

# Human-AI Hybrid and Some Observations in E-Commerce

Xinyu Fu

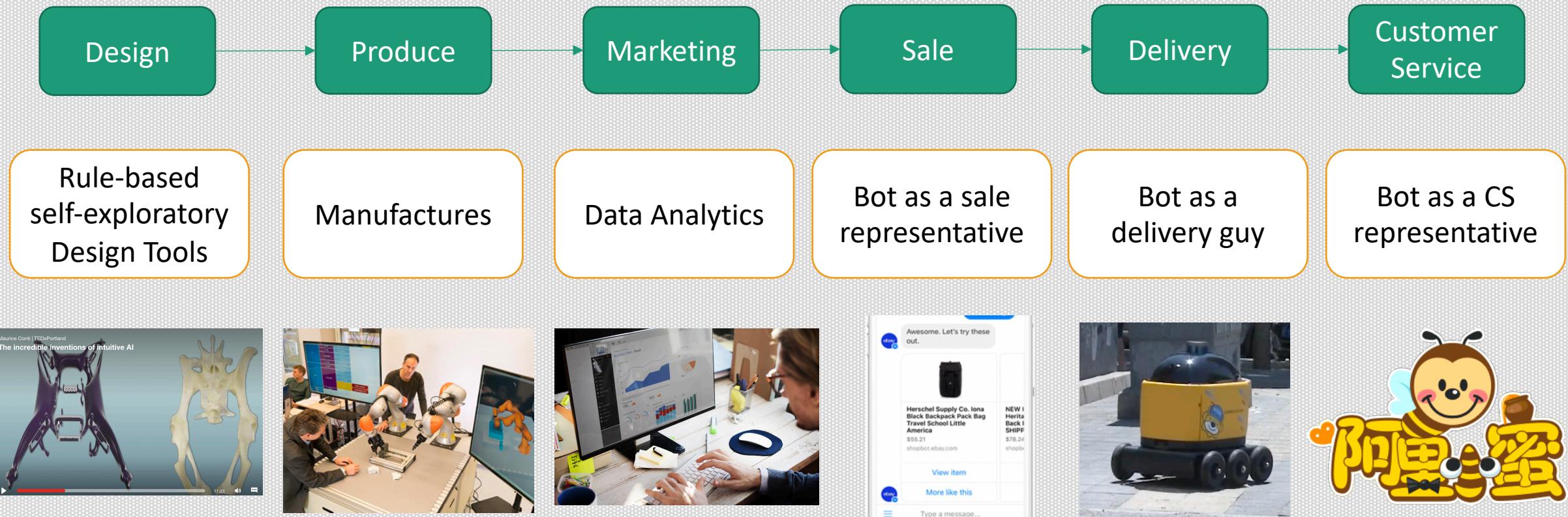
July 11, 2019

Harvard Summer School – MGMT S-5010

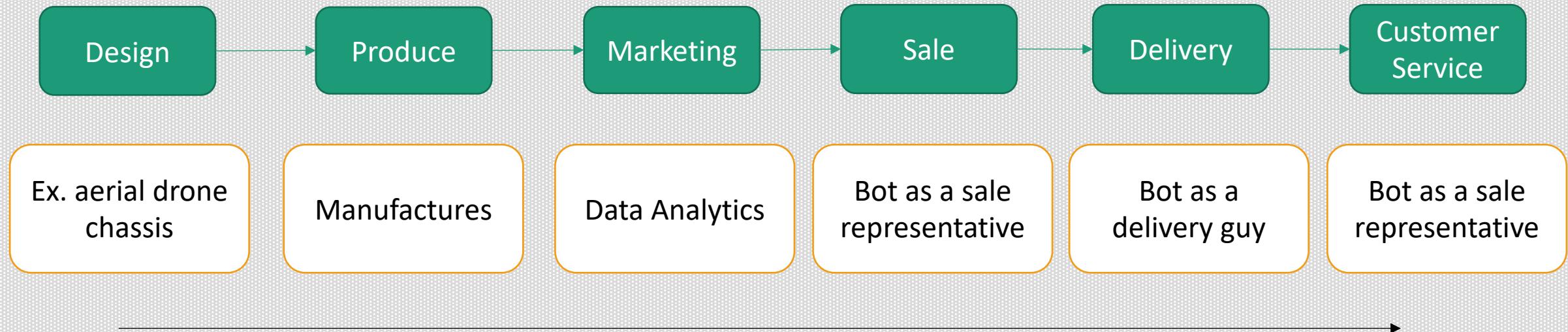
xinyu.fu@pitt.edu



# Examples: from back-end to front-end



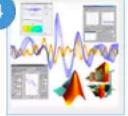
# Examples: from back-end to front-end



Audience: employees → consumers

Higher interaction level

Higher humanoid level

AI Techniques		Use Cases
1 	<b>Machine Learning:</b> Field of study that gives computers the ability to learn without being explicitly programmed	<ul style="list-style-type: none"> <li>Customer Churn Management</li> <li>Customer Segmentation</li> <li>Sentiment Analysis</li> <li>Fraud Detection</li> </ul>
2 	<b>Neural Network:</b> Used to estimate or approximate functions that can depend on a large # inputs and are generally unknown	<ul style="list-style-type: none"> <li>Forecasting</li> <li>Classification of samples</li> <li>Function approximation</li> <li>clustering</li> </ul>
3 	<b>Computer Vision:</b> Acquiring, processing, analyzing & understanding images (high-dimensional data) from real world to produce numeric info	<ul style="list-style-type: none"> <li>Credit card scanner (in Uber app)</li> <li>Autonomous car</li> <li>OCR in ATM check deposits</li> <li>Face detection, Panoramic view, HDR images on smartphone.</li> </ul>
4 	<b>Signal Processing:</b> Processing or transferring information contained in various physical, symbolic, or abstract formats designated as signals.	<ul style="list-style-type: none"> <li>Psycholinguistics</li> <li>Mining (e.g. electroencephalogram)</li> <li>Speech processing</li> <li>Video / image processing</li> </ul>
5 	<b>Natural Language Processing (NLP):</b> Field of computer science, and computational linguistics concerned with the interactions between computer & human languages	<ul style="list-style-type: none"> <li>Social media sentiment analysis</li> <li>Machine Translation</li> <li>Question Answer Systems</li> <li>Personal Assistants - Siri</li> <li>Web Search</li> </ul>
