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GEMS 202

September 22, 2019

Thesis Critique: SPACE

At first glance a reader can immediately recognize the highly organized structure of the SPACE thesis. The table of contents divides the thesis into comprehensive sections with each section being self-contained in regards to the necessary background information. For example, the section on 3D-printed materials provides an analysis of the current state of the research and then demonstrates the analysis of engineering-constraints following directly from their references. These steps allow the team to create a design that is well-supported by research and answers many possible questions in regards to design choices.  
 The introduction provides a thorough narrative into what the current state of the research is like and supports generalizations and assertions with references. The narrative is a preferably informal method of introducing the research topic to laymen. In the thesis, the team walks through the history of the research problem, citing relevant events such as first spacewalks implementing a variation of the researched technology. By the end of the narrative, the problem is framed well and demonstrates the necessity of the research.  
 Technical terms are defined in layman terms which may be both a pro and con of the paper as it significantly lengthens the amount of material unrelated to the substance of the research. It may be favorable to attach a glossary for technical terms and refer to it in place of defining the term in-line. However, providing in-line definitions may also clear up confusion regarding connotations or ambiguity of the term in the research field.  
 A considerable amount of effort was put into selecting diagrams which could aid in the explanation of introductory and background material. For example, the diagram that depicts the various devices and layers of the Extravehicular Mobility Unit (the current spacesuit design) aids in framing the research problem by providing the context of the team’s specific design being the elbow joint. This is a strategy that could help readers become accustomed to the research field quickly and gloss over the lengthy details when getting introduced. Diagrams and images seem to be more likely to convey a sense of familiarity of material to the reader. These also enable the reader to easily assess the data (e.g. bar graphs prompt for comparison between entities).  
 Sections and subsections are well-written in that they provide introductory material and a short narrative in the first paragraph and base conclusions in the final paragraph. This makes it easier for researchers to quickly identify relevant information for referencing. Formatting the sections this way also keeps material self-contained and minimizes confusion when targeting specific parts of the paper, since it is possible that this team was able to divide their final thesis into numerous smaller but more detailed publications.  
 There was a portion of their research which required qualitative data—this being the comfortability ratings of the rigid joint over current designs. In addition to assessing the ratings by asking volunteers to participate in an evaluated task, the researchers supported their methodology through participant surveys. The team additionally analyzed the survey data using a Cooper-Harper rating.

The writing itself is impartial and gives the impression that the researchers have taken many different paths towards their goal into account. The explanations for certain decisions are laid bare and picked at thoroughly in contrast to existing solutions. Considerations to resource limitations are taken into account when the team prototyped the design.

Finally, there is plenty of evidence demonstrating the amount of work the team had put into the research project (as there are figures on almost every page of the literature of their work).

In summary, the SPACE thesis had an exemplary thesis that allowed layman readers to be accustomed to the research and understand the final goal. On the down side, the research may have been needlessly lengthy. The research showed convincing support for the team’s design for rigid joints as well as future work that could be done on their design or otherwise.