Artificial Intelligence and Life in 2030

100 Year Study on AI: 1st Study Panel Report

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https://ai100.stanford.edu

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One Hundred Year Study
Goals of the Endowment

“To support a longitudinal study of influences of AI advances on people and society, centering on periodic studies of developments, trends, futures, and potential disruptions associated with the developments in machine intelligence, and on formulating assessments, recommendations, and guidance on proactive efforts.” (July 2014)
Roots: AAAI Presidential Panel on Long-term AI Futures (Asilomar 2008-09)

Commissioned by AAAI President, Eric Horvitz
Co-chaired by Eric Horvitz & Bart Selman

Charge: Explore potential long-term societal influences of AI advances.

Subgroups focused on

Potential Disruptive Advances Over the Short-term
Longer-term Pace, Concerns, Control
Ethical and Legal Challenges

http://www.aaai.org/Organization/presidential-panel.php
One Hundred Year Study: Timeline of Studies

AAAI Asilomar study

*Standing committee

2015

Study panel

Standing committee

2020

Study panel

Standing committee

2115

...
One Hundred Year Study: Intended Audiences

- Study panel
- Standing committee
- 2015
- AI researchers
- General public
- Industry
- Policy makers

Convey results to multiple audiences
Identify possible *advances* in AI over next 15 years and *their potential influences on daily life*. Specify *scientific, engineering, and legal efforts* needed to realize these developments.

Consider actions needed to shape outcomes for *societal good*, deliberating *design, ethical and policy challenges*.  

Focus: *large urban regions* (typical North American city), grounding the examination of AI technologies in a context that highlights

- *potential influences on a wide variety of activities*
- *interdependencies and interactions among AI technologies*
An Opportunity and a Challenge

• Carte Blanche with respect to format
  • Even flexibility on topic

• Should be topical now at a time of great interest in AI
  • Industry progress, white house studies, press, fear-mongering
  • Balanced view, taking into account possibilities, barriers, and realistic risks

• Also should be relevant over time
• Set a precedent for future studies

• First task: invite panelists
  • Balance of AI areas, seniority, gender, geography (to some extent)
Members of the Inaugural Study Panel
Artificial Intelligence and Life in 2030

Chair: Peter Stone, UT Austin

- Rodney Brooks, Rethink Robotics
- Erik Brynjolfsson, MIT
- Ryan Calo, University of Washington
- Oren Etzioni, Allen Institute for AI
- Greg Hager, Johns Hopkins
- Julia Hirschberg, Columbia
- Shivaram Kalyanakrishnan, IIT Bombay
- Ece Kamar, Microsoft
- Sarit Kraus, Bar Ilan
- Kevin Leyton-Brown, UBC
- David Parkes, Harvard
- William Press, UT Austin
- Julie Shah, MIT
- Astro Teller, X
- Milind Tambe, USC
- AnnaLee Saxenian, Berkeley
Process

• What should the output be?
  • Report? Webpages? Youtube videos? Multimedia?

• What topics?

• Monthly phone calls: outline for a background doc
  • The parts with real impact would come later

• In-person meeting in February: intensive draft writing

• Months of back and forth with a professional writer
  • Became clear the document was going to be our sole output

• Final in-person meeting (callouts)

• Lots of feedback and polishing
Structure

• Preface for context
• Executive Summary (1 page)
• Overview (5 pages)
• Introduction
  • Defining AI; Current research trends
• AI by domain
  • 8 areas with likely urban impact by 2030
  • Look backwards 15 years and forward 15 years
  • Opportunities, barriers, and realistic risks
• Policy and legal issues
  • Current status; Recommendations
• Lots of callouts in the margins
Areas of Focus in the Study Panel Report

Transportation
Home-Service Robots
Healthcare
Education
Public Safety and Security
Low-resource communities
Employment and Workplace
Entertainment

- hardware
- partnering with people
- building trust
- societal futures
- interpersonal interaction
Areas of Focus in the Study Panel Report

Transportation: Short term

Public Safety and Security: Medium term

Meeting needs of low-resource communities: Longer term

Data → Predictive models → Decision models
Transportation: Prediction and Intervention

First domain where public asked to trust AI on a large scale

Problem: Sense surroundings, car state, lane change, parking, route plan..

AI Technologies: Advanced sensors, computer vision, machine learning, ...

Surprising progress in academia and industry:
- Autonomous vehicles (Google, Tesla, Uber, etc)
- Not just cars but drones

But now, must grapple with world full of people
In 15 years, autonomous pickup and delivery of people and packages
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Public Safety and Security: Medium term

Meeting needs of low-resource communities: Longer term

Data → Predictive models → Decision models
Public Safety and Security: Prediction & Intervention

Fraud Detection

Problem: How do we tell which transactions are fraudulent? Credit cards, compromised accounts, etc.

AI Technology: Classification via machine learning

How:

Data: Records of fraudulent and legitimate transactions

Predictive Model: Identify features of fraudulent transactions

Decisions: Autonomous termination of transaction when fraud

Risk: encoding, even magnifying, human biases
Public Safety and Security: Prediction
Predictive policing

Problem: Crime analysis or predict crimes for effective police allocation
        Crime locations, times of higher risk of crime

AI technology: Predictive modeling via machine learning.

How:
   Data: Crime data
   Predictive model: Probability of high-crime areas
Areas of Focus in the Study Panel Report

Transportation: Short term

Public Safety and Security: Medium term

Meeting needs of low-resource communities: Longer term

Data → Predictive models → Decision models
Low Resource Communities: Prediction
Machine Learning for Preventing Lead Poisoning in Children

Problem:
Lead: Severe motor skill/brain impairment in children
Lead found in many homes in paint
▶ Which houses to inspect for lead

AI technology: Machine learning predictive models

How:

Data: 20 year data on children’s blood tests & house inspections

Predictive model: Pre-birth prediction if house needs lead inspections
Low Resource Communities: Prediction & Intervention
Social Networks for Raising HIV awareness in homeless youth

Problem:
Homeless youth HIV: 10x infection rate of general population
Distrust authority; peer interventions to spread HIV information
  ▶ Social network: Uncertain and dynamic

AI technology: Influence maximizing peer leaders

How:
*Data*: Network information
*Decision making*: Most influential peer leaders in network
  Gather more information about network, reduce uncertainty

Decision aid piloted in Los Angeles showing increase in HIV testing
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Service Robots
Healthcare
Public Safety and Security
Education
Meeting needs of low-resource communities
Entertainment
Employment and Workplace

Summarizing callouts in the report