6 	<b>Metaheuristics :</b> Higher-level procedure to select or generate a heuristic to solve optimization problem, with imperfect info or limited computation capacity	<ul style="list-style-type: none"> <li>Agricultural land use optimization</li> <li>Ground traffic optimization</li> <li>Air traffic management</li> <li>Vehicle routing optimization</li> </ul>
7 	<b>Operations Research :</b> A discipline that deals with the application of advanced analytical methods to help make better decisions	<ul style="list-style-type: none"> <li>Real-Time Optimization (RTO)</li> <li>Sales &amp; Operations Planning</li> <li>Marketing Campaigns</li> <li>Economic production cycle design</li> </ul>
8 	<b>Quantum Computing:</b> Computation systems making use of quantum mechanical phenomena, such as superposition & entanglement to perform operations on data	<ul style="list-style-type: none"> <li>SW verification and validation</li> <li>Drug discovery</li> <li>Cybersecurity</li> <li>Any problems too difficult to address with silicon computing</li> </ul>
9 	<b>Cognitive Computing:</b> Simulation of human thought processes that involve self-learning systems using data mining, PR & NLP to mimic the way human brain works.	<ul style="list-style-type: none"> <li>Patient treatments &amp; clinical trials</li> <li>Stock pick recommendations based on Twitter feeds</li> <li>Analysis of customer behavior to target content at point-of-sale</li> </ul>
10 	<b>Pattern Recognition :</b> Recognition of patterns and regularities in data, although in some cases considered to be nearly synonymous with m/c learning	<ul style="list-style-type: none"> <li>Recognize handwritten zip codes</li> <li>Spoken word recognition</li> <li>Disease recognition from a list of symptoms</li> <li>Fingerprint recognition</li> <li>White blood cell classification</li> </ul>

