

# Getting Things Done in Time

Alex Kirlik

Human Factors Division and Beckman Institute  
University of Illinois at Urbana-Champaign

CogSci 2007

**Beckman Institute**  
for Advanced Science and Technology



## A Few Dynamic Projects



*Taxiing the Tangled Web  
of Chicago O'Hare*



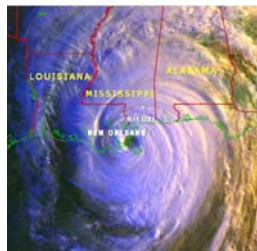
*Cheeburger Cheeburger!*



*Coordination in Group  
Musical Performance*



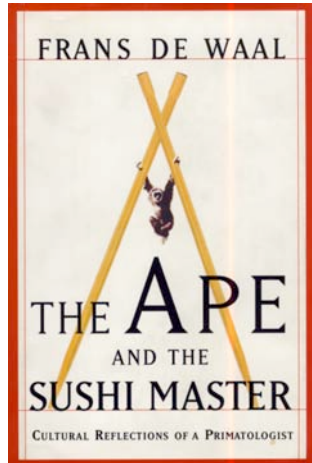
*Rebuilding at Ground Zero*



*How do you solve a  
problem like Katrina?*



## Oh, and by the way ....



*If perceptivity and curiosity are indeed critical for scientific progress, why don't we the behavioral sciences teach our students to keep their eyes peeled?*



3

## Getting things done *in time*: Sense

“Tom puts everything off until the last minute and just did get his CogSci presentation prepared *in time*.”



4

## Sense

“Tom puts everything off until the last minute and just did get his CogSci presentation prepared *in time*.”

X

## Sense

“Henry cleaned up the house after his annual New Years Day ritual of watching college football and realized it was probably *time* for the Christmas tree to go as well.

## Sense

“Henry cleaned up the house after his annual New Years Day ritual of watching college football and realized it was probably *time* for the Christmas tree to go as well.

Conceiving temporal aspects of behavior:

Not: Speed, latency, RT, etc (being as fast as possible)

Instead: Timeliness, esp in harmony with external events also happening *in time*, and often to team with the world to push flows of events in preferred directions.



7

## How Common?

Highest frequency (per million) nouns in combined corpus of written & spoken English?

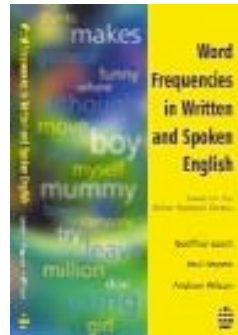


8

## How Common?

Highest frequency (per million) nouns in combined corpus of written & spoken English:

1. time 1833
2. year 1639
3. people 1256
4. way 1108
5. man 1003
6. day 940

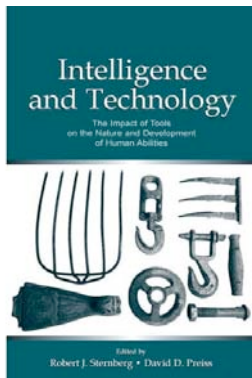


Source: Oxford Univ. Press



9

## Getting things done in time .....




Ref. Kirlik (2005). Work in progress: Reinventing intelligence for an invented world. In R.J. Sternberg & D.D. Preiss (Eds) *Intelligence and Technology*. LEA.

Perhaps we need a notion of adaptation more akin to actively coordinating with the environment as one would in trading leads with a dance partner, as opposed to passively adapting to stimuli during an intelligence test or psychological experiment.




10

## Taxiing the Tangled Web of Chicago O'Hare (w/ Mike Byrne)

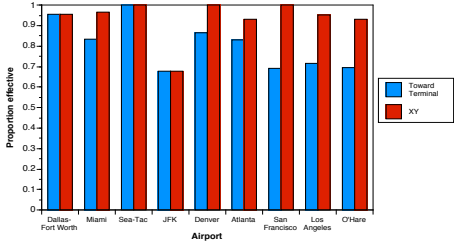


**NASA B-767 Flight Simulator**

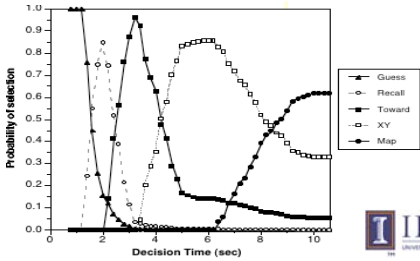


Snapshot View of ORD Taxiway Seen by Pilots


**Beckman Institute**  
for Advanced Science and Technology



Airport	Toward Terminal	XY
Dallas-Fort Worth	0.95	0.95
Miami	0.80	0.95
Sea-Tac	0.95	0.95
JFK	0.68	0.68
Denver	0.85	0.95
Atlanta	0.80	0.90
San Francisco	0.68	0.95
Los Angeles	0.70	0.90
O'Hare	0.68	0.90

