

# The Ironies of Automation Law

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# Ironies of Automation



It's magical. It's revolutionary. It's legs.

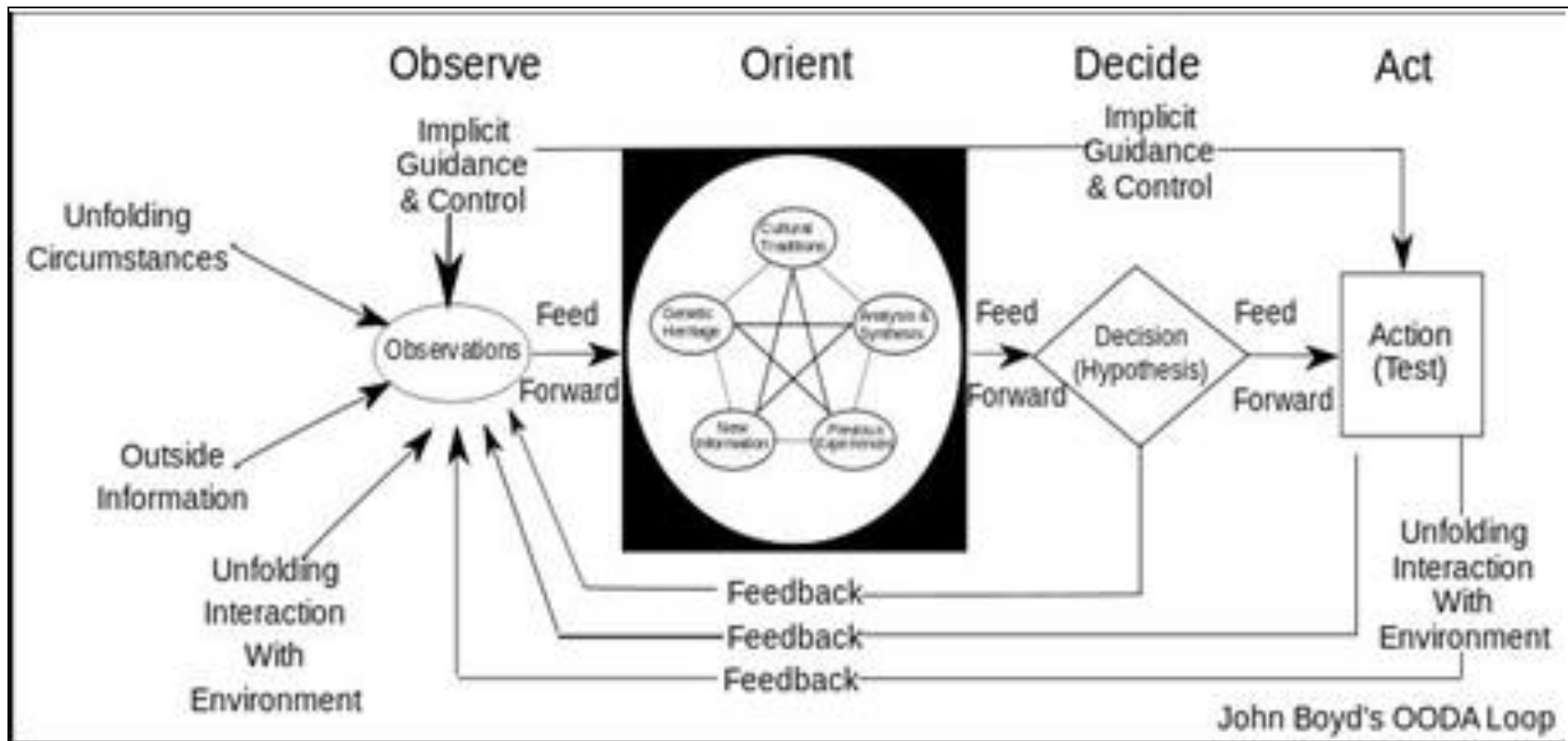
Little Caesar's/YouTube screenshot

# Man vs. Machine (MABA-MABA)

Humans Excel In	Machines Excel In
Ability to detect a small amount of visual or acoustic energy	Ability to respond quickly to control signals and to apply great force smoothly and precisely
Ability to perceive patterns of light or sound	Ability to perform repetitive, routine tasks
Ability to improvise and use flexible procedures	Ability to store information briefly and then to erase it completely
Ability to store very large amounts of information for long periods and to recall relevant facts at the appropriate time	Ability to reason deductively, including computational ability
Ability to reason inductively	Ability to handle highly complex operations, i.e. to do many different things at once
Ability to exercise judgment	

The original Fitts List (MABA-MABA List) from 1951. P.M. Fitts, Human Engineering for an effective air-navigation and traffic-control system (1951).