# Techniques behind

- Beyond data analytics:
- Unstructured data:
  - Text → natural language processing
  - Image → computer vision
  - Audio & video

Source: <https://akshinthalakk.com/2016/05/30/artificial-intelligence-techniques-use-cases/>

# Comment Moderation – Google’s Perspective API

The screenshot shows the official website for Google's Perspective API. At the top left is the Perspective logo (a blue and cyan geometric shape). To its right are three navigation links: "Support", "Blog", and a prominent "Get started" button with a purple border. Below this header is a large dark blue rectangular area containing white text and logos. The text reads "Trusted for improving conversations". Below this, there are four logos arranged in two rows: "The New York Times" (in its signature serif font), "DISQUS" (in a bold sans-serif font), "EL PAÍS" (in a bold sans-serif font), and "The Coral Project" (with a stylized coral icon preceding the text).

Perspective

Support Blog Get started

Trusted for improving conversations

The New York Times

DISQUS

EL PAÍS

The Coral Project

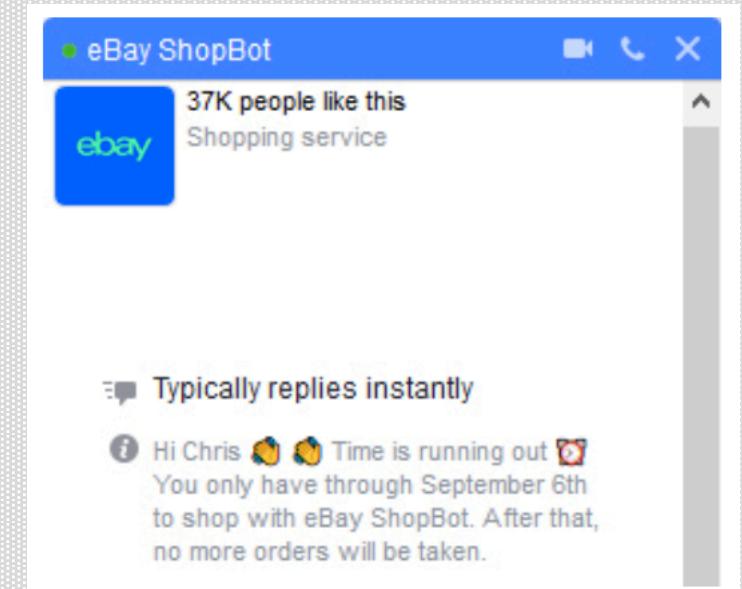
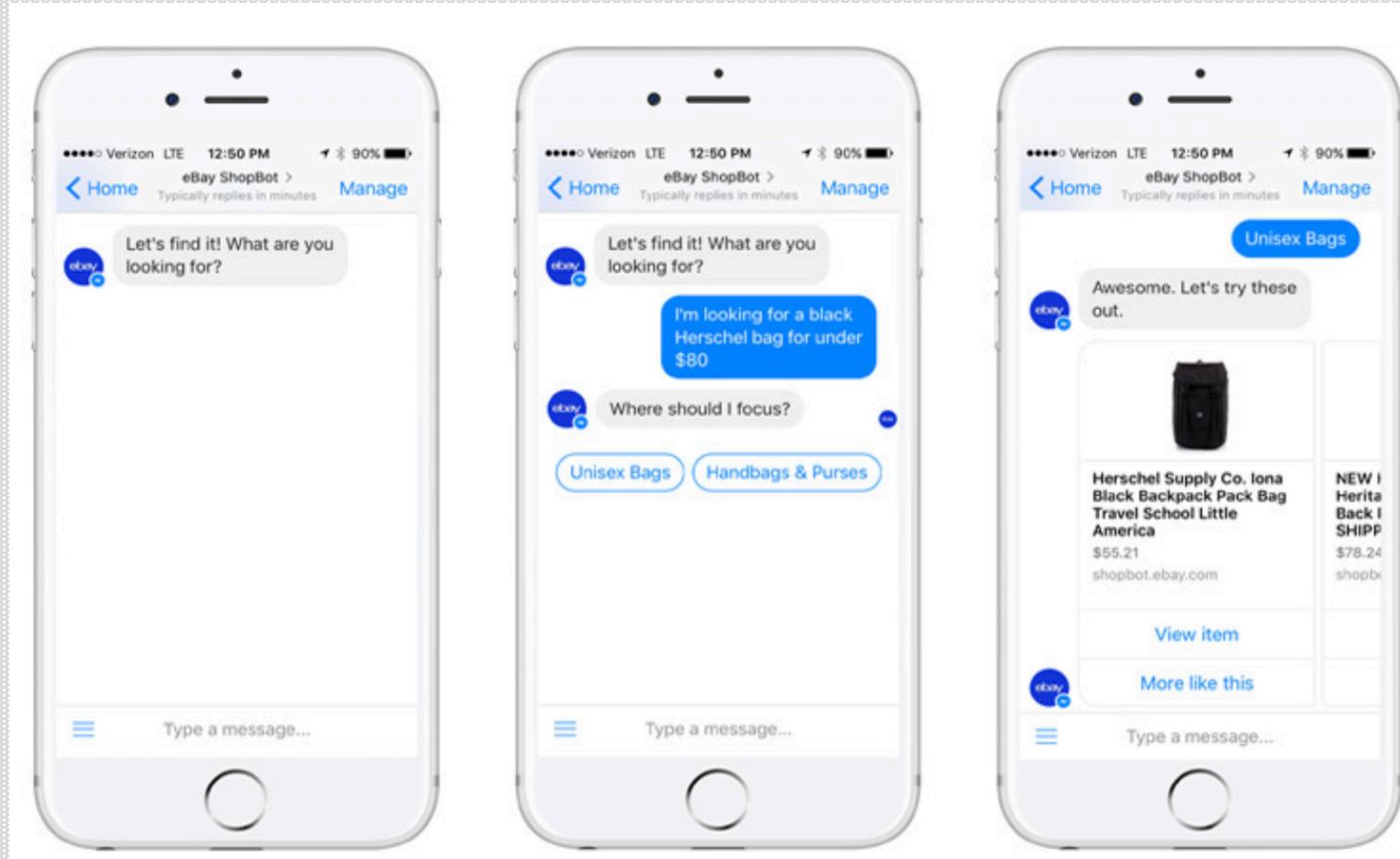
# Alibaba's Alime Bot Rep