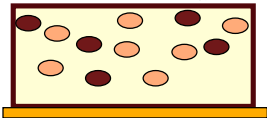
  


Decision Time (sec)	Guess	Recall	Toward	XY	Map
0	1.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0



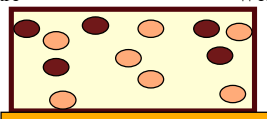
## Modeling Short Order Cooks

**Brute Force Strategy**



**Position Control Strategy**

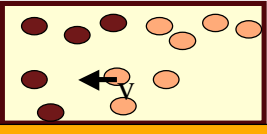
Rare ← Well → Rare

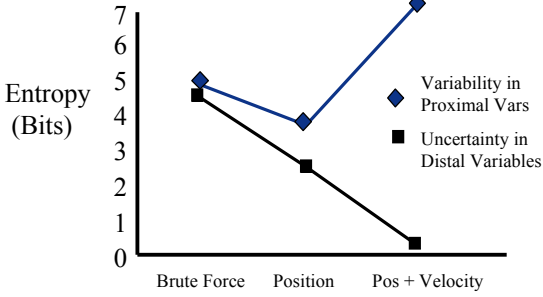


**Pos + Velocity Control Strategy**


Well ↑

Rare ↓



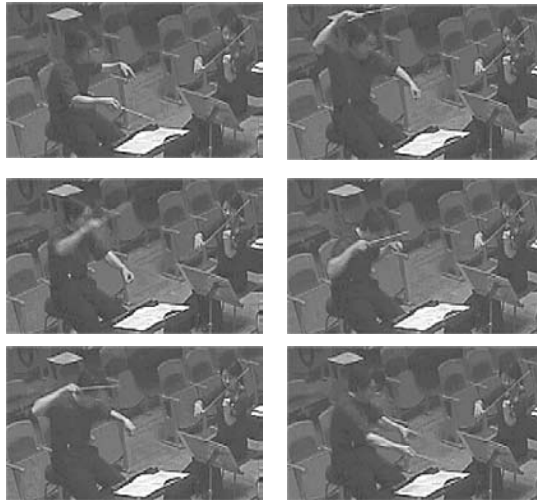


Control Strategy	Variability in Proximal Vars	Uncertainty in Distal Variables
Brute Force	5.0	4.5
Position	3.8	2.5
Pos + Velocity	7.0	0.5



# Group Musical Coordination

(w/ Shin Maruyama)



Conductor: Ryusuke Nuamjiri (1964 - ), principal conductor of the Tokyo Philharmonic, rehearsing the Tokyo Mozart Players. Piece: Beethoven's 5th Symphony.

Study: Temporal coordination between initiating movements and concertmaster's (1st violin) initial bowing action.



Fig. 6. The opening theme of Beethoven's Fifth Symphony (1808). 0 = the eighth rest (beat point by the conductor's hand stroke); 1 = the first note (start of the concertmaster's bowing action).



# Group musical coordination

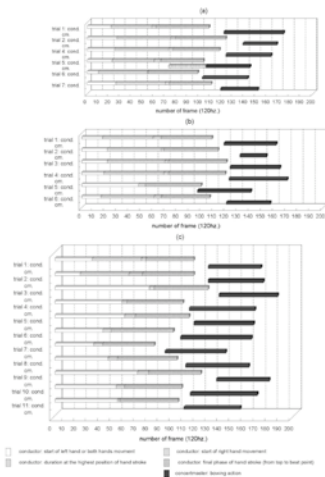


Fig. 9. The overall patterns of conductor's and concertmaster's actions and interactions ("coord") conductor: "con" (concentration); (a) Day 1; (b) Day 2; (c) Recording session.

