

## Committee of Infrastructure: Civic Agency and Representation

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### Abstract

This article examines image classification bias exhibited through machine vision and the issue of agency and representation within the context of a speculative city council meeting. In this paper I present a project that purposely shows bias in order to reveal how easily Machine Learning (ML) algorithms can problematize a situation. I identified a scenario, voting for the removal of traffic lights, as a medium to discuss the topic of bias and agency. This work contributes to the discourses of speculative design and civics in design research.

### Keywords

Civics; Machine Learning; Speculative Design; Agency; Speculative Civics

### Introduction

Artificial intelligence's nascent dominance and pervasiveness in the mediation of our everyday interactions is making it harder to create boundaries of personal space and to distinguish how ruthlessly it changes human behavior. Individuals are becoming increasingly reliant on these services as they become more embedded and necessary to daily life. These Artificial Intelligent (AI) systems such as personal assistants, route planning, language translation<sup>1</sup>, and image sorting<sup>2</sup> are creating a multi-layered and interdependent environment that obfuscates the machinery of the system.

Machine Learning (ML) algorithms in the civic sector are currently being used in the criminal justice, health, and welfare sectors to augment the decision making of federal and state employees. In

the criminal justice system this has led to sentencing imbalances amongst different races. The COMPAS algorithm used by the Department of Corrections in Wisconsin, New York, and Florida has led to harsher sentencing towards African Americans.<sup>3</sup> Although we cannot ascertain the specific type of algorithm used in the criminal sentencing sector, the same issue extends to ML. Bias, if left unexamined, exacerbates the problems it is trying to mediate.

### Committee of Infrastructure Design Project

Committee of Infrastructure is a speculative design project [1] that interrogates the issue of agency and representation with the domain of ML and AI. The project considers how humans and AI systems interact with each other in a local government setting to negotiate issues pertaining to a local community. It explicitly positions human representatives and representatives of AI systems as stakeholders within a local council meeting. These two types of representatives express conflicting positions, ideologies, and motivations. The project asks whether our AI civic representatives will be as intolerant as humans, or can we program a diversity of voices and positions to reflect the populace and other forms of life that create our world? The meeting is intended to the diversity of opinions both human and nonhuman that can be considered as meaningful representatives of a particular position. Like a real city council meeting, the projects intends that these speculative stakeholders will be able to implement changes to their local political system. The project seeks to engage with the nascent field of speculative civics [2]. In order to convey the extent of the project, Committee of Infrastructure includes a transcript, meeting notes, photo manipulation, video, and infographics.

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<sup>1</sup>

<https://www.nytimes.com/2016/12/14/magazine/the-gr-eat-ai-awakening.html?mcubz=0>

<sup>2</sup> <https://www.clarifai.com/>

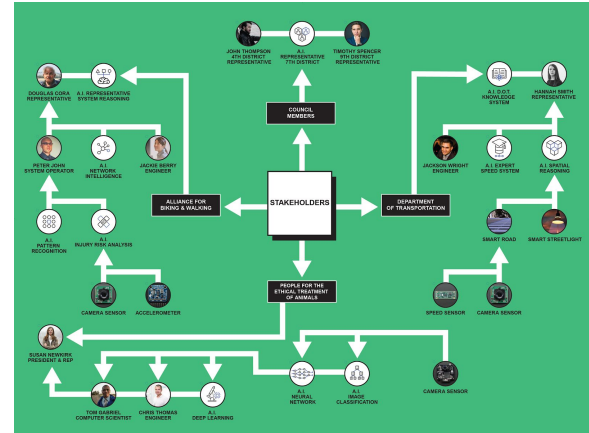
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<sup>3</sup>

