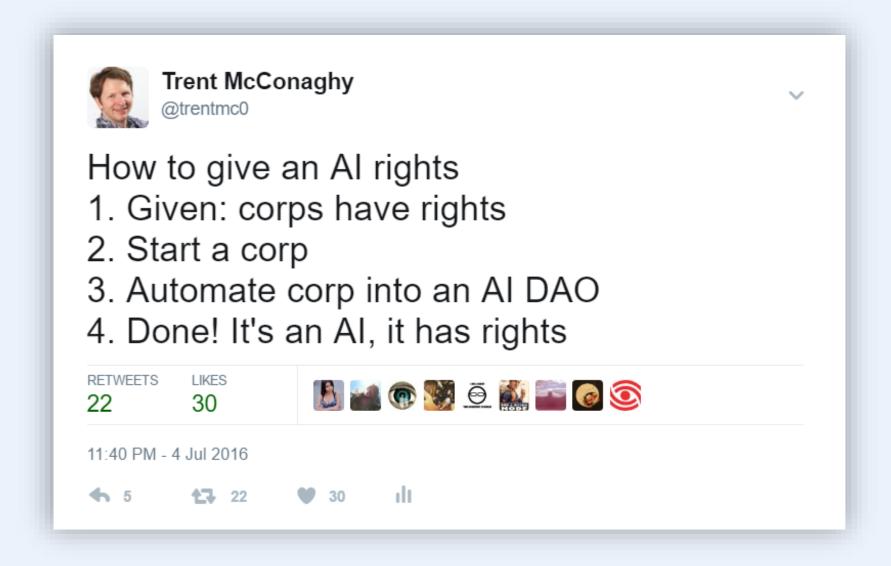


Have data	Have Al (Want data)	Have data	Have data	Have Al (Want data)			
Have Al (Want data)	Have data	Have Al (Want data)	Have Al (Want data)	Have data			
Data marketplace	DM	DM	DM	DM			
DM	DM	DM	DM	DM			
DM	DM	DM	DM	DM			
DM	DM	DM	DM	DM			
Substrate for 1000 marketplaces ====================================							



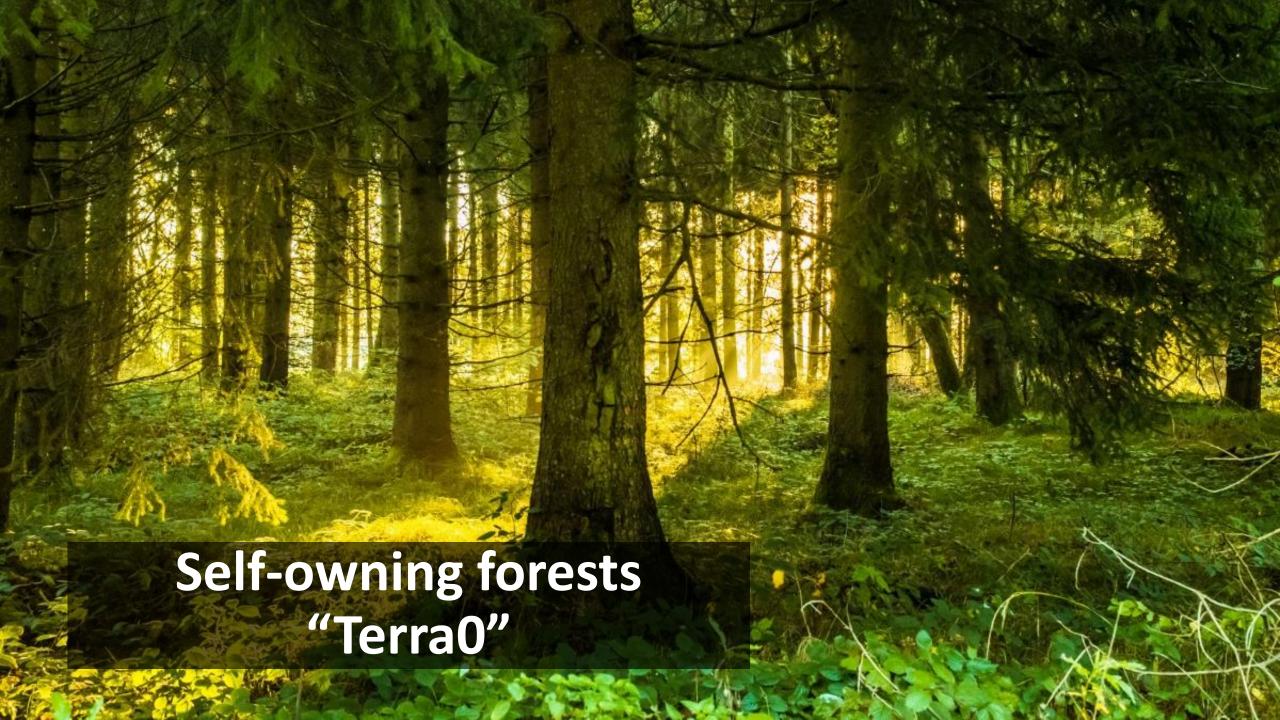


## Giving rights to Als Via Programmable Legal Entities (PLEs)









# Self-owning skyscrapers

Aka
"Create your own customer"...







# Al Yesterday → Today → Tomorrow Algorithms .. Data .. Self-owning

Property prediction, "street map" for interiors, creative building design, real estate data++, self-owning buildings

Trent McConaghy



