Human Friendly Computing:
Neural-like, self-organizing data and functions

Communicating with the Machine

Rocky Nevin, CEO/CTO DataSea Inc.
Before we communicate with a person we must communicate with the Machine

... improve!
Why do we have to do the work?

*We* must guide it to the next step

Von Neumann, c. 1945:

• *Paraphrased: Do things in steps, and tell me the address, and I’ll tell you what’s there.*
Why do we have to do the work?

Machines are simple: evolved from tabulators

- Tabular data structures
- Tabulating algorithms
  
  mov ax, 09

Evolution ("Intelligence")

**Procedural**  
**Speed, size**

**Coding**

**Neural-like**  
**Speed, size**

**Coding**

**Human**
* Humans ≠ Computers
* Language has evolved for a reason
“I know what I want, why can’t I just ask for it?”
Today’s Look: Clutter

- Pulldowns, decision-trees
- Fragmented data
Today’s Look: Hieroglyphs

Old Model
  • Late 1st Pharaonic Dynasty Hieroglyphs?

Which one represents “home”?
Today’s Look: Hieroglyphs

Old Model
• Late 1st Pharaonic Dynasty Hieroglyphs?
Four models of interaction

1) Follow Trees: pre-defined pull-downs (most app’s)

2) Intersection of sets: e.g. search engines

3) Neural Networks: optimization, processing layers

4) ‘Neural-like’ processing: DataSea
Four models of interaction: Trees

1) Follow Trees: pre-defined, pull-downs (most app’s)

   we learn and adapt
   Forced decisions
   many steps,
   islands of data

   ===> “Answer not found”, “Error”,
       “Operation not allowed”

2) Type our queries (e.g. search engines)
3) Neural Networks: optimization, processing layers
4) ‘Neural-like’ processing: DataSea
Four models of interaction: Intersections

1) Follow Trees: pre-defined pull-downs (most app’s)

2) Type our queries (e.g. search engines)
   Keywords, some Natural Language Queries only commands & new info
   Answers are ‘hits’ ... answers ... not enough!

3) ‘Neural Networks: optimization, processing layers
4) Neural-like’ processing: DataSea
Four models of interaction: N-Nets

1) Follow Trees: pre-defined pull-downs (most app’s)
2) Type our queries (e.g. search engines)

3) Neural Networks: optimization, processing layers
   Pattern recognition, not database
   Transformations
   "Hidden layer" ... unpredictable

4) Neural-like’ processing: DataSea
Four models of interaction: ‘Neural-like’

1) Follow Trees: pre-defined pull-downs (most app’s)
2) Type our queries (e.g. search engines)
3) Neural Networks: optimization, processing layers

4) ‘Neural-like’ processing: DataSea

Data and Input --> neural-representation (fused, stateful)
Queries + commands + new info
Precise, explained answers
Context
Today’s methods: Why so brittle?

Relational Databases: - fast, but not highly connected

*Inferencing is hard!*

“What is the beast’s name?”

<table>
<thead>
<tr>
<th>Thing</th>
<th>Name</th>
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<tbody>
<tr>
<td>robot</td>
<td>Gort</td>
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<tr>
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<td>Tally</td>
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<tr>
<td>planet</td>
<td>Earth</td>
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<td>...</td>
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Today’s methods: Query Expansion
What is the beast’s (cat’s?) name?

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Table: Aliases

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<td>animal</td>
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<tr>
<td>dog</td>
<td>canine</td>
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<tr>
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<td>beast</td>
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Select Name from Names where Creature='beast'
plus
Select Name from Names where Creature in
(select Word from Aliases where Alias='beast')
plus
Select Name from Names where Creature in
(select Word from Aliases where Alias in
(select Word from Aliases where Alias='beast'))
“I know what I want, why can’t I just ask for it?”
DataSea’s Query Expansion: automatic

“what is the beast’s name?”

Tally, is Name

Associative Memory ... Single Network
Today’s methods: Query Expansion
What is the beast’s (cat’s?) name?

Need to automatically:

1) Look further than one link
2) Treat 3 inferences in the same way as 1
3) Avoid ‘query-explosion’
Object Reusability, Data integration ... just connect them up?
Object Reusability, Data integration ...

just connect them up?

rather complex
Object Reusability, Data integration ...
& Brain Transplants:
just connect them up?
rather complex
Biology

Immune system, Protein ‘lock and key’ model

rather complex
Fitting together?

