Next Generation Cognitive Overload

- Overwhelming amount of information
- Rapid Decision-Making and Instant Execution
- Required Collaboration

Emergency Response and Disaster Management

Air Traffic Control

Intelligence Analysis

Cyber Security and Warfare
Start of an attack...

- 2 systems are compromised. Both systems are coordinating malware.
- IP reputation (generated from SRI’s Malware Threat Center) searches help understand origin of attacks.
- Network admin must locate the machines, inform the users, and remove the machines from network.
- All the while keeping track of what the malware is up to...
Start of an attack...
Attack gains momentum...

Within minutes about a dozen systems are compromised.

7 Different types of malware are spreading through the network.

Number of dialog events, infection profiles and alerts are starting to grow...
Attack reaches its pinnacle...

Reality is **FASTER** than you can think or act.
The N/W admin must deal with...

- Rank Compromised Systems
- Identify Vulnerability
- Fix Vulnerability
- Locate and Notify End Users
- Restructure Network
- Provide Status Updates
- Coordinate with other N/W Admins
The Future of Cyber Operations

Right Amount of relevant information and controls

At the right time

At the right place

Cognitive Overload

Overwhelming amount of information

Rapid Decision-Making and Instant Execution

Required Collaboration
Key Insight: System must anticipate what users should do next – and make their next steps efficient

Technical Approach: *Learned Models of User Intent*

bRIGHT learns

- Situation- and user-dependent filtering
- Task automation, UI pre-positioning
- Shared context models

Cognitive Overload

- Overwhelming amount of information
- Rapid Decision-Making and Instant Execution
- Required Collaboration
bRIGHT Approach

Engineer a ‘user-experience’ using the visualization framework then capture the user’s reaction to it using the observation framework.
Email Example

Semantic Wrapper

Application

SendMail (sender, receiver, subject, body, attachments, time)

Mail from sender on subject with body

bRIGHT Manager

Model of user interactions

Model of what’s on the screen

Context Model

Who sent me this document?

What emails had I read at that point?

What was I looking at?

What did I do next?

Observation / UI Layer

Interest/Intent Model
Cognitive Indexing

bRIGHT’s cross-application and cross-context reference system

Where
• Was I?
• Were my Documents?

Who
• Sent me this document?
• Was I with?

What
• Was I looking at?
• Applications were running?

When
• After Grit sent me this email?
• Did I learn this task first?

What is the document that Grit sent me about a month ago that I edited and sent to Pat along with an Excel Spread sheet?

What IP Address was Phil accessing when he sent me this email about the attack at Menlo Park?
bRIGHT Research Road Map

Next Generation HCI Hardware
bRIGHT Framework and Applications
bRIGHT Desktop and Applications
Learning Tasks by Demonstration
Short Term Memory Model
Cognitive Indexing
Interest Prediction + Contextual Filtering
Cognitive Auto-Fill
Learning Tasks by Observation
Task Automation
UI Prepositioning
Cognitive Desktop
Collaborative Cognitive Model

We are here
A New Human–Machine Interaction Paradigm

• sri.com/bright
• Contact: Grit.Denker@sri.com
  650 269 1034
Thank You