



Tulane University Center for Community-Engaged Artificial Intelligence



<https://sse.tulane.edu/cs/ceai>

SSE

SLA

SPHTM



Aron Culotta
CMPS



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Andrea Boyles
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Patrick Button
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What is Artificial Intelligence?

- A field of study that aims to develop machines that can acquire, understand, and use knowledge effectively.
- Many aspects of intelligence:
 - Perception, knowledge representation, reasoning, planning, learning
- Interdisciplinary:
 - computer science, philosophy, mathematics, psychology, economics, linguistics, neuroscience, ...
- “Artificial Intelligence” coined in the 1950s

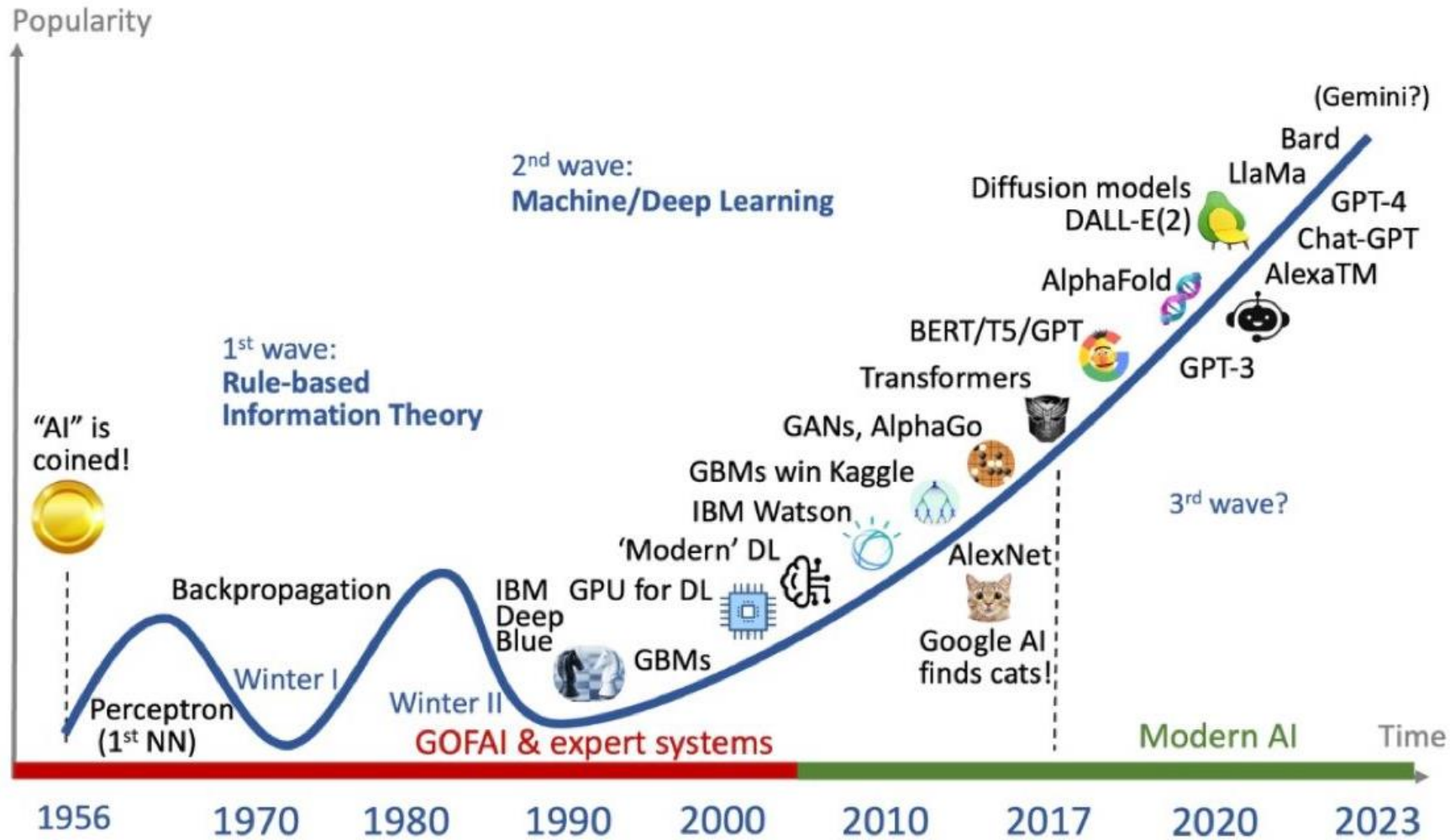
What is Artificial Intelligence?

