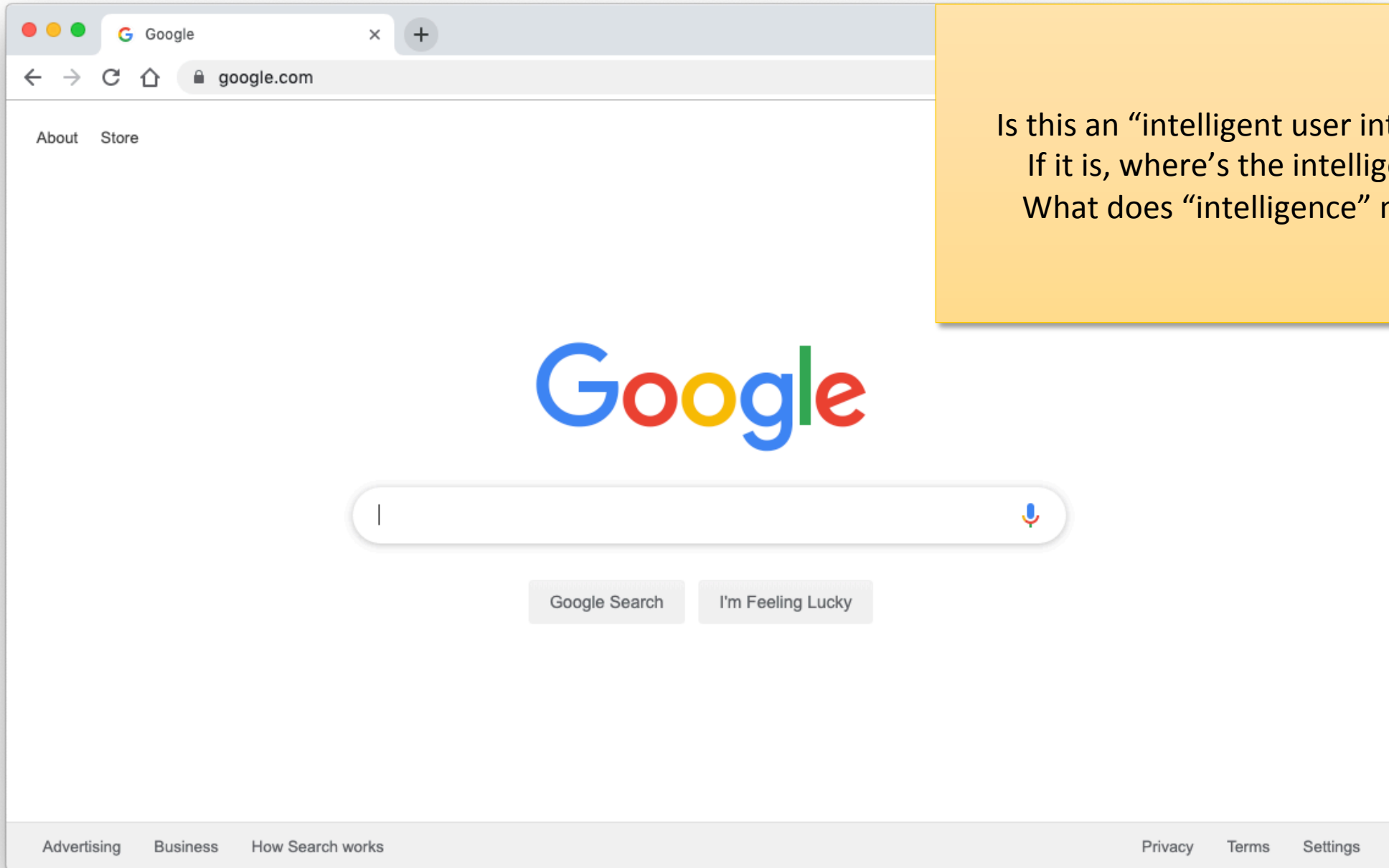


# Human-Machine Teaming AI

Rudolph P. Darken

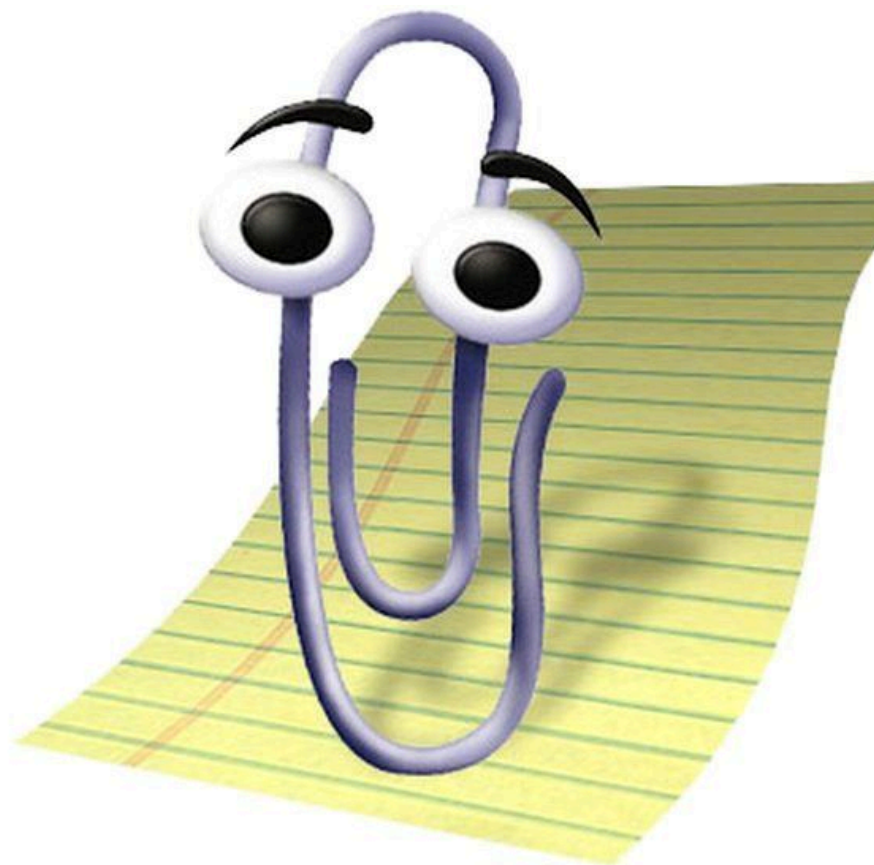
Department of Computer Science



Is this an “intelligent user interface?”  
If it is, where’s the intelligence?  
What does “intelligence” mean?