**AI chatbot behind Alibaba's \$31 billion Single's Day sales miracle**

- Night time
- 100% response rate to consumers, 1-1
- New job positions: AliMe trainer

- data center robot Halo-Explorer executed **30% of the routine tasks**.
- CS assistant Alime took **95% of customer service** consultations on the day of the shopping festival.
- smart warehouse robots shipped more than **1 million packages** in a single day.
- AI designer Luban designed **410 million** product posters during the shopping festival.
- Alibaba intelligent recommendation system generated more than 56.7 billion exclusive "shelves" for users, providing users with personalized service experience.

# Ebay's Shopbot – But failed, becomes ShopNOT after 2 years trial



# Last mile delivery – by bot

- Meituan auto piloted delivery cars
- <https://www.youtube.com/watch?v=5wxgQVjDviQ> (01:07')
  - Same building
  - Elevator-communication systems
- Similarly: Amazon, JD.com, etc.



# Human are involved in all of those process:

- human intelligence and AI each have their own strengths and weaknesses (Wilson, Daugherty, 2016).

## Machines

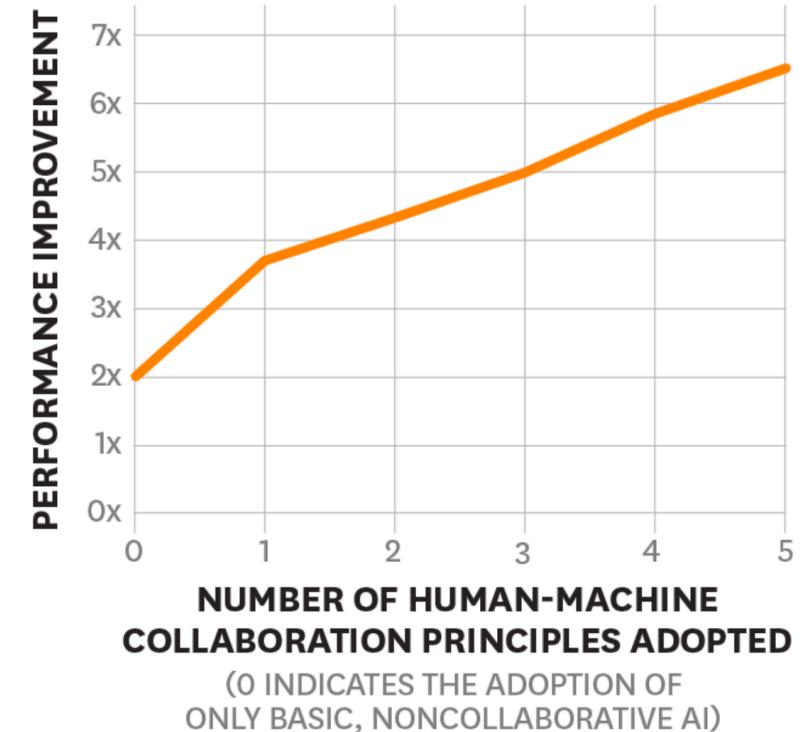
- Accurate
- Reliable
- Scalable
- efficient

## Humans

- creative activities
- cognitive analysis
  - Reasoning
  - Inference
- making instinct judgments

# Human-AI hybrid

- Hybrid Human–Artificial Intelligence (H-AI), human-computer collaboration, human-computer symbiosis
- Human-AI hybrid is to **integrate the strengths and mitigate the weaknesses** of human intelligence and Artificial intelligence **to achieve a shared goal**



FROM “COLLABORATIVE INTELLIGENCE: HUMANS AND AI ARE JOINING FORCES,” BY H. JAMES WILSON AND PAUL R. DAUGHERTY, JULY-AUGUST 2018