<https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing>

## Speculative City Council Meeting

Situating the project in the Los Angeles Echo Park neighborhood provides further context for the council meeting. The meeting is proposed to take place in 2023. The issue discussed amongst stakeholders is a ballot measure to remove all traffic lights at the intersection of Sunset Boulevard and North Alvarado Street in order to create a fully autonomous intersection. Autonomous cars will sense objects, things, and people through machine vision and proximity detection. These autonomous cars will communicate with different Industrial Internet of Thing (IoT) devices such as smart streetlights<sup>4</sup> and speed sensors to avoid collisions and efficiently move through traffic. Not only will pedestrians have their presence notated by machine vision from smart streetlights but also from embedded sensors on clothing such as a magnetometer, GPS, gyroscope, accelerometer, and proximity sensor. These sensors will allow open communication between pedestrians, cyclists, and autonomous vehicles. With the advent of machine vision and sophisticated statistical models, AI systems and human representatives will be able to speak on behalf of new groups. Machine vision allows for detection of non human living beings such as birds, insects, dogs, etc. Machine vision would be utilized to understand their specific behavior on the streetscape (e.g. location and duration) and protect them from becoming injured by autonomous vehicles. In turn both human and AI representatives will advocate on their behalf as data can support their arguments.



**Fig. 1 / Meeting and Organizational Chart**

A city council meeting transcript provided the framework to work within, wherein each participant constructs arguments representing the the interest of their respective organizations. The four groups in the meeting are the city council members, People for The Ethical Treatment of Animals (PETA), L.A. Department of Transportation (DOT), and the Alliance for Biking and Walking. Stakeholders include engineers, presidents, AI experts, Smart Roads, and sensors. The transcript was created by using the Karpathy char-rnn machine learning algorithm<sup>5</sup> that used seminal texts important to the ethos of each agency or the technical jargon required to speak as an expert. For example the L.A. DOT representative learned to speak from City of Los Angeles Transportation Impact Study Guidelines<sup>6</sup> and Traffic Studies Policy and Procedures<sup>7</sup>. Once given instructions about the content of the arguments the algorithm creates a wholly artificial language mimicking the mechanics of a Los Angeles city council meeting. The constructed language is absurd and awkward, but exhibits AI systems and humans conversing amongst themselves.

<sup>5</sup> <https://github.com/karpathy/char-rnn>

<sup>6</sup>

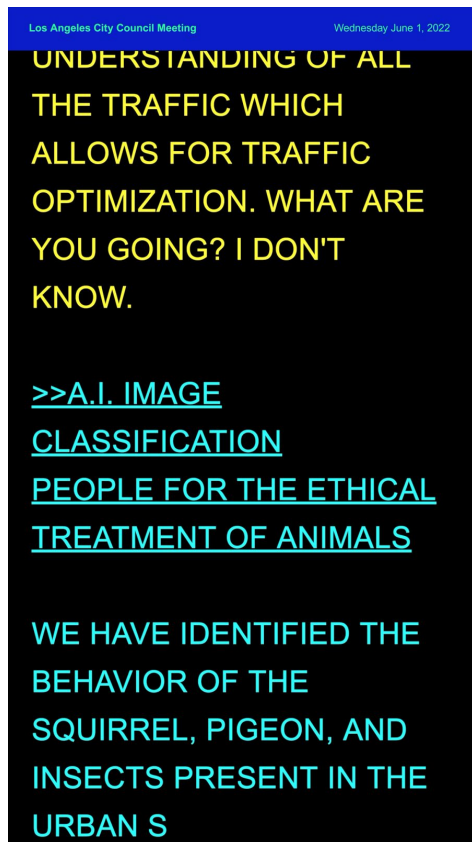
<http://ladot.lacity.org/sites/g/files/wph266/f/COLA-TIS-Guidelines-010517.pdf>

<sup>7</sup>

[https://planning.lacity.org/eir/8150Sunset/References/4.J.%20Transportation%20and%20Circulation/TRAFFIC%20POLICIES%20AND%20PROCEDURES\\_2013.pdf](https://planning.lacity.org/eir/8150Sunset/References/4.J.%20Transportation%20and%20Circulation/TRAFFIC%20POLICIES%20AND%20PROCEDURES_2013.pdf)