Is this an “intelligent user interface?”  
If it is, where’s the intelligence?



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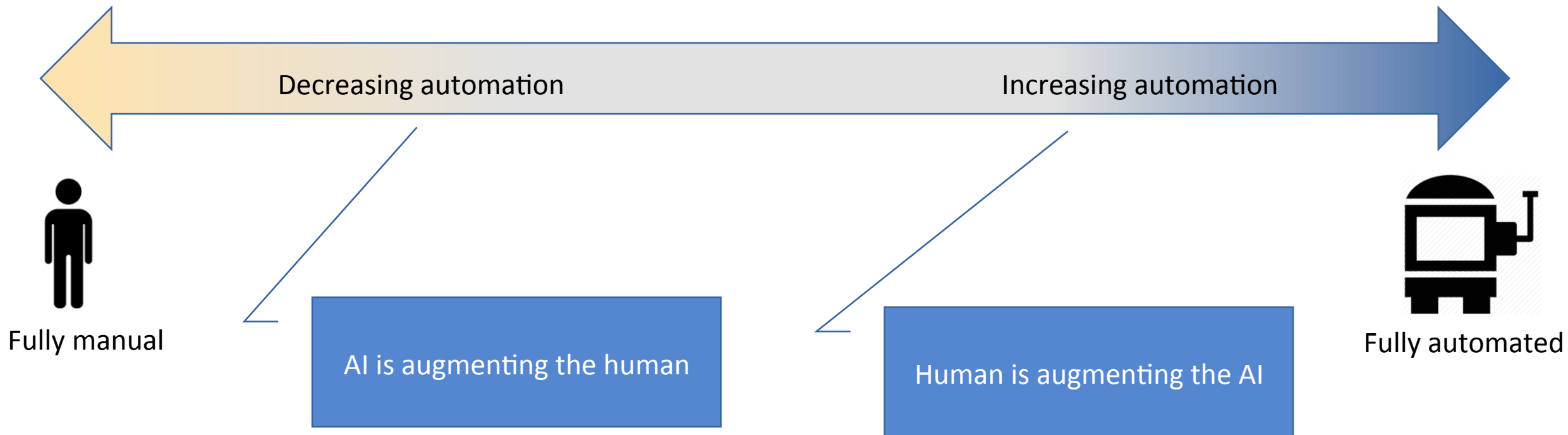
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# Computing's Symbiotic Continuum