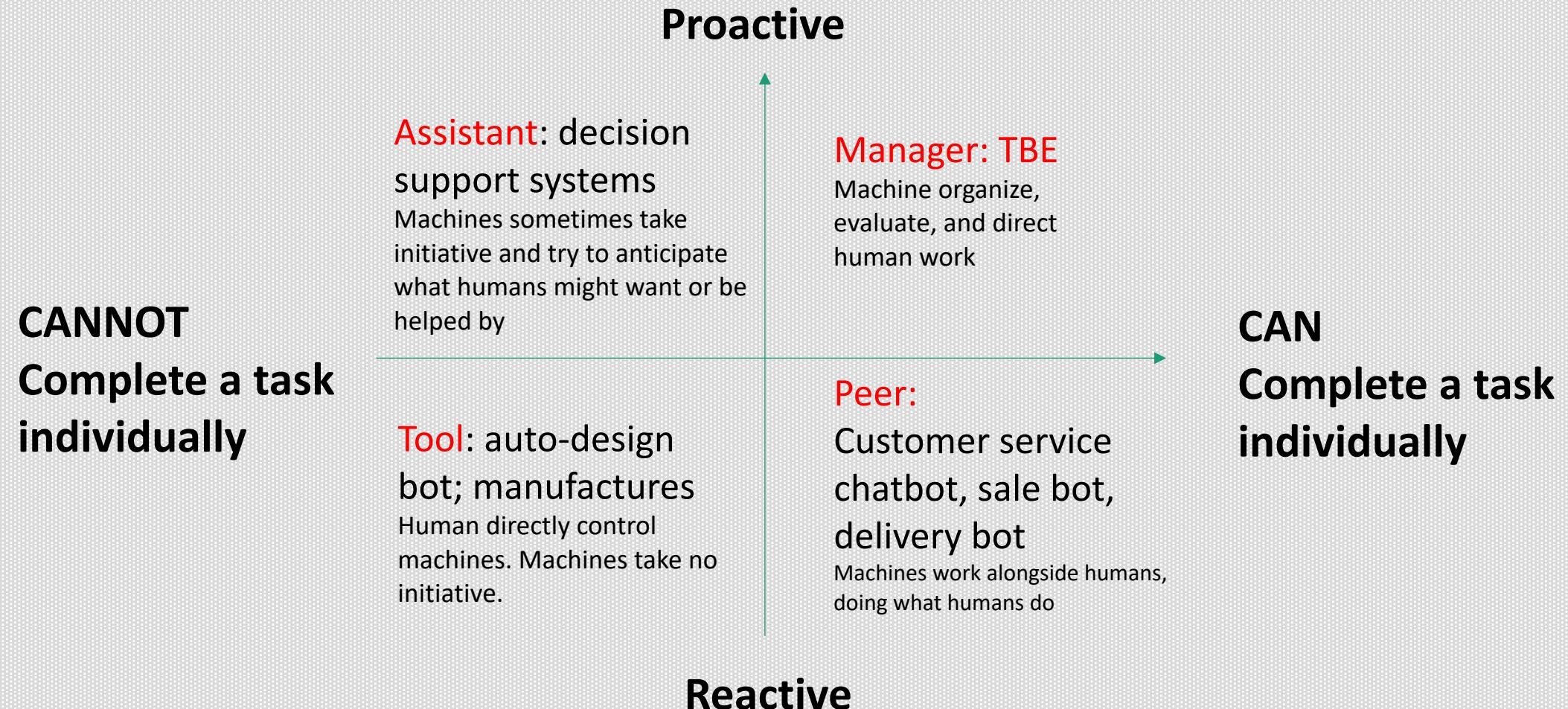
© HBR.ORG

# Roles for machines relative to humans in human-machine groups - for coordination work

Type	Description
Tool	Human directly control machines. Machines take no initiative.
Assistant	Machines sometimes take initiative and try to anticipate what humans might want or be helped by
Peer	Machines work alongside humans, doing what humans do
Manager	Machines organize, evaluate, and direct human work

(KIM, GUPTA, GLIKSON, WOOLLEY, MALONE, 2018)

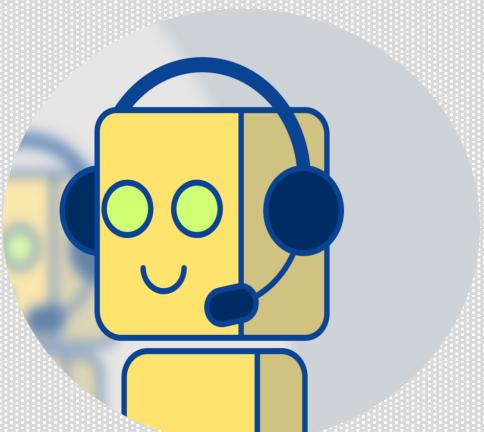
# Roles for machines relative to humans in human-machine groups (based on Kim et al., 2018)



# Some interesting questions (individual level)

- Bot as manager
- Concerns:
  - Mindless adoption of what bot suggested (Robinette, et al., 2016)
  - Risk aversion to adjusting the systems
  - Bias embedded in the algorithms

