I, Researcher: Finding one’s role in science

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I, Researcher: the roadmap.

• Science is not wholly objective but depends on the researcher doing it.
• Scientific journey and personal journey determines the direction and methods of research.
• I, Researcher: inspirations from fiction.
Science depends on the scientist.

• Trofim Lysenko: exposed seed to humidity low temp (vernalization) to increase yield, passed trait to offspring (reject natural selection for cooperation)

• Questionnaire of farmers confirms agricultural revolution (against theory is against the party)

• Famine, imprison scientists
Science depends on the scientist.

- Peter Wason: asked to identify rule applying to three numbers (2-4-6)
- Subjects can ask if any set of 3 nums satisfies rule, most tested seq of even num even though correct rule is increasing nums
- No questions that would falsify rule: confirmation bias, gather positive info
Cultural personal influences on science.

- Motivation
- Metaphysical
- Practicality
- Culture (science fiction)
- Consistency (avoid cognitive dissonance)
- Controversy (debate)
- Perspective (C. P. Snow, The Two Cultures)
Case study culture 1: HRL research labs, UC Riverside robotics REU.

8.1. Inheritance Relationships

8.1.1. Application Suite Inheritance Diagram

![Diagram showing inheritance relationships between application modules.]

Figure 1. This is an inheritance diagram that represents how the applications will be derived; notice that this is not a class inheritance diagram. The Input Module, Resource Manager, and Display Modules will inherit the sockets implementation and a main control panel from the Application Module. The Information, Situation, and Uncertainty Modules will be inheriting display navigation and display interfaces from the Display Module.
Case study culture 2: Cal Berkeley, Palo Alto Research Center.

Every node in the model is continuous, with equations that look like

\[ H_s(t + 1) = BV_s(t + 1) - H_s(t) + W_H(t), \]
\[ V_s(t + 1) = AV_s(t) + W_v(t), \]
\[ H_o(t) = C_H H_s(t) + U_H(t), \]
\[ V_o(t) = C_V V_s(t) + U_V(t), \]

where \( H_s \) is the control module associated with the hand, \( H_o \) is the estimated hand parameters (in particular, hand position), \( V_s \) and \( V_o \) are the estimated and observed target motion characteristics, \( A, B, \) and \( C \) are corresponding output matrices, and the \( W_s \) and \( U \) are noise. \( H_s \) and \( V_o \) are observed. Note that the first equation accounts for sensory correction due to visual feedback.

Figure 1: Graphical model of visuomotor tracking. Note that \( VisSt \) and \( Hand \) nodes are observed in our case.
Case study culture 3: UCLA.

AP\{2{\mu}, 2{\sigma}, 3{\mu}, 3{\sigma}\} ligated to pGBT.
Case study culture 3: UCLA.

Oregon Green BAPTA-1 AM -> transverse slice

Luo, Dellal, Otis, 2012

Regehr and Atluri, 1997
Case study culture 3: UCLA.

Calcium transients

Fiber volleys

NEURON model
Case study culture 4: RIKEN Brain Science Institute.

habituation  training  testing
Case study culture 4: RIKEN Brain Science Institute.
Lab pictures: a collection.
How to reconcile doing unbiased science with doing what you want?

• In social science, interpretation is inevitable.
• Even in science, direction and methods differ.
• In papers we tell “a story”.
• In next step we do what is feasible, interesting.
• SAT testing has hidden bias (Aguinis et al, 2016).
• Cultural differences: Japan vs. US.
• Like writer making sense of world around her.
• Recognize subjectivity in self, but try to eliminate systematic bias.
Three Laws of Research

1. robot may not injure humans
2. obey humans unless conflict 1.
3. protect own existence as long as 1. and 2.

I, Researcher
1. researcher may not bias results
2. obey scientific method unless bias
3. do what thrills you as curiosity dictates long as 1. and 2.

“Evidence”: robot runs for office
I, Researcher: the summary.

- Science is not perfectly objective.
- Life goals and interests affect science.
- Recognize one’s own limitations.
- Let’s discuss!