Dartmouth Workshop

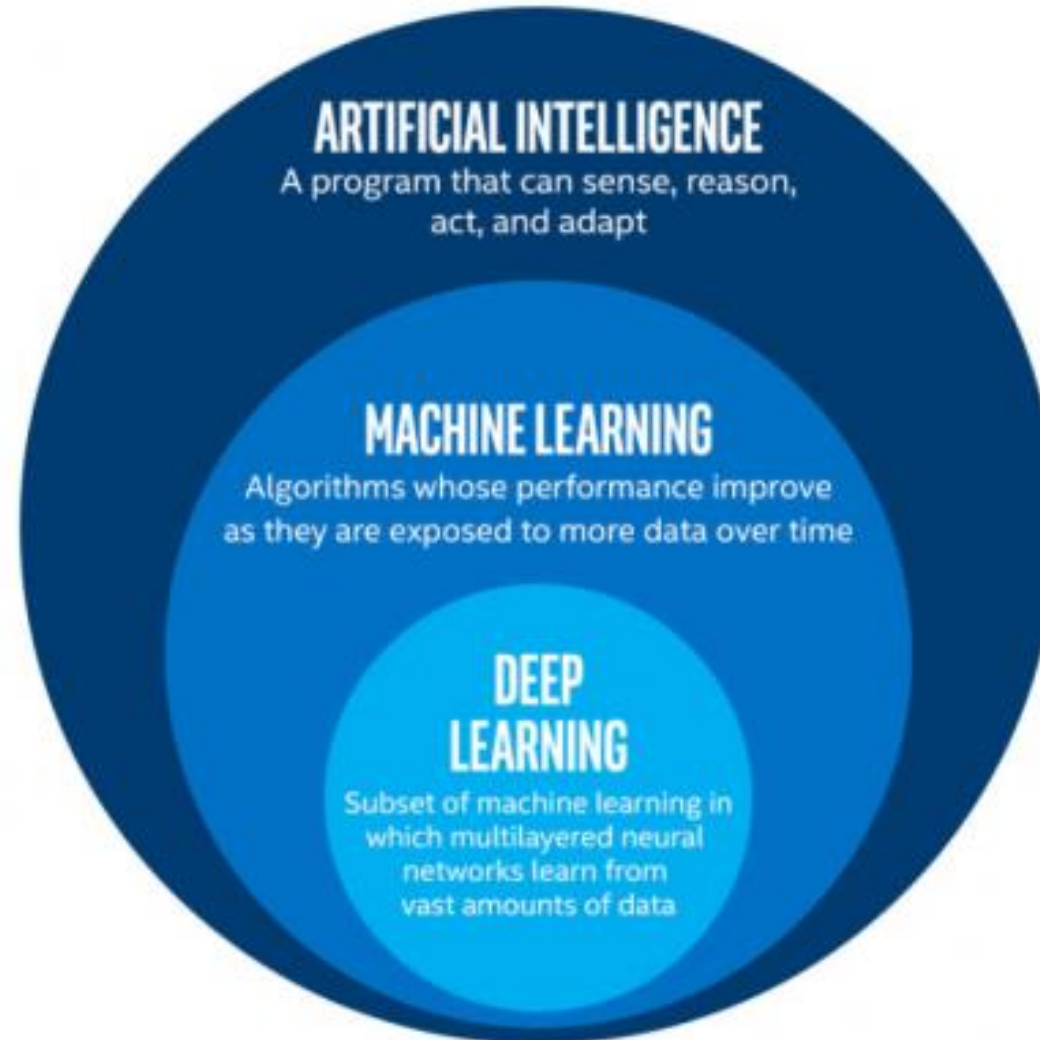
John McCarthy, Marvin Minsky, Nathaniel Rochester, Claude Shannon

We propose that a 2-month, 10-man study of artificial intelligence be carried out during the summer of 1956 at Dartmouth College in Hanover, New Hampshire. The study is to proceed on the basis of the conjecture that **every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it**. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves. We think that a significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it together **for a summer**.

A bumpy road...



Modern AI



What can AI do now?

- Detect cancer in medical images
- Predict spread of wildfires and disease
- Beat the best humans at games like chess, Jeopardy, and Go.
- Write software
- Write cogent essays in response to a wide range of prompts

machine learning + data + computing power + \$\$\$ = major advances in past decade

What can go wrong?

‘Thousands of Dollars for Something I Didn’t Do’

The New York Times

Because of a bad facial recognition match and other hidden technology, Randal Reid spent nearly a week in jail, falsely accused of stealing purses in a state he said he had never even visited.

Amazon scraps secret AI recruiting tool that showed bias against women

 REUTERS

Mental health service criticised for experiment with AI chatbot

NewScientist

The free mental health service Koko experimented with using an AI chatbot to help respond to people seeking support. The test has drawn criticism as being unethical and lacking transparency

Motivation for CEAI

- Most AI systems are developed far from the people they most affect.
- Little oversight or transparency into how system works (or doesn't).
- Quickly evolving technology means that issues of accuracy and equity are still not fully understood.

