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Discourse Analysis of Designing and Constructing an Animatronic Head

“Designing and Constructing an Animatronic Head Capable of Human Motion Programmed using Face-Tracking Software” is Robert Fitzpatrick’s Capstone Project Report for his master’s degree in Robotics Engineering from Worcester Polytechnic Institute. The pursuit of a master’s degree both shows Fitzpatrick’s depth of knowledge in robotics and places him at the crossroad of engineering and academia. This report was completed on May 1, 2010 and is published on WPI’s website. Fitzpatrick set out to create an animatronic head that could mimic human motion with the goal of learning about animatronics. In addition to his educational pursuits, he sought to utilize face-tracking technology programming the movements of the head, which is a new technology in the animatronics field. Fitzpatrick’s report documents his engineering process as he developed the mechanism for animating the head and utilized motion-tracking software to program the movements. Fitzpatrick’s paper is an excellent example of engineering academic papers and the techniques employed in this style of writing, which can be analyzed to better understand the tools that make academic writing successful.

Technical reports like Fitzpatrick’s typically employ a similar general layout where the author briefly introduces the project before diving into the specific details. By using this common structure, Fitzpatrick aligns himself with the academic engineering community. Fitzpatrick’s report follows this format by having a table of contents, figures, and tables,

followed by an abstract and introduction, and then finally containing the majority of the report that explains the project in detail. This structure aids in sharing information between members of the engineering community by providing the most relevant information at the beginning of the report in the abstract. After reading the abstract, the reader can then decide if they wish to read the entire report to learn more about what was detailed in this abstract. Structuring a paper in this way is a common discourse tool in the academic community.

Not only is Fitzpatrick's general formatting of his paper in line with that of academic engineering writing, but his diction is too. He mentions actuators, degrees of freedom, cam mapping, linkages, and other technical terms used in the engineering world. Fitzpatrick's correct use of the lexicon of the engineering discourse community shows his membership in this community. It also establishes that the intended readers of his report are members of the engineering community. The style of his writing, too, matches the engineering community. Engineers tend to prefer direct and effective communication over more flowery language, which is noticeable throughout Fitzpatrick's work. These two elements show that this piece of writing is written by and for members of the engineering discourse community.

In addition to using the lexicon to demonstrate membership of the engineering discourse community, the use of technical terms makes it easier for Fitzpatrick to effectively communicate with readers. Fitzpatrick does not explain what these technical terms mean because they are part of the common lexicon of the engineering community. It is completely fair for Fitzpatrick to assume that his readers will know what actuators, degrees of freedom, and the other aforementioned words mean. Explaining these terms would be unnecessary and dilute the important information presented in his paper, which would negatively reflect upon Fitzpatrick as

an engineer. Utilizing the engineering diction is a vital part of composing important works within the community so that the author's message can be clearly and properly communicated to others.

After introducing his project, Fitzpatrick goes on to explain his inspiration for his design. He cites two companies: Hanson Robotics and Zeno. His admiration is clear in the following sentence: "The Hanson Robotics robots were all astounding in the realism they were able to portray with pliable skin and the number of actuators they had underneath that skin. However, due to the complexity of these robots, they serve best as models for inspiration than anything that useful information could be gained from for this project" (Fitzpatrick 3). While citing companies as inspiration can be problematic, as it can reveal bias or hint at an ulterior motive, Fitzpatrick's reference to these companies serves more to show that he is knowledgeable of, and inspired by, the professional animatronics world. Understanding the author's inspiration is key to understand his motivation behind his work. Knowing that his work was inspired by, but does not aspire to be, professional animatronics companies helps readers understand what technologies and processes inspired Fitzpatrick's thoughts and methods. The reader can then read the paper from the author's frame of mind to better understand his processes.

In Fitzpatrick's quote in the above paragraph, he acknowledges deficiencies in his project. This employs the vital step of establishing credibility as a researcher. Research is only as credible as its author, so it is of the utmost importance for an author to be forthright with information that exposes potential shortcomings in his research. In the introduction, Fitzpatrick states "This researcher would not argue that the [face-tracking] technology is used to its full potential in this project, but it was furthered in use compared to the current face-tracking methods used in the field" (Fitzpatrick 3). Fitzpatrick acknowledges that he did not use face-tracking technology to its full potential, which shows that he as the author is aware that there is

more to this technology than he demonstrates in his project. By telling the reader that he is not omniscience, Fitzpatrick communicates to the readers that he is aware of what he does and does not have knowledge about. This establishes his credibility as a researcher because it tells the reader that Fitzpatrick will only present himself as knowledgeable on topics where is he genuinely proficient.

Fitzpatrick further backs up the validity of his work by citing outside research. The goal of his project was to mimic human motion, so he cited outside research that related human motion to rotational motor motion. He cites Kristi Stevens' information on the motion of the head on page 6 and Jung and Sclafini's data on eyebrow movement on page 7. Citing the research of others further ties Fitzpatrick and his work into the research and engineering community by creating links between his work and the work of others. The reader has the option to further investigate the cited papers to understand more about animatronics and determine for themselves if they also believe the information cited is accurate and relevant to animatronics. His in-text citations and bibliography follow the APA format. APA is commonly used in research and lab reports, so his use of APA makes sense in the context of his work.

Fitzpatrick's work "Designing and Constructing an Animatronic Head Capable of Human Motion Programmed using Face-Tracking Software" documents his process of creating an animatronic head and relates the information he discovered to the readers. His work exemplifies many qualities of both the engineering discourse community and the research discourse community. His use of academic and engineering format, diction, style, and citations establishes his membership and credibility in these communities. Each sentence is crafted to document his process and clearly communicate what he did and learned. In a discipline that values concise and

accurate communication, Fitzpatrick's paper effectively communicates his message while remaining in line with the communities he belongs.

Works Cited

Fitzpatrick, Robert. "Designing and Constructing an Animatronic Head Capable of Human Motion Programmed Using Face-Tracking Software." Edited by Sonia Chernova and Gregory Fisher, *Worcester Polytechnic Institute Available Pubs*, Worcester Polytechnic Institute, 1 May 2010, web.wpi.edu/Pubs/ETD/Available/etd-050112-072212/unrestricted/Fitzpatrick.pdf.