**Biology**

*Immune system, Protein ‘lock and key’ model*

*complex … But biological systems are self organizing*

*Self-organizing => don’t need to know details*
Self-organizing: The Solution?

Self-organizing data

New Input

Self-connecting

Self-organizing => don’t need to know details
Self-organizing: The Solution?

Are Operations different from Data?
Are Operations different from Data?
Data & Operations merge
Self-organizing: The Solution?

Self-organizing data and operations

New Input

Self-connecting

Self-organizing => don’t need to know details
Self-organizing: The Solution?

Self-organizing data and functions

Self-organizing => don’t need to know details
Neural-like network of fused data
DataSea Network

Processing ...

Input
DataSea Network

Answers pulled from network

Output

Input
Fusion ...

- Entire network accessible
  *you can get there from here*

- Immediate influence from new info

- Inferencing
Reduces ...

- difficult UI navigation
- multiple, precise steps & decisions
- False negatives (null intersection)
Multi-Source, Multi-modal:

**Inputs**
- Google: web and Desktop
- Corporate Repositories
- MS Office: Excel/Word/Outlook
- XML/HTML
- SQL-RDBMS
- Applications
- Thesaurus
- Voice & Text Notes

**Outputs**
- DataSea Assimilation
- VoIP
- Voice
- PDA
- Computer
Tricky Parts Solved

How to:

Represent data and functions
→ self-organizing, neural-like network

Process the network
→ simple algorithms

Package answers
→ extract activated elements, reassemble
Integrating with the Real World

Upload Files
  AddressBook, SpreadSheets, Text, HTML

Crawl Relational Database

Customize GUI for application specific needs
Typed inputs work  ==>  Voice (w/ VR) works ...

- Microphone & speakers in house
- DataSea behind VR

**Example**

- Audrey!  *(starts listening)*
  yes? ...
- What is Linda’s cell?”
  ‘Linda’s mobile is  (604)9xx-yyy
- Call her and say Hi, I’ll be late for the meeting.
  ‘calling (604)9xx-yyyy with the message ‘Hi, I’ll be late...’
- Thank you
  you’re welcome.  *(stops listening)*
Point of View ...

Data Modules

Load Another User's Data, run a query:

→ see the world *from their Point of View*
Application ...

Product 1:
Salesforce.com plugin (beta)

Gives:
- Single-Step
- Query expansion
- Actions
SF: Current method: failures, # steps
Finding accounts and contacts in Chicago

1) Search, Chicago –> fails ... null answer
2) Click Advanced Search,
3) Select Find All,
4) Type: Chicago
SF: DataSea; one step, richer response
Finding accounts and contacts in Chicago

1) “show Chicago”
SF: Current method
Calling the contact for Grand Hotels

1) Search,
2) Detail Page,
3) contacts-DetailPage,
4) place call: dial, wait, speak
Time: 2+ minutes
1) “show Grand Hotels”
2) “call Tim Barr and say Hi Tim, I’ll be there at noon, sorry for delay.”
Time: 0.5 mins

SF: DataSea’s method
Calling the contact for Grand Hotels

Prior-input: **CALL TIM BARR**

Say 'execute' to _CALL_ 312-596-1000 [Phone]. The message is: Hi Tim, I’ll be there at noon, sorry for the delay.
Costs: (US/Canada) is $0.025 per minute, your phone (6049885975, US/Canada) is $0.025 per minute. Your current balance is $0.8.
312-596-1000, is Phone

**Execute _CALL_ 312-596-1000 [Phone]**
Applications:
- Salesforce.com (beta)
- Personal Assistant
- Corporate DB/Knowledge-base
- Corporate web portal
- Identity Sharing
- Home Voice companion (prototyped)
- Business Portal (design)
- Intelligence community
Broad Applicability

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Evolution of Search and Actions

- Traditional systems
- Neural-like
- DataSea
- Human

Evolution ("Intelligence")
DataSea Assimilates, ‘connects the dots’
Summary

Technology:
- Highly-connected
- Fused, cross-domain data
- Self-organizing

Results
- Inferencing & query expansion
- Natural Language I/O
- Plugin data (‘knowledge modules’) and functions
Contact Us

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SalesForce DataSea Plugin
Pending SFDC Appexchange certification