AI needs new **human-centered** development practices to be socially beneficial.

Vision

To earn trust of communities, AI systems and their design process must:

- 1) be demonstrably equitable, transparent, and accountable
- 2) establish meaningful relationships with diverse stakeholders at all stages of design/deployment
- 3) be used to augment, rather than replace, human interaction

Requires a cross-disciplinary partnership among scholars, community groups, engaged citizens, government

What types of engagement are we talking about?



Collaborative Exploration

- project designed around the needs/goals of a particular community
- prioritize expertise of local knowledge and lived experience
- active involvement from problem formulation to solution

To Improve AI Experience



A new vision of artificial intelligence for the people

In a remote rural town in New Zealand, an Indigenous couple is challenging what AI could be and who it should serve.

To Improve AI Algorithms

- contextualizing data, reducing bias, enabling oversight

Convergence Research

- Collaborative or convergence research ... entails **integrating knowledge, methods, and expertise from different disciplines** and forming novel frameworks to catalyze scientific discovery and innovation.
- The convergence paradigm intentionally brings **together intellectually diverse researchers and stakeholders** to frame the research questions, develop effective ways of communicating across disciplines and sectors, adopt common frameworks for their solution, and, when appropriate, develop a new scientific vocabulary.

Convergence Research

Artificial Intelligence Human-centered Design Participatory Research
Machine Learning Ethical AI Inequality Health Equity
Optimization Natural language processing Race & Intersectionality
Group Decision Making Discrimination
Game Theory Causal Inference Criminology Economics



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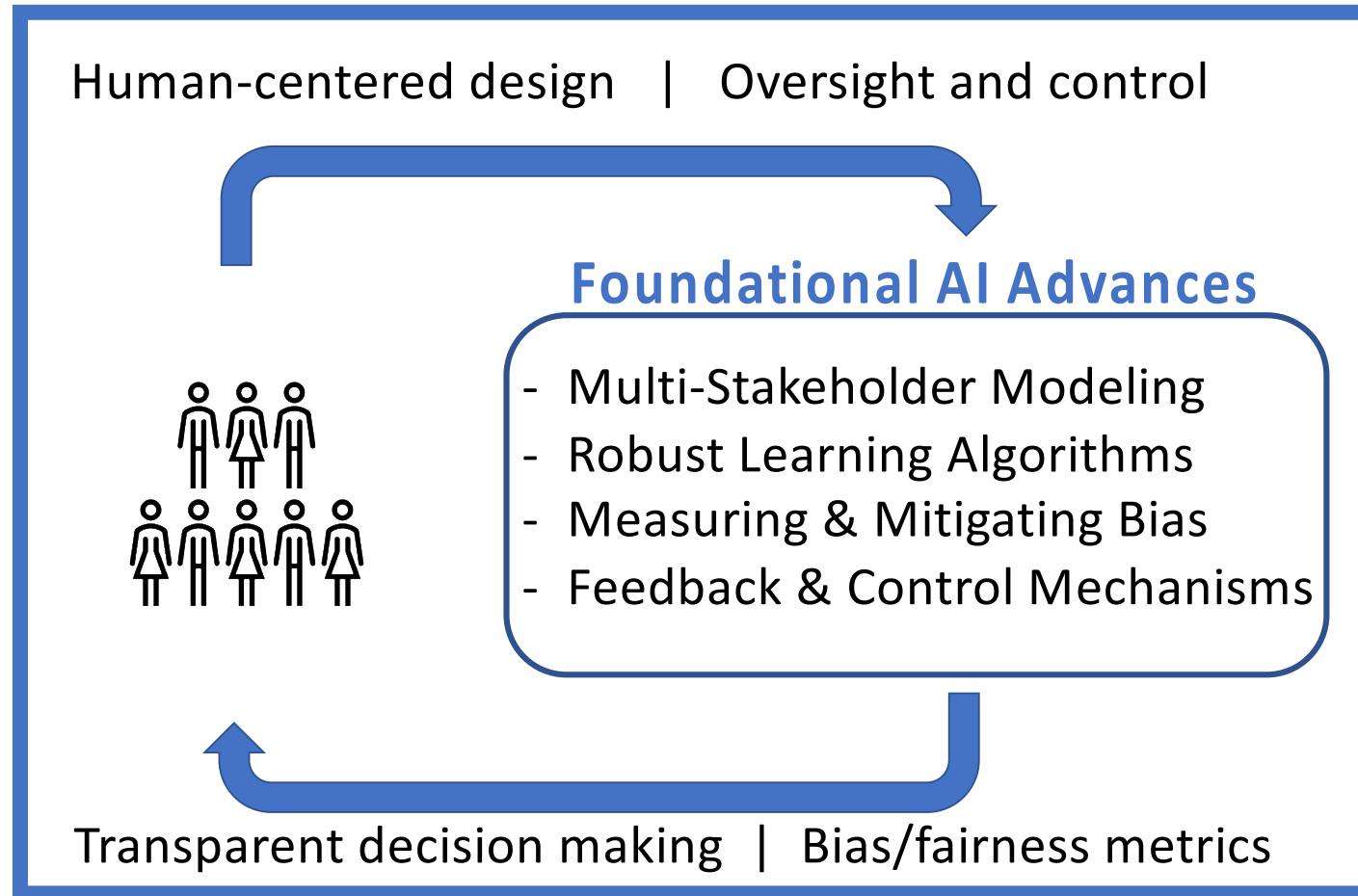
Alessandra Bazzano



