Automatic Light Tailoring Apparatus Instructing Radiance (ALTAIR)

(Technical Paper)

Anonymity's Influence: Defining Anonymity as a Continuum to Proactively Design Online Environments to Combat Toxic User Behavior

(STS Paper)

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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General Research Problem

How can technology affect privacy rights?

According to Pew Research Center, 97% and 77% of U.S. adults own a cellphone and computer respectively. Data makes such technology useful, but introduces problems of privacy and free speech issues. Data protection laws among states are diverse (Russom & Sloan & Warner., 2011). Public policy can improve personal privacy and data security (Agre, 1997).

Responsive Ambient Light Controller for Windows

How can wireless sensors improve lighting for an area?

Technical research is in the Electrical and Computer Engineering department under Professor Harry Powell's supervision. Teammates include Mason Notz, Steven Peng, and Alexander Tomiak.

The project system controls light in an area by a remote node and window node. The window node actuates blinds and controls wireless lights. The remote node measures light within an area and wirelessly sends information to the other node to process. The user selects a location for the remote node and a preferred light level. The system will adjust the blinds and lights accordingly. This system will improve comfort because light affects mood, alertness, and metabolism (Paul, 2014). The human eye perceives the most light around 550nm (Campell & Gubisch, 1966), with perception decreasing to either side. A light sensor with a similar spectral response was chosen for the best measurement results (Vishay, 2021).

The goal of the project is to integrate code on a microcontroller unit to control room lighting and stay within design budget. Due to the pandemic, available components for building the light controller are limited (Cornell, 2021). Currently, IKEA and Lutron have smart blind technology (IKEA, 2021) (Lutron, 2021). Both products are timer scheduled. Our project differentiates itself through responsiveness to measured light levels and connection to wireless lights.

The team will prototype a complete system. First steps will design hardware and software to collect light measurements and wirelessly communicate between the nodes. Custom circuit boards will be

fabricated and the code deployed. Upon assembly, system functionality will be verified in lab using oscilloscopes and logic analyzers. Collected light measurements will alter the ambient light within the room accordingly. The project will conclude with a final system that can integrate into rooms to alter ambient light conditions. The system is designed to improve the user's experience within a room. After completed, the system can be optimized for home integration by scaling the microcontroller processing power and decreasing power usage.

Taming the Internet: Privacy's Relationship to Data and Free Speech

In the United States, how do users, privacy advocates, and data collectors compete and influence privacy standards, data collection, and free speech?

According to Pew Research Center, 79 percent of Americans report concern about government agencies and private companies using their personal data; 72 percent report suspecting that companies track almost all cellphone data (Auxier, 2020a). Pew also found that 77 percent of Americans believe that social media companies must not collect and sell user data political advertising (Auxier, Oct 2020b). Participants disagree about the standards that should govern personal data privacy, data security, and data collection and monetization.

The Electronic Frontier Foundation (EFF) is an advocacy defending digital civil liberties. The EFF unites "leading technologists, activists, and attorneys in our effort to defend free speech online… advocate for users and innovators, and support freedom enhancing technologies" (EFF, 2021). EEF publicizes privacy issues and privacy rights through guides and workshops, and litigates to defend digital privacy rights. It promotes free speech and privacy, and draws attention to digital privacy matters such as anonymity and corporate speech controls. It has engated in advocacy related to medical privacy, real ID, and search engines. All information is freely available on the EFF website. EFF also prepares amicus curie (Cohn, 2021).

Facebook is publicly traded social media company. Now named Meta, the company also includes Instagram and Messenger. All Meta products collect user data such as network connections, content

viewed, device information, and more as described by Facebook's data privacy (Facebook, 2021). Meta is a publicly held, for profit company. By law, its purpose is to earn dividends for its shareholders. Meta earns revenue through advertising. In the third quarter of fiscal 2021, Facebook earned USD 28 trillion in advertisement revenue (Facebook Investors Relations, 2021). In response to bad publicity, especially following the Cambridge Analytica scandal of 2018 and the consequent threat of public regulation, Facebook introduced tools that give users greater control over their personal information (Holmes, 2021).

The Free Speech Alliance (FSA) is a coalition of 90 conservative groups that allege that big technology companies engage in censorship to silence conservatives online. Through its Censorship Project, FSA published a report purportedly documenting conservative speech suppression; in 2018 it was referenced by members of Congress during hearings (FSA, 2021).

Privacy Rights Clearinghouse (PRC) is a California advocacy that claims to "provide clarity on complex topics by publishing extensive educational materials and helping people find answers to their questions" (PRC, 2021). Like EFF, PRC provides extensive, free material online such as privacy guides, questions and answers, articles, and relevant news. In California state and local elections, PRC promotes candidates who support its privacy positions.

The American Civil Liberties Union (ACLU) is an advocacy that defends constitutional civil liberties. The ACLU has litigated more U.S. Supreme Court cases than any other private organizations. It claims that through its Speech, Privacy, and Technology Project, it "fights in the courts, lobbies on Capitol Hill, and works with technology companies to ensure that civil liberties are protected as technology advances" (ACLU, 2021).

The Electronics Privacy Information Center (EPIC) is an advocacy committed to digital privacy. EPIC seeks to promote digital privacy through public policy and litigation (EPIC, 2021).

In 2013, Snowden released classified documents revealing Department of Homeland Security surveillance of Americans. Activists rallied to stop the surveillance which spurred a desire for privacy (Wäscher, 2017). Surveillance events like Snowden's release bring attention to privacy concerns, providing the opportunity for activists to unite and further their agenda. Privacy is a unique issue since no

dedicated opposition movement exists. Privacy interests are furthered by a network of public and private actors (Bennett, 2011). The United States lacks a governmental position focused on data protection, referred to as inside advocates. This void allowed an advocacy network to expand through the populace regardless of age, sex, or political affiliation. The outside advocates consist of groups and individuals. Groups divide into political or apolitical organizations; the former seen as a threat to authorities (Daskal, 2018). Political organizations challenge the status quo of laws to benefit the general warfare as opposed to personal gain. Successful organizations frame cultural information to resonate with individuals through symbolic slogans and American ideals. Garnering support incentivizes individuals to participate in public activity or support the branding of the organizations. Individual participation in advocacy networks leads to fluid membership. A dichotomy ensues. Events such as the Snowden release results in boosted participation. Individual privacy views shifted from a "leave me alone" attitude to "I want to be forgotten" (Romansky, 2014). They desire reliable security systems, control over data sharing, and the ability to delete their data following proper use. Without unifying events, individual persistence wanes to fight for privacy rights. The rise of social media lead to indifference of data privacy for the sake of connectivity. For continual advocacy, Stark recommends establishing an emotional connection between users and their data (Stark, 2016).

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