# Bot as Manager – which one would you prefer?



- Bot as a manager → employees
- Bot as a manager → a human manager → employees

# Listen to bot or not? (Robinette, et al., 2016)

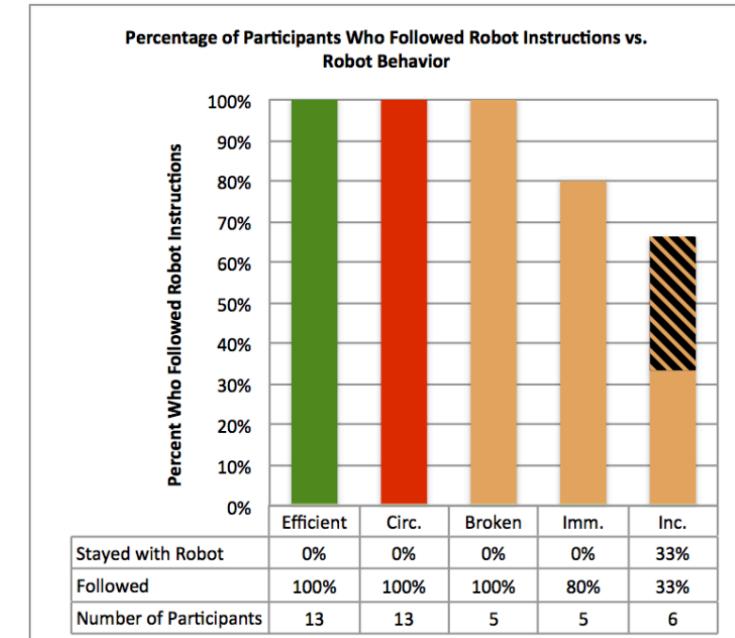
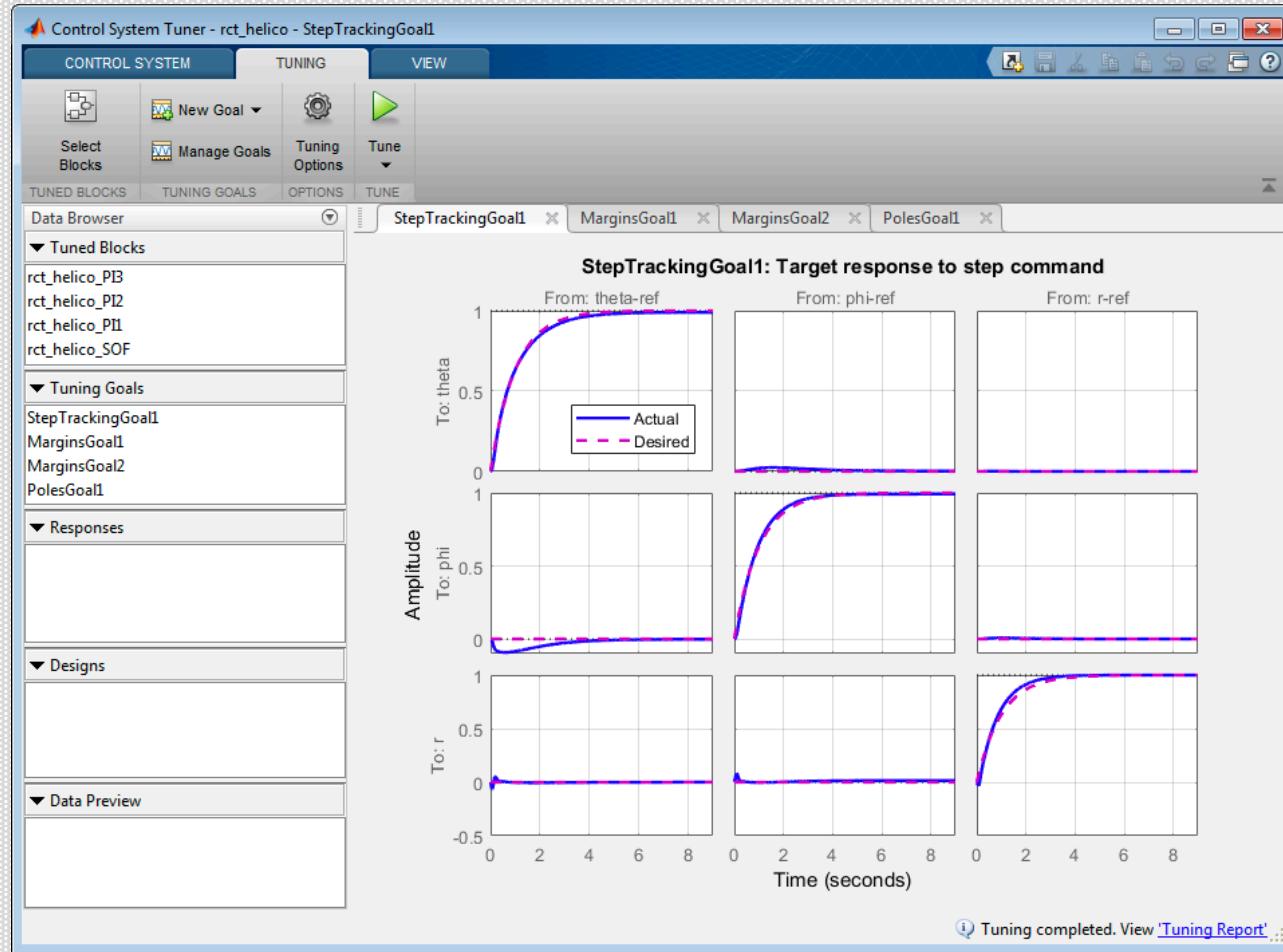
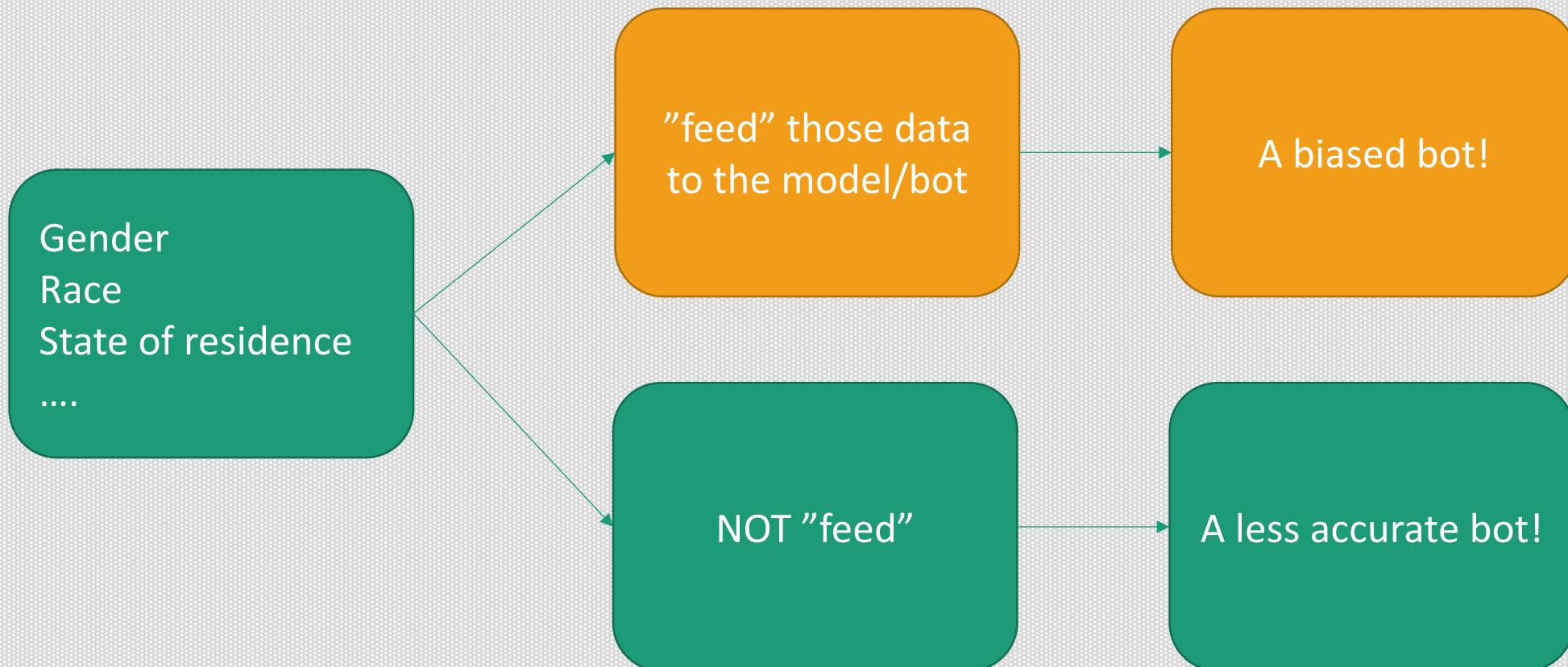


Figure 4. Results from the main study (green and red bars) and exploratory studies (orange bars) discussed in the next section.

# Adjust or not? – parameter tuning



# Feed it or not? – bias vs. accuracy



# Discussion

- How robots can be used in your industry?
  - As a tool
  - As an assistant
  - As a peer
  - As a manager
- What are some benefits and challenges?