Caryn Bell

CEAI Overview

Community-Engaged AI



Social Impact

Public Health

Criminal
Justice

Employment

Housing

Research Directions

- Project 1: Understanding community perceptions of AI
- Project 2: Developing new computational methodologies for community-engaged AI
- Project 3: Equitable AI for Public Health Applications
- Project 4: AI for Discrimination Detection

Understanding community perceptions of AI

“Artificial Intelligence: Risks and Benefits for Local Communities”

Friday April 28th, 2023

9:00am - 12:00pm

Tidewater Building - Diboll Gallery - Tulane University - 1440 Canal Street



“What does the future of AI look like for your community?”

What are the benefits?



What are the challenges?



Black Perceptions of Neighborhood Safety and Artificial Intelligence in Crime Prevention

Andrea S. Boyles, Sociology

- Black perceptions regarding neighborhood safety and crime prevention tend to vary by generations and residential statuses.
- Older Black residents and homeowners are likelier to embrace ideas of increased police surveillance, while younger residents and renters are more distrustful and resistant to police involvement.
- Does the use of artificial intelligence in policing make a difference in Black residents' perceptions of safety and crime prevention?

Analyzing the Equity of Bond Decisions in Orleans Criminal Court

Aron Culotta, CMPS



CourtWatch NOLA is a non-profit organization dedicated to promoting transparency, equity, and justice in the criminal court system. By training volunteers to observe and report on thousands of criminal court cases a year, Court Watch NOLA works to ensure judges, prosecutors, public defenders, sheriff deputies, police officers, and other criminal justice actors are doing their jobs professionally, transparently, fairly, and economically.

Darrin Browder – Executive Director

Jesse Manley – Deputy Director

Analyzing the Equity of Bond Decisions in Orleans Criminal Court

Aron Culotta, CMPS CS Capstone Students: Anna Schoeny, Marisa Long, Ethan Sollender

Docket Search

Please enter the information associated with

Magistrate Number

Defendant Name

Section

Charge Code

Charge Name

Bond Total
 Min

Date of First Proceeding
 Start

Date of Any Proceeding
 Start

Keyword(s) from proceeding text

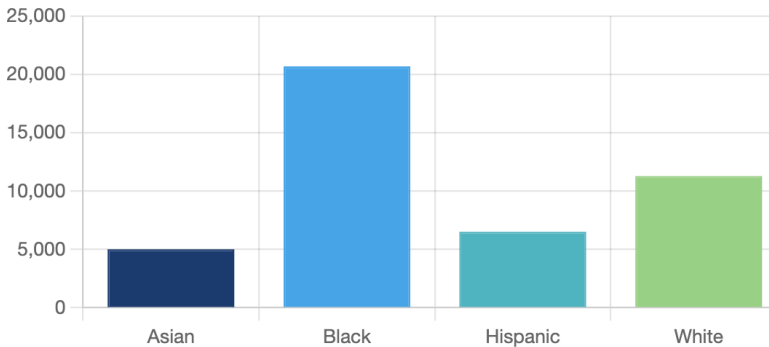
Filter to: ROR Stay away order
 Charge type: Violent crimes Domestic violence Child abuse Property crime Substance use Sex offense Public Health Violation

Docket Search Results

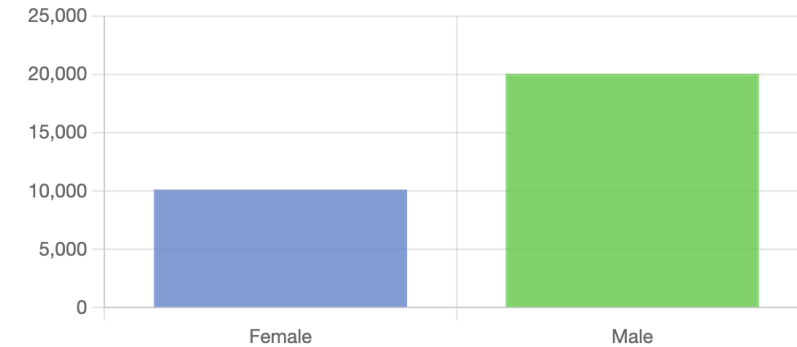
Your query matches the following documents