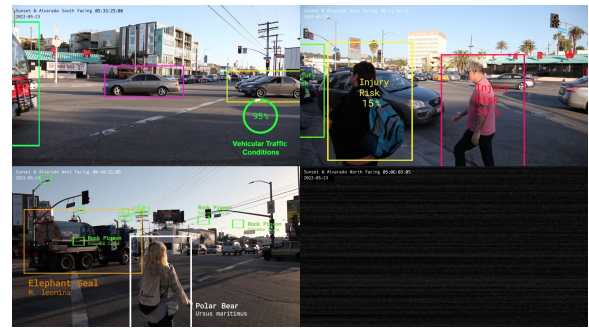
<sup>4</sup>

<https://techcrunch.com/2015/04/16/ge-spotlights-new-smart-street-lamps/>



**Fig. 2 / Transcript Excerpt**

In addition to the verbal arguments of each organization, sets of video evidence (machine vision) display each organization's motivations. Specifically, computers classify static and moving objects within a video. By classifying these objects and assigning value to each object a hierarchy is created allowing communication between vehicles, people, and animals. As one organization focuses on traffic efficiency, another focuses on pedestrian injury risk, and the remaining organization focuses on animals. Each organization over optimizes their object classification system to produce supporting analytics that promote their motivations. For example PETA mistakenly classifies every moving object in the video as an animal. The videos reveal the bias coded into object classification. Not only is the bias present, but also the ruthless efficiency of the machine vision system doesn't allow for flexibility. In effect, its extreme sensitivity to detect all stimuli creates errors.



**Fig. 3 / Machine Vision**

Top left: L.A. Department of Transportation / Top right: Alliance for Biking & Walking / Bottom left: People for the Ethical Treatment of Animals

More broadly, AI systems are subject to the same fallibility that is present in the day to day interactions between humans. Therefore, as we continue to rely more on these AI systems we must be aware of how they can lead us astray. We cannot blindly follow the decisions made by AI systems. We must challenge them when they are wrong, assess what is missing, and be inclusive of a broader set of individuals and other forms of life such as animals. This process is ongoing and must be constantly revisited and updated to reflect the constant flux of society and culture. Humanity and the larger world's present and future coexistence with technology is reliant on the delicate balance of us and AI systems. Creating an open process that informs the populace and that is inclusive is necessary. Committee of Infrastructure proposes the model of civic dialogue as a framework to interact with AI systems.

### **Conclusion**

In this paper, I presented the Committee of Infrastructure as speculative design project. The purpose of the project is to provoke and create a vehicle to discuss ML bias and agency. The project is not intended to be a realized depiction of a city council meeting. However, it considers the future of civics and ML by using speculative design scenarios.

### **Proposal Format**

I propose displaying the machine vision video to elucidate bias. The video displays the bias of each organization. L.A. DOT is wholly focused on traffic efficiency without regard for pedestrian traffic. PETA is solely focused on animal classification for all moving objects. In some cases, incorrectly classifying people as animals. Lastly, the Alliance for Biking and Walking focused on pedestrian injury risk. The video can be found here: <https://vimeo.com/213373126>.

### **Biography**

Currently, I am graduate student at Art Center College of Design in the Media Design Practices program. I position myself as a multi-disciplinary designer whose work engages with the cultural, political, and societal implications of new technology such as machine learning and ubiquitous computing. My current area of work focuses on data and governance within urban environment. It is largely centered around mediating the approaches of Western and Chinese culture disparities to create methods and tools that negotiate these competing influences. The research combines traditional qualitative design research and speculation as means to propose untraditional projects that addresses data and governance.

### **Acknowledgements**

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### **References**

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2. Carl DiSalvo, Tom Jenkins, and Thomas Lodato. 2016. *Designing Speculative Civics*. CHI 2016.