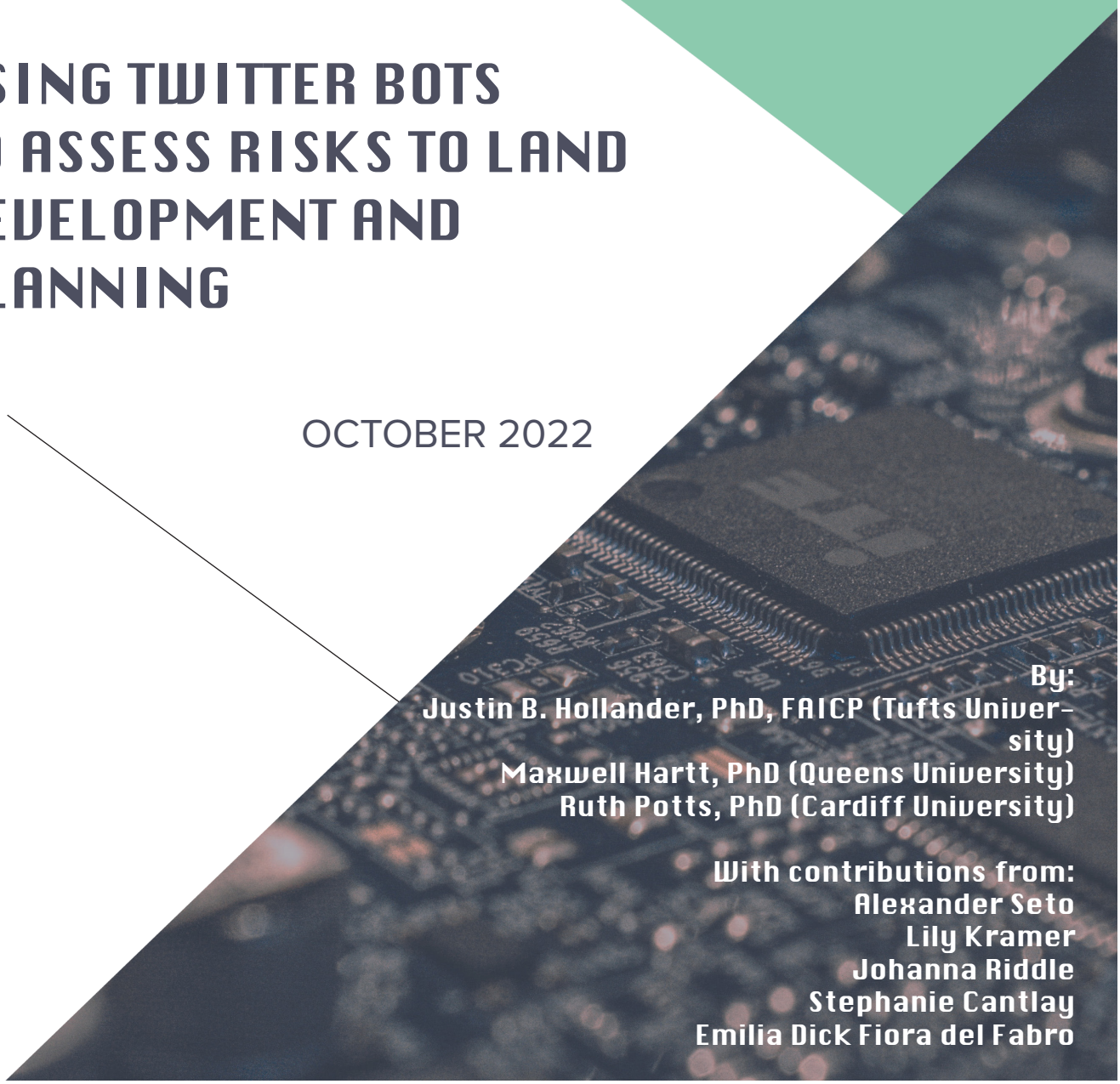
EXECUTIVE SUMMARY OF FINAL REPORT TO

Lambda Alpha International's Land Economics Foundation

LEF
LAND ECONOMICS FOUNDATION

USING TWITTER BOTS TO ASSESS RISKS TO LAND DEVELOPMENT AND PLANNING

OCTOBER 2022



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PROJECT BACKGROUND AND PLAN

This study examined the role and potential risk of automated social media accounts in participatory planning processes related to land development. This project builds on research we conducted last year with LEF where we studied the risks that social media manipulation poses to online community discourse around land development and planning topics.

We developed our own Twitter bot to test a range of cyber influencing strategies. The bot, Urbanist Uma, has a core set of artificial intelligence and a unique personality with topical interests around key land development and planning issues. Our findings allowed us to draw some conclusions around land development discourse and generate targeted recommendations for planners and policymakers.