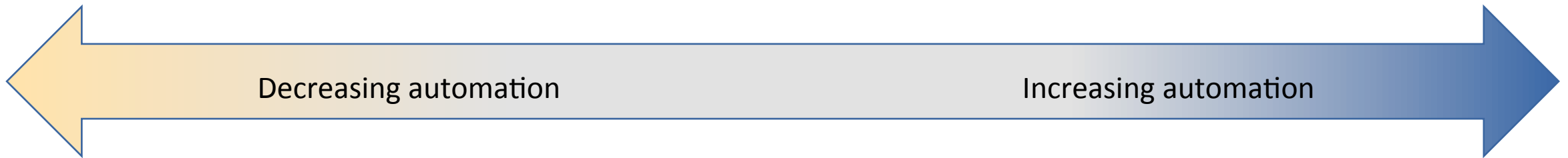


# Human-Machine Teaming (UI + AI)

- Most of what we do is neither manual nor fully automated...it's somewhere in between
- Human-Machine teaming is finding the balance between what the human operator(s) has to do and what the machine can do ...
- **that maximizes the efficiency and capabilities of the overall system**



The challenge is finding the right balance  
The user should do what a human has to do  
The computer should do the rest



Fully manual



Fully automated



# Do what you do best ...

## **Computers ...**

- Calculate
- Compare
- Apply logic
- Don't mind doing something billions of times in a row
- Deal with very large data sets
- Require certainty, determinism (no context)
- Ask yourself... Is it computable?

## **Humans ...**

- Decide things
- Make judgements
- Empathize
- Have preferences (esthetics)
- Tire easily
- Get bored
- Can function in ambiguous situations (context)

# Freestyle Chess (Cyborg Chess)

- Each human player uses a computer to assist during play
- Kasparov lost to Deep Blue in 1997.
- Anti-computer tactics develop...
- In 2005, two amateurs using three PCs, won a grandmaster-level tournament.



# A Process for Designing Intelligent UIs

- Needs analysis
  - What is the purpose of the system being designed?
- Task analysis
  - Decompose into finite steps
- Functional analysis
  - Determine which parts have to be performed by the user, the rest should go to the computer
- Design (\* we'll explore design principles for intelligent systems next...)
- Prototype
- User test
- Repeat until it works

