

COMPARING VOICE USER AND GESTURE INTERFACES

**THE ETHICS OF ARTIFICIAL INTELLIGENCE ON UNMANNED AERIAL
VEHICLES**

An Undergraduate Thesis Portfolio
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Bachelor of Science in Computer Science

By

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SOCIOTECHNICAL SYNTHESIS

Artificial intelligence (AI) and its subset machine learning are two technologies that are incredibly good at gathering information to learn from experience. The technical project, comparing voice user and gesture interfaces show how using machine learning can improve a technology until it is able to compete with more ubiquitous technologies. While the technical research tried to find the most accurate interface between voice and gesture interfaces, it also compared it to current technologies to show the impact machine learning can have due to the emergent array of alternative technologies. The technical topic ties into my Science Technology and Society (STS) topic because both artificial intelligence and its subset machine learning effect improve decision making. The STS topic will research the effects of using an autonomous unmanned aerial vehicle (UAV) and see if its use is ethical. The technical and STS project will add to the research of the effects that artificial intelligence has on technology.

The technical topic shows how machine learning can improve interfaces. The topic will research how machine learning effects both gesture and voice user interfaces and then compare both to find the most accurate interface. The technical project consisted of researching the state of the art for both the gesture and voice user interfaces. The research articles had information on one of the interfaces that showed how machine learning was able to improve either the gesture or voice user interfaces (VUIs). The articles will research the models in each of the experiments and compare the best results for both gesture interfaces and VUIs.

After studying the state of the art for both gesture and voice user interfaces, VUIs were found to be more accurate than gesture interfaces. VUIs or speech detecting interfaces also

tended to handle noisier environments, or environments with more interference, than gesture interfaces. Thirdly the speech detecting interfaces also tended to be more accessible, which makes it an easier interface for people to use. This makes VUIs a better alternative than gesture interfaces for more ubiquitous interface such as touch screens or mouse and keyboard interfaces. The technical report concluded that even though voice user interfaces were a better alternative for more ubiquitous interfaces, gesture interfaces are also a suitable replacement.

The STS topic researched the effects of artificial intelligence on unmanned aerial vehicles. It will more specifically delve into the ethics of using artificial intelligence and UAVs. The main sources for this topic were both research articles and news articles that were relevant to drone usage. The articles researched the ethics of using UAVs in both civilian and military use cases as well as recent and relevant actions surrounding unmanned aircraft. They also researched how artificial intelligence can be used to improve decision making.

The results of the research showed how artificial intelligence could allow domain experts to do a job with little to no training. For autonomous aircraft the social construction of technology model shows the engineer needs to consider the lawmakers, citizens, government, and private businesses while creating the drones. The SCOT model emphasizes how unmanned aircraft rules and regulations should be created by the individual or community where the drone operates. The study concludes that for UAVs to be used ethically they need to be looked at through a utilitarian, deontology, and virtue ethics lens. In addition, using drones in military situations call for considering the reasons for fighting and the actions taken once in war.

Machine learning and artificial intelligence can be used to improve technology, but this does not mean that the effects of its use should be ignored. It is important to understand the

impact and regulate the impact that AI can have on technology such as UAVs. The technical topic shows how computers can improve at a task, while the STS topic shows how to create rules and regulations for UAVs as well as who creates them.

TABLE OF CONTENTS

SOCIOTECHNICAL SYNTHESIS

COMPARING VOICE USER AND GESTURE INTERFACES

Technical advisor: Paul McBurney, Department of Computer Science

THE ETHICS OF ARTIFICIAL INTELLIGENCE ON UNMANNED AERIAL VEHICLES

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PROSPECTUS

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