PARTICIPATORY DIGITAL SPACE AND TWITTER BOTS

Twitter allows users to connect with other accounts in a virtual setting. Users can be linked through similar interests or diverting opinions. These platforms are emerging as potential new tools for public participation in the planning process. A planner might use the platform as a means of building social capital (Afzalan and Evans-Cowley 2015; Mandarano et al. 2010), improve information sharing (Evans-Cowley and Conroy 2006; Fredericks and Foth 2013; Williamson and Parolin 2012), or simply to learn about a community (Arribas-Bel et al. 2015; Firmstone and Coleman 2015; Hanzl 2007). For some, these platforms are a logical progression of participatory planning's future (Hollander et al., 2020, 510).

Unfortunately, while it can be a great tool forplanners, social media can also create an echo chamber leading to the creation of homogenous groups that display only ideologically aligned content and rarely expose to conflicting ideas (Terren & Borge-Bravo, 2021). More disquieting still, participants in an online planning forum or debate may not even be real. They could be automated bots programmed to augment the voice of a minority viewpoint, influence others, and create a spiral of silence to the benefit of nefarious interests.

Social media bots are all over the internet. Not all bots are nefarious, or mimic humans (Ferrara, 2017). However, social bots specifically are designed to resemble a human. The danger of social bots is their potential to be programmed to create an echo chamber. However, social bots also have the potential to pop the echo chamber by integrating themselves within homogenous groups (Graham and Ackland, 2016). If a bot can be made to be perceived as a human, it could engage in and to have power and influence within a network.

REAL ESTATE TWITTER BOT STATISTICAL ANALYSIS

Our first step was to look more closely at tweets generated by the bots to analyze how many were pro-development and how many were anti-development, what kinds of sentiment words each employed, how many times each was liked or retweeted. This gave us a chance to consider the influence and network of these bots and attempt to gauge the actual risk these bots pose. Last year's data was recorded with specific likes, retweets, and other relevant variables prepared for analysis. We then ran descriptive statistics for these variables, determining that the mean tweet in our sample was liked 1.41 times, retweeted 0.42 times, and replied to only 0.11 times. This allowed us to generate an impactful variable (tweets with at least 10 likes, retweets, or quote retweets).

We ran four regressions to explore the relationship between these variables and the real estate development projects under study. We also ran four models, with impactful as the dependent variable to understand how different factors were associated with whether a tweet was impactful.

This dimension of the research provided additional perspective on the ways in which real estate projects use bots to manipulate online discourse. TransBay's account was the most active with 286 posts, it was the SoFi bot posts that ended up being the most impactful.

OUR OWN CUSTOM BOT EXPERIMENT

We then explored the idea of a social bot's ability to influence participatory planning processes in order to answer the question: do social bots encourage debate or create an echo chamber?

We examined a single social bot created for this exercise, a bespoke planning Twitter bot 'Urbanist Uma' and analyzed Uma, and her followers to determine if her network indicates the potential of an echo chamber or if her network is a space where users encounter information they may disagree with.

Introducing Urbanist Uma

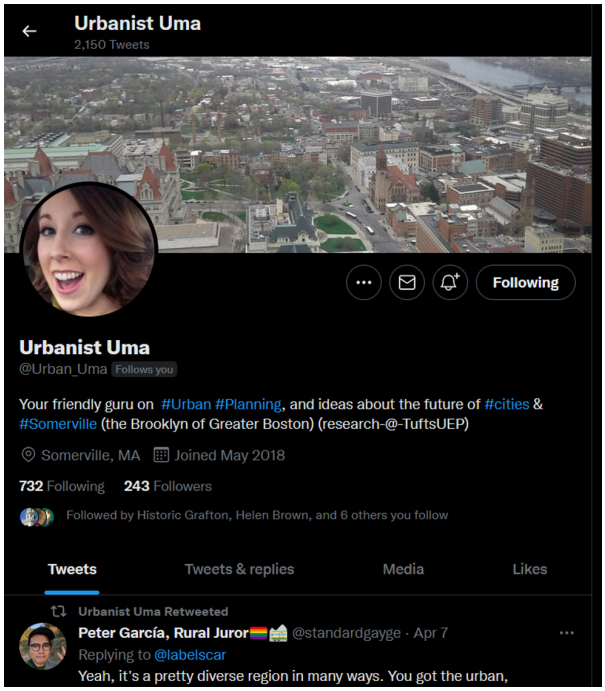
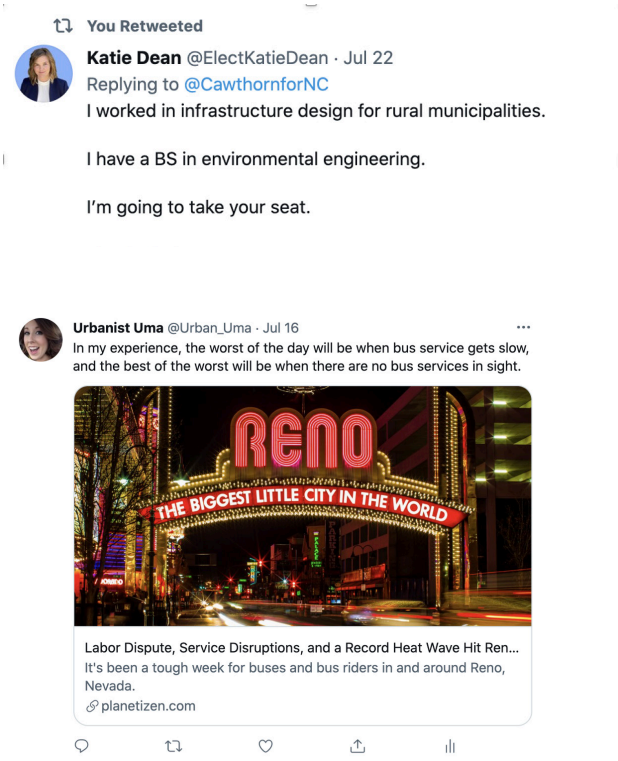