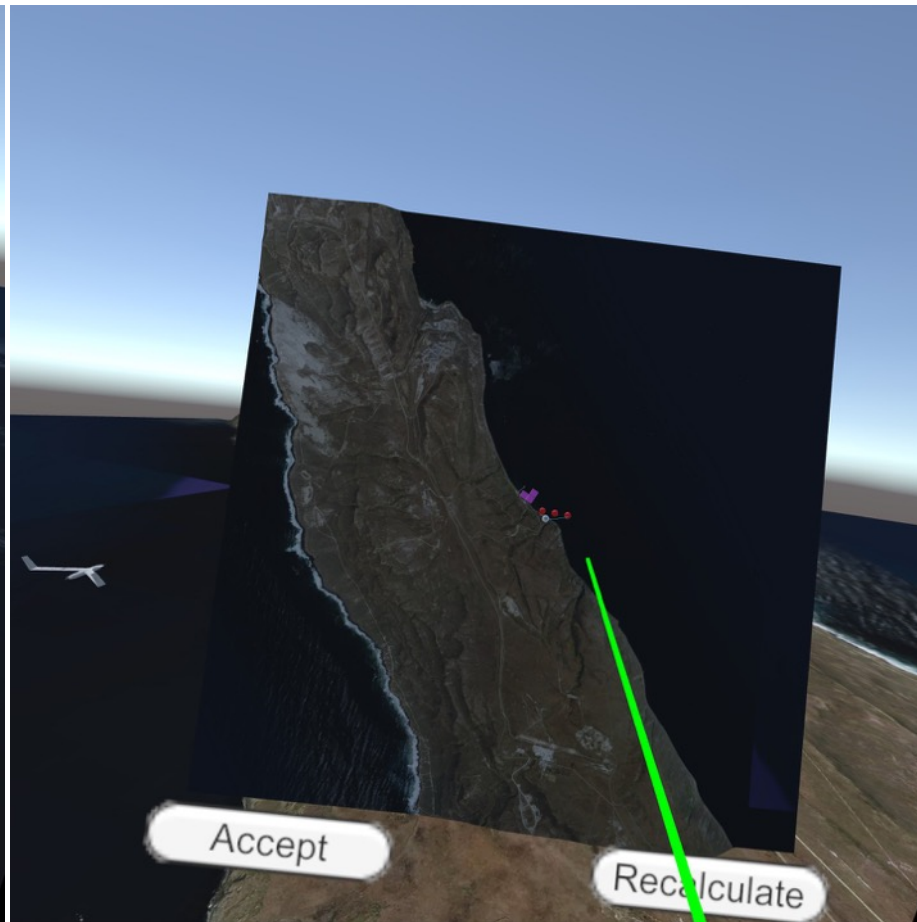
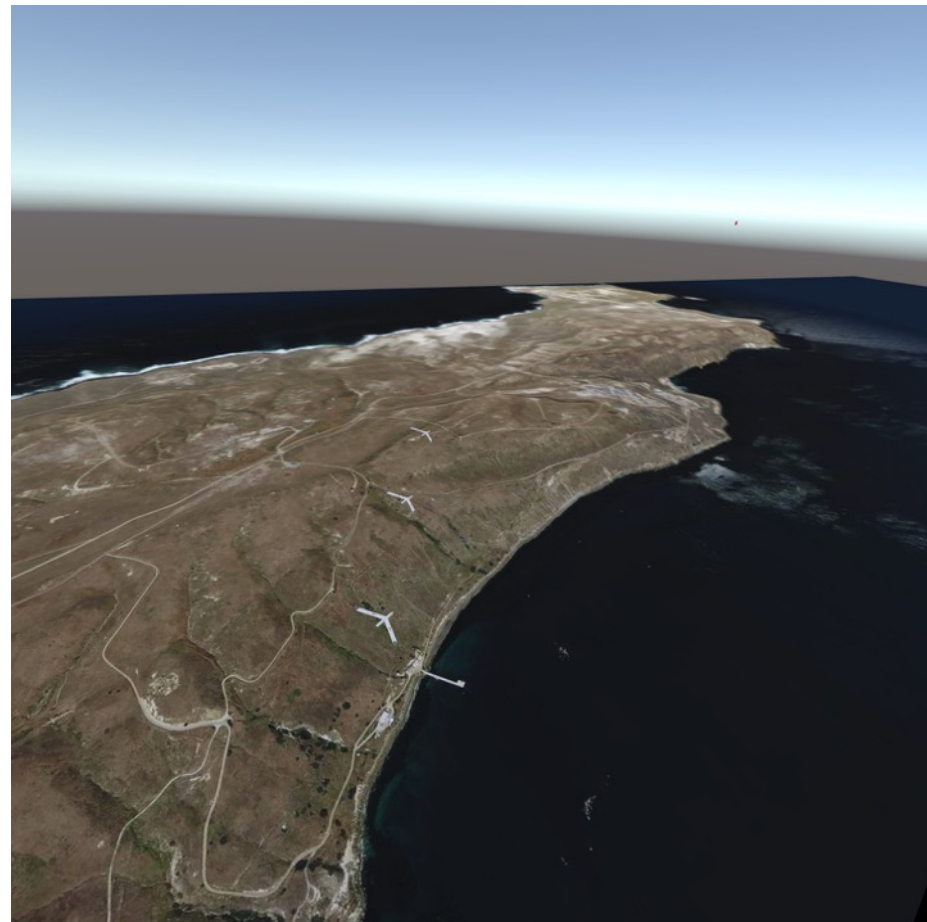