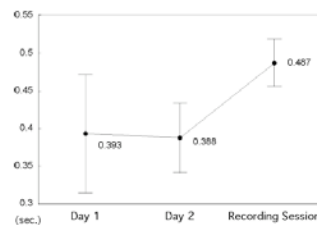


Fig. 8. The progressive change of the eighth rest values: the time interval between the beat point shown by the conductor's hand stroke (point 0 in Fig. 6) and the concertmaster's bowing initiation (point 1 in Fig. 6).

*Conductor and concertmaster used rehearsal to negotiate a longer (but less variable) interval between conductor's hand stroke and initial bowing action.*



## Rebuilding at Ground Zero (WTC-7)

(w/ Skidmore, Owings & Merrill Architects)



15

## Rebuilding at Ground Zero (WTC-7)

(w/ Skidmore, Owings & Merrill Architects)



16

## How do you solve a problem like Katrina?



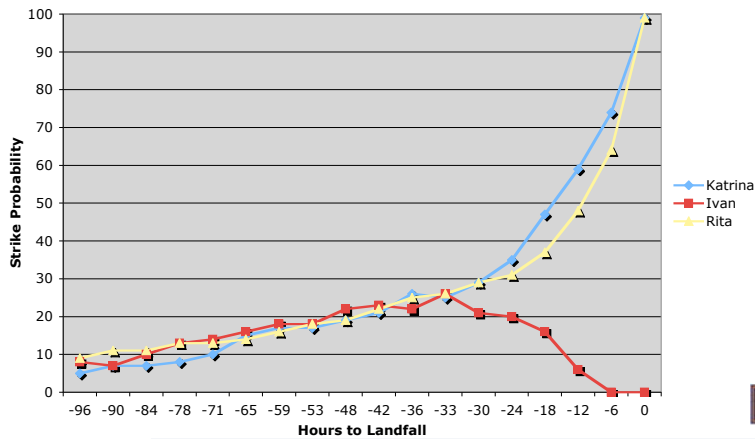
Date/Time (hr)	Possible Action	Hrs Left	to 34K(39)	to 50K(56)	to 64K(74)	to Eye	Day/Night
08/26/05 23EDT	Preparation/Planning	6 to Decide	429 miles	444 miles	456 miles	467 miles	Dark
08/27/05 00EDT	Preparation/Planning	5 to Decide	421 miles	437 miles	449 miles	461 miles	Dark
08/27/05 01EDT	Preparation/Planning	4 to Decide	414 miles	430 miles	443 miles	455 miles	Dark
08/27/05 02EDT	Preparation/Planning	3 to Decide	406 miles	423 miles	436 miles	449 miles	Dark
08/27/05 03EDT	Preparation/Planning	2 to Decide	399 miles	416 miles	430 miles	443 miles	Dark
08/27/05 04EDT	Preparation/Planning	1 to Decide	391 miles	409 miles	423 miles	437 miles	Dark
08/27/05 05EDT	DECISION TIME	42 to Hazard	384 miles	402 miles	417 miles	431 miles	Dark
08/27/05 06EDT	Evacuation if needed	41 to Hazard	376 miles	395 miles	410 miles	425 miles	Daylight
08/27/05 07EDT	Evacuation if needed	40 to Hazard	369 miles	388 miles	404 miles	419 miles	Daylight
08/27/05 08EDT	Evacuation if needed	39 to Hazard	361 miles	381 miles	397 miles	413 miles	Daylight
08/27/05 09EDT	Evacuation if needed	38 to Hazard	353 miles	373 miles	390 miles	406 miles	Daylight
08/27/05 10EDT	Evacuation if needed	37 to Hazard	345 miles	365 miles	383 miles	399 miles	Daylight
08/27/05 11EDT	Evacuation if needed	36 to Hazard	338 miles	358 miles	376 miles	392 miles	Daylight
08/27/05 12EDT	Evacuation if needed	35 to Hazard	330 miles	350 miles	369 miles	385 miles	Daylight
08/27/05 13EDT	Evacuation if needed	34 to Hazard	322 miles	342 miles	361 miles	377 miles	Daylight



17

## How do you solve a problem like Katrina?

Forecast Strike Probabilities by Hours to Landfall:  
Katrina and Ivan (New Orleans), Rita (Galveston)



18

We have much to learn about how people get things done *in time*, their limitations in doing so, and how we can design technology to support them.

Thank you!

Alex Kirlik: [kirlik@uiuc.edu](mailto:kirlik@uiuc.edu)

<http://www.humanfactors.uiuc.edu>

19