| Magistrate Number | Defendant | |
|-------------------------|-------------|-------|
| 607521 | | |
| Demographic Information | | |
| Race | Sex | |
| B | M | |
| Charges | | |
| Charge Code | Charge Name | |
| RS 14 94 | ILLEGAL USE | |
| RS 14 56 A 1 | SIMPLE CRIM | |
| RS 14 37.4 | AGG ASSAULT | |
| RS 14 62.8 | HOME INVASI | |
| RS 14 35.3 I | DOMESTIC AB | |
| | LAW | |
| Proceedings | | |
| Date | Section | Clerk |
| | M1 | NELI |
| CDC Charges | | |
| Charge Code | Charge Name | |
| CDC Proceedings | | |
| Date | Section | Clerk |
| 607500 | | |
| 607504 | | |

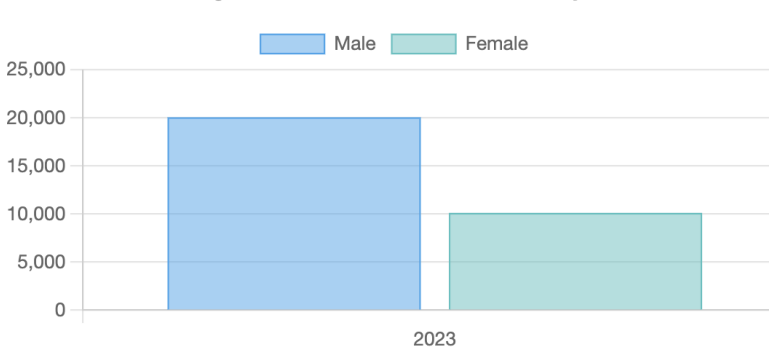
Average Bond Amount by Race



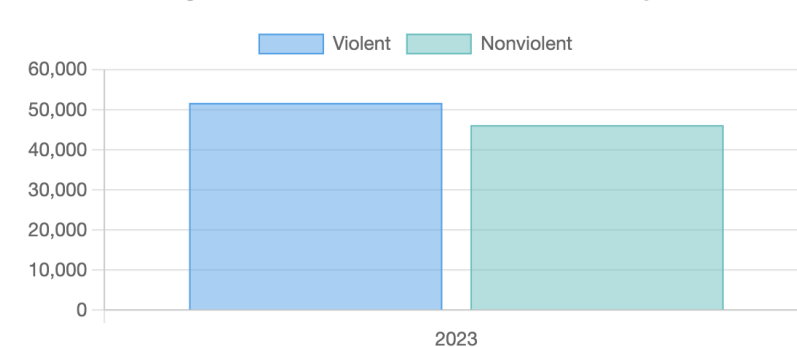
Average Bond Amount by Sex



Average Bond Amount for Males v Females by Year



Average Bond Amount for Violent v Nonviolent Crimes by Year



>100K cases from 15 years

Supporting Transparency and Equity in the Criminal Legal System through a Community-Engaged Digital Platform

Aron Culotta, Andrea Boyles, Andrea Armstrong

- NSF Smart & Connected Communities Program
 - The S&CC program encourages researchers to work with community stakeholders to identify and define challenges they are facing, enabling those challenges to motivate use-inspired research questions.
- We propose to develop more rigorous data analysis methods to provide oversight in criminal legal system
 - Natural language processing to extract information from case notes
 - Neural networks to perform counterfactual analysis
 - Human-in-the-loop systems to actively acquire important information from court observer

Using Large Language Models to Understand City Government

Aron Culotta, CMPS; CS Capstone Students: Catherine Brooks, Hayden Outlaw, Mikey Sison

- Eye on Surveillance: non-profit focused on providing oversight into how the government uses surveillance technology
- They created a tool based on ChatGPT to summarize City Council transcripts in response to user questions.



How close is the city council to a full ban on short term rentals?

15 days ago

The city council appears to be taking decisive action on short-term rentals, but it's unclear if they are approaching a full ban. While they have certainly condemned the current situation and proposed restrictions, there seems to be a lack of consistency and urgency in their actions. Their focus app...

 0  Share [Report Response](#)



Using Large Language Models to Understand City Government

Aron Culotta, CMPS; CS Capstone Students: Catherine Brooks, Hayden Outlaw, Mikey Sison

- How can we ensure that such models provide diverse and accurate information on controversial topics?
- We are developing an evaluation framework for humans to rate the bias and accuracy of the results.
- With this, we can then investigate methods to tune the language model to more accurately and objectively respond to user questions.

Fairness in Microlending Recommendation Systems

Nicholas Mattei, CMPS



Samoa

\$550 helps Rosalina to buy banana tube, taro roots, wheelbarrow, water tank, hand gloves, rake, and shovel.