# Some principles of UI (UX) design in intelligent systems

1. Make clear what the system is capable of doing (i.e. what the user doesn't have to do)
2. Interrupt the user intelligently
  - The system knows what the user is doing, doesn't it?
3. Efficient invocation, correction and dismissal
4. Remember recent interactions, string into a dialog if possible
5. Learn from user behavior (adapt)

<https://uxdesign.cc/guidelines-for-infusing-artificial-intelligence-to-products-bbbcf7b928f7>





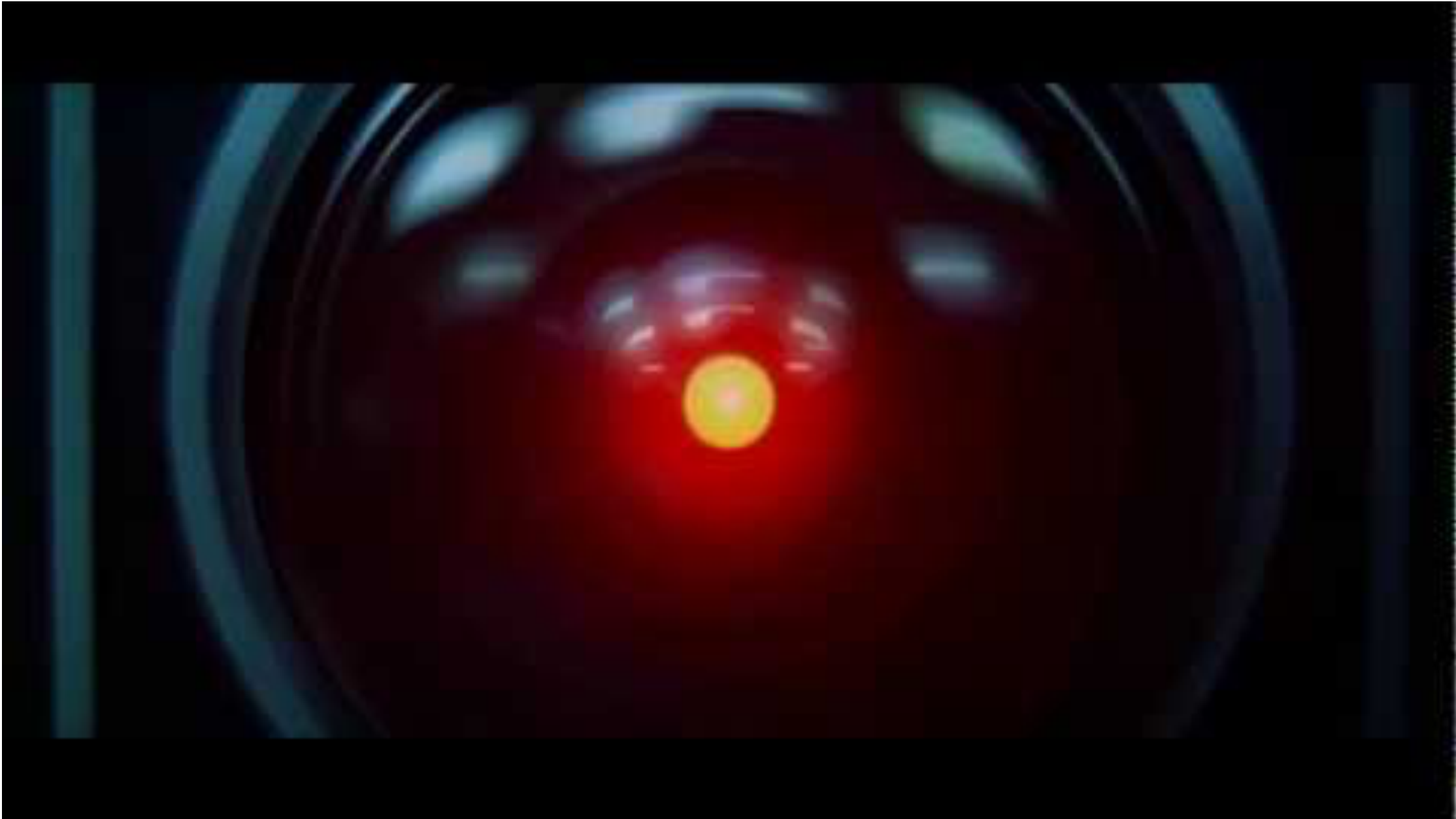
Maj Ryan Keller







Robot State: Waiting



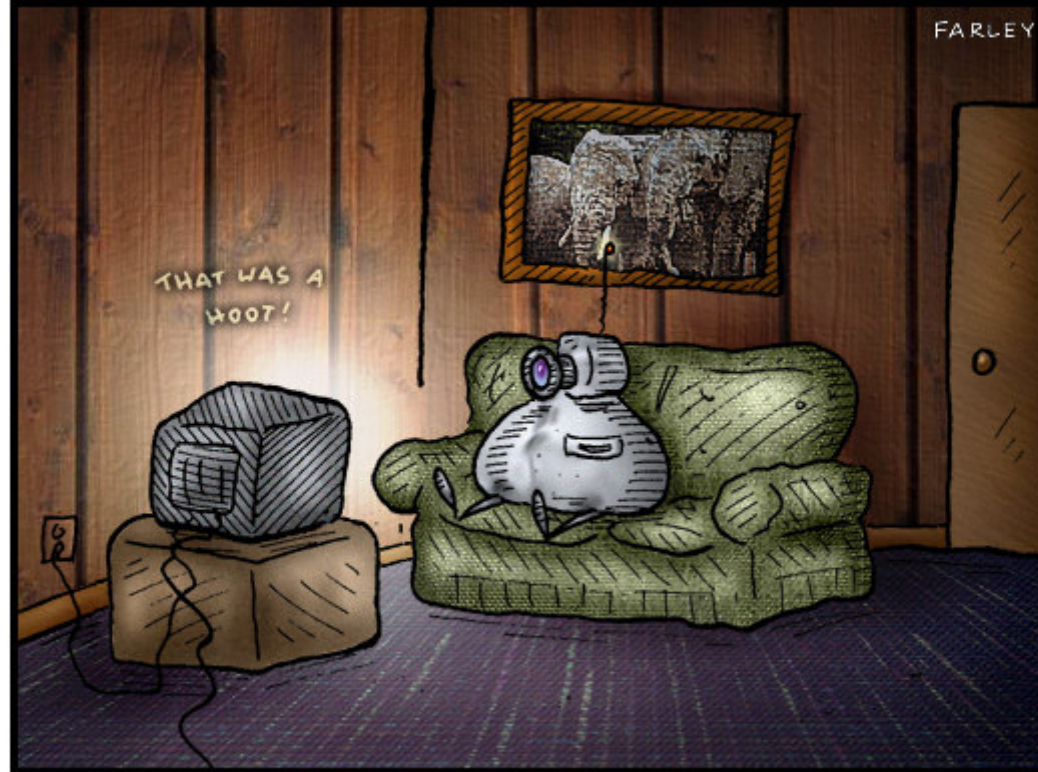
# What I hope you remember...

- Most “systems” include some combination of AI and UI where the human user does some things and the machine does the rest.
- To maximize the efficiency and capability of intelligent systems, you need to figure out what tasks have to be done and then assign each task to the best performer (human or computer)
- There is an interactive software design process that will help you answer these questions and make good design decisions that will lead to improved “system” performance and usability.

Questions?

## DOCTOR FUN

26 Sep 96



In the world of the future, "intelligent agents" will waste hours watching television for us.

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<http://sunsite.unc.edu/Dave/drfun.html>

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