The Nature of Attitudes Towards Artificial Intelligence Among Mass Publics

Ignacio Urbina[1]   Oleg Smirnov [1]

April 23, 2024

[1]State University of New York at Stony Brook

- Artificial intelligence (AI) has seen an unprecedented adoption across many sectors of the economy and social life.
- There has been debate on the need to consider the public views on AI to guide regulation and democratic governance.
- Measurement: General Attitudes Toward AI.
- Yet, it is unclear the extent to which a general, unidimensional, attitude allows to sufficiently explains AI attitudes toward specific applications.

Research Question

- To probe the structure of attitudes towards AI we ask the following questions:

  - Are the attitudes based on a single underlying dimension (e.g., a simple positive versus negative attitudinal space), or are they domain-specific (e.g., personal assistants, autonomous vehicles, face recognition, and so on)?
  - What is the role of the social and political context surrounding those domains, and could AI attitudes, even within a single domain, differ depending on the specific application of the technology?

Conceptualizing AI

- AI has been characterized as "the science and engineering of making intelligent machines" (Rajaraman, 2014).
- intelligence entails the capacity to learn and apply techniques to address challenges and achieve goals in a dynamic environment (Auernhammer, 2020).
- AI technologies and applications can have different domains (e.g., computer vision, recommendation systems, classification, etc)

The origins of AI Attitudes

Public attitudes towards AI are shaped by a variety of factors

- Concerns about diversity and inclusion.
- Individuals' perceptions of societal norms and expectations—must play an important role in forming attitudes towards AI.
- Concerns about privacy.
- Perceptions of control and autonomy.
- Conspiracy theories (Stein et al., 2024).
- General trust in industry, government, and academic community.

Study's Design and Analysis

- We employ EFA on more than 50 items tapping on AI beliefs and perception on a sample of more than 5,000 US adults fielded by Pew Research on November 2021. We analyze factor correlations and scores distributions.
- The survey focus: Decision and classification systems algorithms (focus on content moderation in social media), computer vision algorithms (focus on facial recognition), and automated vehicles.
- We use the scree plot and the Kayser criterion to decide on how many factors to extract.
- We use an an oblique rotation to improve factor structure interpretation (oblimin rotation).

Factor Correlation Structure

- We extracted 12 factors accounting for roughly 60% total item variance.
- We find a multidimensional structure of AI attitude.
- E.g., We observe that respondents' perception of facial recognition technology can be explained with four distinct factors: (1) public surveillance, (2) concerns about biases, (3) policing, and (4) commercial applications.
- While all the questions measure respondents' attitudes toward facial recognition, we see that the social context matters, creating four distinct clusters of opinions.

Structure

| Conjectured Substantive Factor	
Autonomous vehicles – individual acceptance (personal comfort and general sentiment)	**F1**
Facial recognition – public surveillance (civil liberties and surveillance)	**F2**
AI-based algorithmic decision-making (health, real estate/finance, employment)	**F3**
Information management online (political censorship, misinformation)	**F4**
Knowledge of AI technologies (driverless cars, facial recognition, algorithms)	**F5**
AI-based critical decisions and insights (life decisions, access to human thoughts)	**F6**
Facial recognition – concerns and biases (false arrests, racial bias, privacy invasion)	**F7**
Facial recognition - law enforcement (public safety and crime resolution)	**F8**
AI practical applications across contexts (chores, repetitive tasks, customer service)	**F9**
Information and communication benefits (greater accessibility, conversations quality)	**F10**
Autonomous vehicles - societal Integration (transportation and logistics)	**F11**
Facial recognition – commercial applications (daily settings, privacy and business security)	**F12**
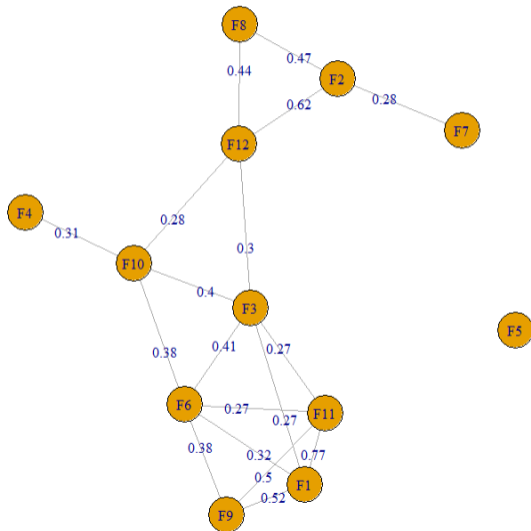
Distribution
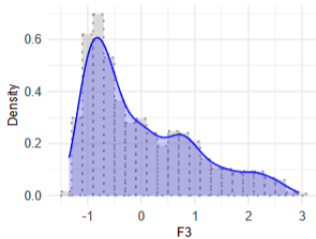
Discussion
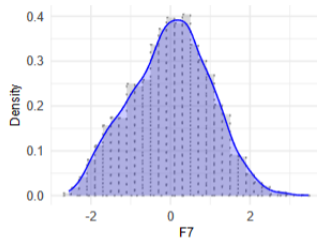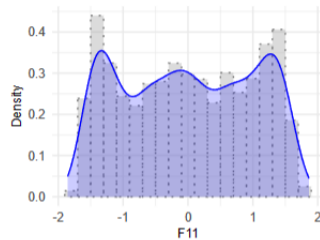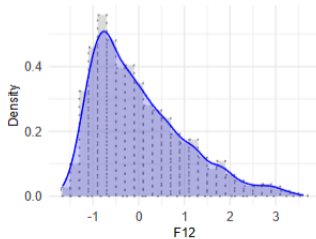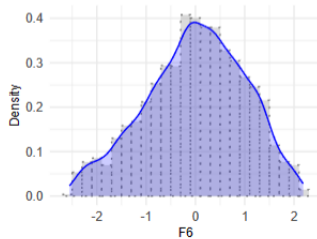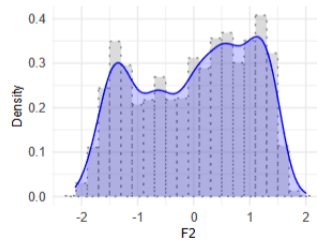
- Our analysis suggest a multidimensional structure of AI attitudes around three conceptualizations: (a) General Attitude Dimensions, (b) Public Opinion on Specific Technologies, (c) Contextual Influences on Attitudes