Eco-friendly Agriculture

\$350 to go

View loan >

- Kiva is a crowd funding platform for micro-loans
 - ~\$2B in loans, ~4M borrowers, ~2M lenders; 77 countries
- A recommendation algorithm directs potential lenders to certain loans
- **What would it mean for this algorithm to be “fair”?**
 - Fair to whom? Lenders, borrowers, Kiva, ...
 - How is fairness measured?
 - Equal opportunity; equal outcomes; distributive justice; meritocracy,...
- **How to deal with conflicting notions of fairness?**
 - E.g., riskier loans may have greater impact, but if not repaid, will reduce funds available to other borrowers

Fairness in Microlending Recommendation Systems

Nicholas Mattei, CMPS

- Conducted structured interviews with diverse stakeholders to understand tradeoffs and values
- Developed solution to increase exposure of underfunded loans, while preserving quality of the rest of the system.

Spotlighted by Kiva

We're spotlighting these loans because they haven't gotten the attention they need — and we need your help to fund them.



Geoffrey

Uganda / Livestock



Aijamal

Kyrgyzstan / Livestock



Madina

Tajikistan / Cattle



Parizat

Kyrgyzstan / Dairy

[1] Burke, Robin, et al. "A performance-preserving fairness intervention for adaptive microfinance recommendation." *Proceedings of OARS*.

[2] Smith, Jessie J., et al. "The Many Faces of Fairness: Exploring the Institutional Logics of Multistakeholder Microlending Recommendation." *Proceedings of the 2023 ACM Conference on Fairness, Accountability, and Transparency*. 2023.

Fairness in Hiring

Patrick Button, ECON; Nicholas Mattei, Disa Sariola, Aron Culotta, CMPS

Amazon scraps secret AI recruiting tool that showed bias against women



- Long history of “audit studies” to measure discrimination in society
- E.g., send identical resumes to job openings, but change name from male-sounding to female-sounding
- Measure difference in callbacks
- Can audit studies improve our understanding of AI discrimination?
- Can AI improve our ability to conduct audit studies?

Fairness in Hiring

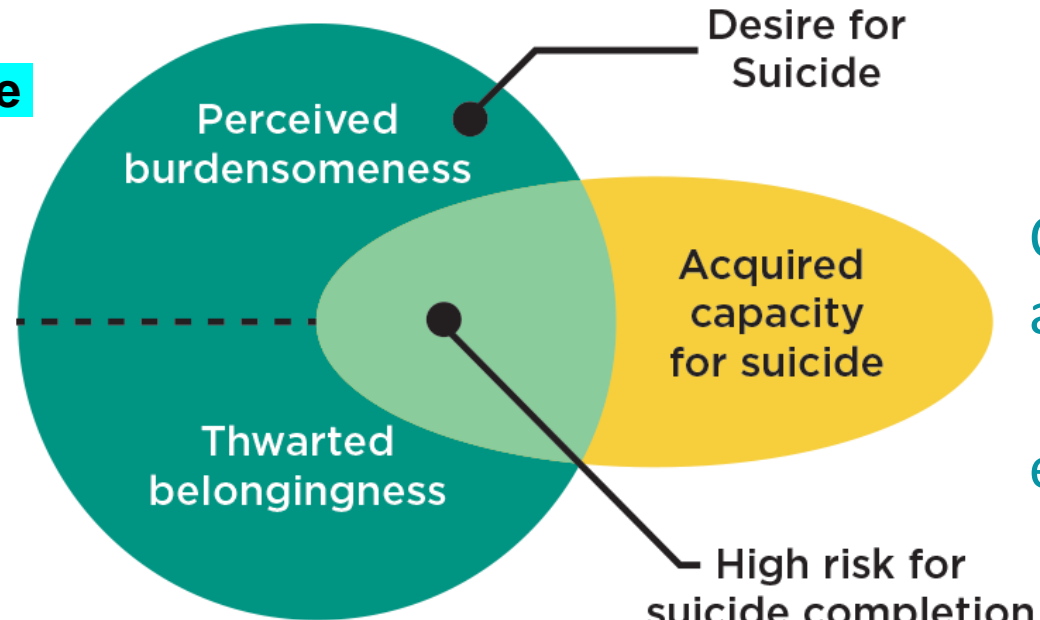
- Pilot study: trained a machine learning algorithm on audit study data to mimic a resume screening tool
- Measuring how equitable the AI system is compared to humans
- Investigating how data quality influence equity
 - E.g., if data is more like “the real world,” how does that affect our measures of algorithmic bias?
- Future work:
 - analyze text of responses to identify linguistic markers of disparate treatment
 - Investigate other domains (loans, rental applications)

Detecting suicidal ideation on social media

Simone Skeen, SPHTM

“I think **my family would be relieved if I was gone.**”

“I just realized **how alone I am here.** Absolutely no friends...”