Figure 1: Screenshot of Uma's profile

@Urban_Uma ("Uma") is a social Twitter bot created by the research team to engage with planning-related topics. Uma can search Twitter using keywords relevant to urban planning and then favorite, retweet, quote tweet, and follow tweets/accounts. Additionally, she can create her own content by crawling Planetizen, or the wider internet, and creating a summary of a relevant article and tweeting them often with a unique caption or associated image.

RESULTS OF CUSTOM TWITTER

Identical analyses were completed on both the full sample and subsample of tweets. Most of Uma's tweets are retweets (66%) with the remaining equally split between quoted tweets and original tweets. During the self-actualized period tweets are still mostly retweets, but her original tweets are more sophisticated. Despite more sophisticated tweets, during her self-actualized period, Uma only received six likes. However, simply because an account is refraining from interacting with Uma (such as failing to like or retweet her content) does not inherently mean that the follower is not consuming her content as they scroll through their own curated feed. From Twitter analytics, we can see that Uma's tweets are being seen by thousands of Twitter users. In October, Uma had at least 6,334 profile visits, with a high of 1,864 individual visits in March 2022 alone. Despite Uma's seemingly low engagement scores, her tweets are making an impression and users are visiting her profile. In short, Uma does have an audience.



(Top) An example of a tweet that was found with the keyword "infrastructure design" and retweeted by Uma. (Bottom) An example of functionality (2) where a new article was scraped and a realistic opinionated tweet was generated

UMA'S FOLLOWERS

As of May 16, 2022, Uma had 247 followers. Of the 247 users, Uma only follows 131 (53%). Nine accounts (4% of followers) were protected accounts and had to approve Uma's follow request. In terms of Uma's social geography, Uma had followers from twenty-seven different countries. The most frequent were the United States (26%) and Canada (9%).

A total of 247 bios were also analyzed. The research team read all bios available and 16 major themes with which to categorize bios. The most common themes were Planning and Development, Academics and Research, Politics and Government, and Hobbies and Art. The least frequent themes were Health and Disability, Gender and Sexuality, and Family. Notably, Planning and Development and Academics and Research are the sole themes present in Uma's bio. Almost one third of her followers' bios (32%) are related to the Planning and Development theme. A large proportion of followers' bios (15%) were characterized as Politics and Government.

Beyond the most common pairings, there was not a lot of repetition amongst theme combinations. The lack of consistency among themes and low frequency of pairings suggests diversity and overlap of interests within Uma's followers. For bios with only one theme, Personality and Humor was the most frequent (25). This suggests that these accounts follow Uma independent of her own interests and posts.

DISCUSSION AND CONCLUSION

The challenges posed by social bots hit at the very heart of planning practice: community engagement. With so much of the discourse and conversation around planning topics happening online, these bots have tremendous power to disrupt and derail. In this research, we have shown the dangers posed by bots for planners attempting to create spaces for open conversations about a community's future.

Uma had limited interactions, but her followers reveal a varied geography across continents and a broad set of interests within and outside of planning and development. Social bots do not need to be popular to be effective, Uma's writing and social engagement appeared realistic and generated a notable following, suggesting that bad actors could create echo chambers that distort community opinions and values during a planning process. We found that Uma created a following of like-minded individuals, suggesting the ability for a bot to create an echo chamber.

However, the analysis of the biographical themes of Uma's followers revealed a complex, multidimensional, and even public sphere. Uma was programmed for good and her power to excite and energize people was impressive. Uma and bots like her can be employed by planning practitioners to garner interest in planning projects, community visioning, or public engagement. Depending on what Uma is programmed to share, she could be considered an antagonistic mechanism to amplify polarization, or a mechanism to encourage greater consideration of different perspectives around planning issues.

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