# The Loop (OODA or AADA)

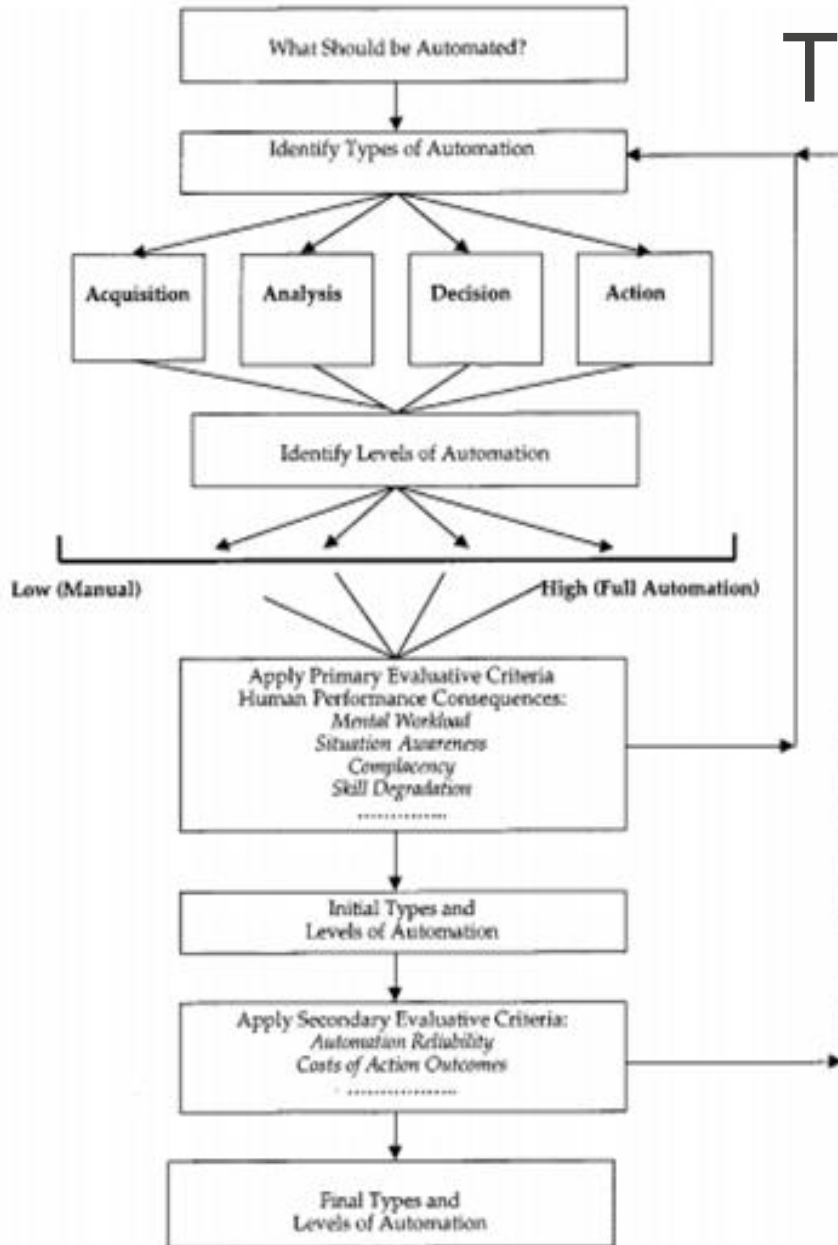


# Levels of Autonomy

## Levels of Autonomy

10. The computer decides everything, acts autonomously, ignoring the human.
9. The computer informs the human only if it, the computer, decides to.
8. The computer informs the human only if asked, or
7. The computer executes automatically, then necessarily informs the human, and
6. The computer allows the human a restricted time to veto before automatic execution, or
5. The computer executes that suggestion if the human approves, or
4. The computer suggests one alternative,
3. The computer narrows the selection down to a few, or
2. The computer offers a complete set of decision/action alternatives, or
1. The computer offers no assistance; the human must take all decisions and actions.