Joiner, Thomas. *Why people die by suicide.* Harvard University Press, 2005.

Can we identify such utterances automatically in online forums?

e.g., on Reddit r/SuicideWatch

Detecting suicidal ideation on social media

“I just realized **how alone I am here**. Absolutely no friends...”

“I think **my family would be relieved if I was gone**.”

- Conducted manual coding of hundreds of posts for model fitting and evaluation.
- Developed a natural language classifier that identified the two constructs with ~80% accuracy.
- Pilot study indicates feasibility

Next steps:

- Apply classifier to >100k posts to discover trends in data
- Work with health professionals and individuals to better understand significance and implications of this type of technology

How can community engagement strengthen the social innovation potential of AI for public health?

Alessandra Bazzano, SPHTM



ISIRC2023

International Social Innovation
Research Conference

- Community involvement in AI can help ensure that AI is developed in a human-centered way, particularly addressing the needs of underrepresented and minoritized communities who often face greater health disparities
- Public health has a strong tradition of community engagement and participation.
- How can the techniques and knowledge gained from years of public health community engagement inform AI research, to ensure it benefits all members of society and promotes health equity?

Linguistic Analysis to Understand Perceptions of Racial Health Disparities

Caryn Bell, SPHTM

- Popular press has increasingly discussed racial health disparities as a key public health issue
- How do different constituencies (journalists, politicians, public health officials, general public) vary in how they talk about this issue?
- How do public health declarations vary in content by region and political preferences?

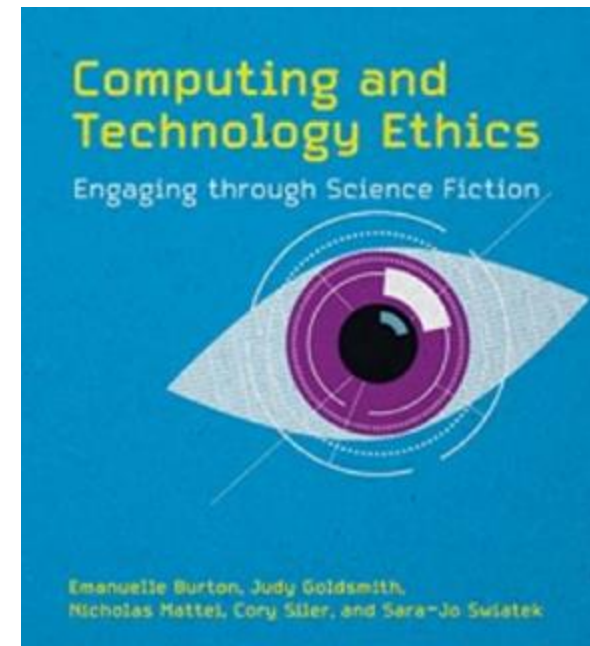
Other Highlights from Year 1

Computing and Technology Ethics: Engaging Through Science Fiction

- Available NOW! From MIT Press
- Chapters covering Ethical Frameworks, Managing Knowledge, Privacy and Personhood, Technology and Society, and Professional Ethics
- Anthology of short stories from acclaimed writers including Ken Liu, Elizabeth Bear, Paolo Bacigalupi, and T. C. Boyle to animate ethical challenges in computing technology



<https://rebrand.ly/SciFi-Book>



MIT Sloan

Management Review

DATA PROTECTION

Use Open Source for Safer Generative AI Experiments

Commercial AI services can put proprietary data at risk — but there are alternatives.

By Aron Culotta and Nicholas Mattei

- Preventing data leakage
- Adapting to changing data
- Mitigate systemic biases
- Data stewardship

Events

- [Gulf Coast Artificial Intelligence Social – Neural Information Processing Systems Conference](#)
(Dec 2022 and Dec 2023)
 - Forum to raise awareness about the AI work happening in the region, including the unique and pressing challenges where AI/ML/DS research can have impact including coastal, climate, logistics, and materials.
 - Tulane, LSU, UNO, ULL, UWF
- Distinguished Speakers at Tulane
 - “Outracing Champion Gran Turismo Drivers with Deep Reinforcement Learning,” **Peter Stone**, UT-Austin, Truchard Foundation Chair in Computer Science and Director of Texas Robotics. Nov’22
 - “Machine Learning for Engineering,” **Pascal Van Hentenryck**, A. Russell Chandler III Chair and Professor in the H. Milton Stewart School of Industrial and Systems Engineering at Georgia Tech; director of the NSF Artificial Intelligence Institute for Advances in Optimization. May’23

