

Thesis Project Portfolio

Designing an Air Guitar – S.H.R.E.D.

(Technical Report)

Suitability of Social Credit System in Modern Society

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

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Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

The technical and science, technology and society (STS) parts of the thesis are interconnected by utilizing readily-available technologies in an innovative way to reform the existing mechanisms. Moreover, the two projects – the ECE Capstone project and STS research paper, adopt distinct methods of examining the scale of impact and ownership of technologies. Specifically, the ECE Capstone project aims to bring music to the general population in a novel form with the help of portable technologies such as smartphones, and its scope of use and influence is limited to individuals. The STS research paper emphasizes the impact on the entire social system when data and technology are integrated into the Social Credit System (SCS) for governance and surveillance. Although the two projects focus on technologies of different scales and purposes, the principles of technology ownership and long-term impact on stakeholders and society are important considerations for future engineers.

The technical portion of this paper documents the design of an “Air Guitar” with electronics to provide users with a cheaper and more sustainable option for learning and playing the guitar. The sophisticated and bulky design of traditional guitars limits the target audience from attracting professional and wealthier consumers. To provide an equal and accessible method for everyone to learn how to play the guitar, the “Air Guitar” design utilizes mobile phones and inexpensive sensors to simulate the real instrument.

The research question for the science, technology and society (STS) portion of this paper examines the suitability of the Social Credit System (SCS) in modern society by analyzing its development and ongoing disputes using the Social Construction of Technology (SCOT) theory. Launched as a national pilot program in 2014, the Social Credit System is a national reputation system that the Chinese government developed to realize the socialist market economic system

and the social governance system. While its purpose is to raise public awareness of integrity and enhance credit level, the system has caused numerous debates about its purpose, ethics, and validity. Therefore, this paper researches the basis for the Social Credit System and its differences with the existing credit rating system. It will then explore the extent to which the Social Credit System is appropriate for modern Chinese society and concerns for its future development.

Working on the two projects simultaneously encourages me to not only focus on the technical details of the project, but also identify their social origins and ethical implications. Specifically, the integration of society, ethics and technology for the STS project made us consider the ethical impacts and external standards of the “Air Guitar” for the ECE Capstone more thoroughly. We considered the expectations of stakeholders at each stage of our design process and communicated with a range of audiences more effectively. This experience has enhanced my ability to think critically about the problem definition process, as well as the ability to incorporate social, moral, and economic factors into the technical design process in future research and work.

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Suitability of Social Credit System in Modern Society

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Prospectus

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