# The Human in the Loop



(1) intervention and (2) interaction

## Primary Evaluation Criteria

- Mental workload
- Situation awareness
- Complacency and bias
- Skill degradation

## Secondary Evaluation Criteria

- Automation reliability
- **Costs of action outcomes**

R. Parasuraman, T. Sheridan, & C.D. Wickens, *A Model for Types and Levels of Human Interaction with Automation*, 30:3 IEEE Transactions on Systems Man and Cybernetics Part A: Systems and Humans 286-297 (2000).

# HRI

(1) higher robot autonomy requires less frequent interaction; and (2) higher robot autonomy requires higher levels or more sophisticated forms of interaction

Appropriate tasks:

- Criticality
- Accountability
- Context

Social variables:

- Anthropomorphizing
- Social meaning

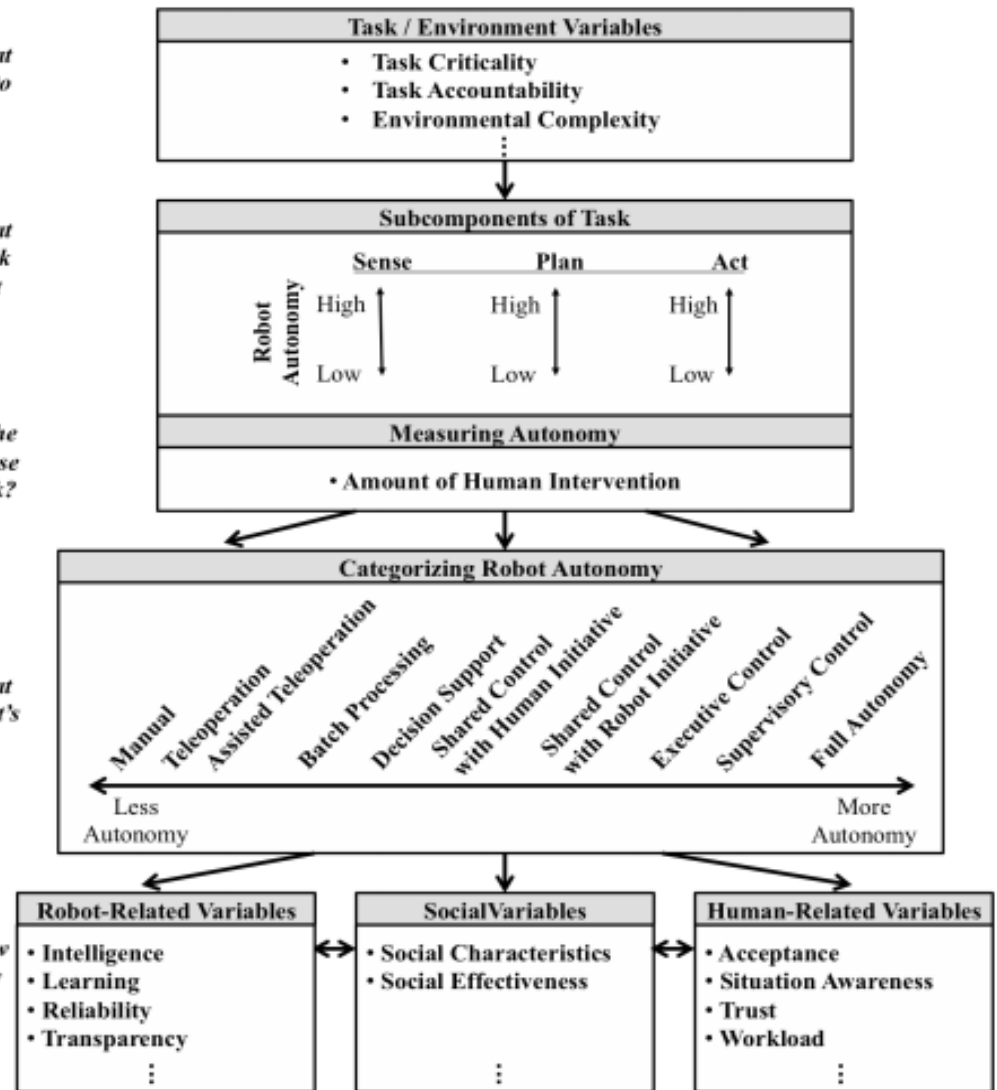
*Guideline 1: What task is the robot to perform?*