Selected Presentations

1. **Andrea Boyles:** "Racial-Spatial Artificial Intelligence: Exploring the Legalization and Legitimization of Police Bias and Mistreatment through Technology," presented to Law and Society Association (LSA) Annual Conference, 2023
2. **Andrea Boyles** Presented at the United Nations (UN) for CSW 67 (Commission on the Status of Women), entitled "The Technology Dichotomy: Black Women's Push for Advancement in the Age of Digital Misogynoir." SWS-NGO Panelist, 67th Commission on the Status of Women (CSW).
3. **Patrick Button:** "Sexual orientation discrimination in access to mortgages," Federal Reserve Board of Atlanta (April 2023).
4. **Caryn Bell:** "Upending Power Inequities in Community-Based Research: The role of Community Knowledge and Expertise," Center for Public Service Speaker Series (Nov 2022)
5. **Nicholas Mattei:** Leveraging Data and Artificial Intelligence for Human Centered Computational Reasoning and Choice – UNSW.ai Institute Invited Talk (March 2023).

Many podcasts, panels, news articles, etc.

- CityBusiness; Hullabaloo; On Good Authority; GNO, Inc; CELT; Newcomb Gallery, Tulane Library; ...

Goals for Year 2

- Create Community Advisory Board to encourage regular interaction with broad group of community leaders and organizations.
- Fund seed grants to foster Community-Engaged AI across the university.
- Hire staff to help coordinate projects and interface with community groups
- Work with CAIDS on joint programming
- Invited speakers on AI Ethics for general audience
- Continue to publish in high-quality, multi-disciplinary venues
- Targeting several NSF/NIH solicitations to secure additional funding
- Work with development office to identify additional funding sources



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Thank you!



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Year 1 Publications

- Emanuelle Burton, Judy Goldsmith, Nicholas Mattei, Cory Siler, and Sara-Jo Swiatek. *Computing and Technology Ethics: Engaging through Science Fiction*. MIT Press, Spring 2023. (Book)
- **Linsen Li, Aron Culotta**, Douglas N. Harris, **Nicholas Mattei**. "Online Reviews Are Leading Indicators of Changes in K-12 School Attributes." *In the proceedings of the ACM Web Conference*, 2023. (19% acceptance rate).
- **Xintian Li, Aron Culotta**. "Forecasting COVID-19 Vaccination Rates using Social Media Data." *The 11th International Workshop on Natural Language Processing for Social Media at The ACM Web Conference*, 2023.
- **Xintian Li, Aron Culotta**. "Domain Adaptation for Learning from Label Proportions Using Domain-Adversarial Neural Network", *Springer Nature Computer Science*, to appear
- **Alessandra Bazzano, Caryn Bell, Andrea Boyles, Patrick Button, Aron Culotta, Nicholas Mattei**, "How can community engagement strengthen the social innovation potential of AI for public health?" *15th International Social Innovation Research Conference (ISIRC 2023)* Guimarães, Portugal
- Harrell, Benjamin, Luca Fumarco, **Patrick Button**, David Schwegman, and Kyla Denwood. 2023. "The Impact of COVID-19 on Access to Mental Healthcare Services" *American Economic Association - Papers and Proceedings*, 113:420-2.
- **Aron Culotta** and **Nicholas Mattei**, "Responsible Data Stewardship in the AI Era," MIT Sloan Management Review, 2023
- Omer Lev, **Nicholas Mattei**, Paolo Turrini, Stanislav Zhydkov. "PeerNomination: A Novel Peer Selection Algorithm to Handle Strategic and Noisy Assessments." *Artificial Intelligence* 316: 103843, 2023.
- Xiaolin Sun, Jacob Masur, Ben Abramowitz, Zizhan Zheng, and **Nicholas Mattei**, "Pandering in a Flexible Representative Democracy," *Proc. of the 39th Conference on Uncertainty in Artificial Intelligence (UAI 2023)*.
- Jessie J. Smith, Anas Buhayh, Anushka Kathait, Pradeep Ragothaman, **Nicholas Mattei**, Robin Burke and Amy Volda. "The Many Faces of Fairness: Exploring the Institutional Logics of Multistakeholder Microlending Recommendation." *Proc. of the 6th ACM Conference on Fairness, Accountability, and Transparency 2023 (ACM FAccT 2023)*.
- **Karthik Shivaram**, Ping Liu, Matthew Shapiro, Mustafa Bilgic, **Aron Culotta**. "Characterizing Online Criticism of Partisan News Media using Weakly Supervised Learning," *In the proceedings of the 18th International AAAI Conference on Web and Social Media*, 2024. (R&R)
- Fumarco, Luca, Benjamin Harrell, **Patrick Button**, David J. Schwegman, and E Dils. 2023. "Gender Identity, Race, and Ethnicity-based Discrimination in Access to Mental Health Care: Evidence from an Audit Correspondence Field Experiment." R & R at the *American Journal of Health Economics*. (R&R)