- We find low to moderate correlations across AI attitudes with some exceptions.

- We find important differences in the distributions of these attitudes.

- We note that we are limited on two fronts: the possibly outdated measures and the limited subset of AI domains and contexts.

- Out study has implications for measurement of AI public sentiment and democratic governance of the technology.

Factor	Renamed Item	Relevant Loadings	Wording	Detail (Target / Statement / Responses)
F1			**Autonomous vehicles – individual acceptance**	
	dcars would ride	0.766	Would you personally want to ride in a driverless passenger vehicle, if you had the opportunity?	Definitely want, Probably want, Probably NOT want, Definitely NOT want
	dcars idea judgment	0.784	Do you think widespread use of driverless passenger vehicles would be a...	Good idea for society, Bad idea for society, Not sure
F2			**Facial recognition – public surveillance**	
	aiface eval crowded events	0.919	Would you consider each of the following uses of facial recognition technology by police to be acceptable or not acceptable? Scanning people ...	Large events to see who is in the crowd
	aiface eval public protest	0.802	Would you consider each of the following uses of facial recognition technology by police to be acceptable or not acceptable? Scanning people ...	At public protests
F3			**AI-based algorithmic decision-making**	
	ai pref medicaldecis	0.785	Computer programs like the ones used by social media companies to find false information could be used for a number of purposes. Would you favor or oppose the use of computer programs to make final decisions about each of the following?	Which patients should get a medical treatment
	ai pref parole	0.834	Computer programs like the ones used by social media companies to find false information could be used for a number of purposes. Would you favor or oppose the use of computer programs to make final decisions about the following?	Which people should be good candidates for parole

F4			**Information management online**	
	aism eval mistakes rev	0.843	Do you think widespread use of computer programs by social media companies to find false information is making the following happen on their sites?	Statement: 'News and information are being wrongly removed'
	aism eval censorship rev	0.859	Do you think widespread use of computer programs by social media companies to find false information is making the following happen on their sites?	Statement: 'Political viewpoints are being censored'
F5			**Knowledge of AI technologies**	
	aiface knowledge	0.805	How much have you heard or read about facial recognition technology by police?	A lot
				A little
				Nothing at all
F6			**AI-based critical decisions and insights**	
	ai cap diag medical	0.5	How excited or concerned would you be if artificial intelligence computer programs could	diagnose medical problems

Appendix

Factor	Renamed Item	Relevant Loadings	Wording	Detail (Target / Statement / Responses)
F7			**Facial recognition – concerns and biases**	
	aiface eval tracklocation rev	0.557	If the use of facial recognition technology by police becomes widespread, do you think each of the following would happen? The police would...	Be able to track everyone's location at all times
	aiface eval racebias rev	0.621	If the use of facial recognition technology by police becomes widespread, do you think each of the following would happen? The police would...	Monitor Black and Hispanic neighborhoods
F8			**Facial recognition - law enforcement**	
	aiface eval missingpers	0.667	If the use of facial recognition technology by police becomes widespread, do you think each of the following would happen? The police would...	Find more missing persons
	aiface eval efficiency	0.759	If the use of facial recognition technology by police becomes widespread, do you think each of the following would happen? The police would...	Solve crimes more quickly and efficiently
F9			**AI practical applications across domains**	
	ai cap repeti work task	0.673	How excited or concerned would you be if artificial intelligence computer programs could	perform repetitive workplace tasks
	ai cap house chores	0.734	How excited or concerned would you be if artificial intelligence computer programs could	perform household chores

F10			**Information and communication benefits**	
	aism eval better-conver	0.84	Do you think widespread use of computer programs by social media companies to find false information is making the following happen on their sites?	Statement: 'It is allowing people to have more meaningful conversations'
F11			**Autonomous vehicles - societal Integration**	
	dcars pref delivery	0.813	The technology used to operate driverless passenger vehicles could be used for a number of purposes. Would you favor or oppose the use of this technology in each of the following purposes?	Delivery vehicles
	dcars pref public-transbus	0.882	The technology used to operate driverless passenger vehicles could be used for a number of purposes. Would you favor or oppose the use of this technology in each of the following purposes?	Buses for public transportation
F12			**Facial recognition – commercial applications**	
	aiface pref credit-security	0.707	Facial recognition technology could be used for a number of purposes. Would you favor or oppose the use of facial recognition technology for each of the following purposes?	Statement: 'Stores enhancing credit card payment security'
	aiface pref workat-tend	0.732	Facial recognition technology could be used for a number of purposes. Would you favor or oppose the use of facial recognition technology for each of the following purposes?	Statement: 'Com-panies autom. tracking the attendance of their employee'