*Guideline 2: What aspects of the task should the robot perform?*

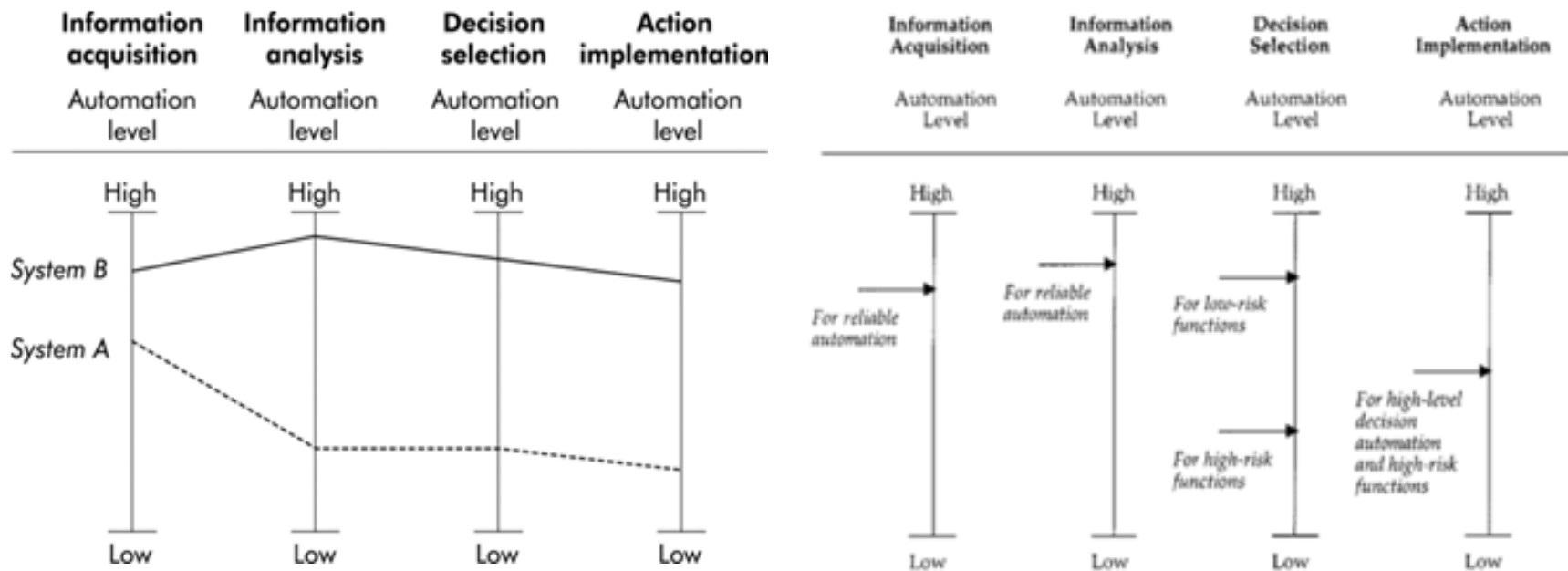
*Guideline 3: To what extent can the robot perform those aspects of the task?*

*Guideline 4: What level can the robot's autonomy be categorized?*

*Guideline 5: How might autonomy influence HRI variables?*



# Man + Machine Design



R. Parasuraman, T. Sheridan, & C.D. Wickens, *A Model for Types and Levels of Human Interaction with Automation*, 30:3 IEEE Transactions on Systems Man and Cybernetics Part A: Systems and Humans 286-297 (2000).



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Man vs. Machine Law



Man + Machine Law