In terms of what the paper attempts to do I would rank it at a 4/5. It fully accomplishes the task of being a very thorough and categorized review of mobile soft robotics but suffers from being extraordinarily dry as a standalone paper. The small descriptions of some of the more influential or relevant pieces, it does attempt to incite some sort of engagement with the reader, but I often found many of the papers still unclear unless I read further into the specific citations. So overall I believe that the report is very successful at reaching its goals but does not quite reach the last point to be a perfect paper.

To me this paper has two primary contributions. Primarily it serves as an up-to-date reference guide of what works currently exists in the field of mobile soft robotics, as well as categorizing them to make digestion and discussion of the field more intuitive. There is also a novelty to creating a nomenclature and categorization of the work. It can be difficult to subdivide classifications of work in the developmental period of a field, but now that soft robotics seems to be moving into the middle of its lifespan there is enough context to subdivide the work that has been done to date. This provides a helpful tool for new researchers (or graduate students in a related class) to know what has been done in the field in order to properly assess the novelty of their ideas as well as where to advance the field. Secondarily the paper also provides the opinions and thoughts of the authors on the field and what has been done. By assessing the quality and characteristics of the work that was included this paper also is able to identify strengths and weaknesses of the field as well as areas for development. It proposes potential focuses and usages that would be potentially very beneficial for the advent of soft robotics. In contrast to showing what has already been done this points to work that has yet to be done that could present an engaging project or research idea.

The major strength of this paper for me is the comprehensiveness of the inclusion. The paper addresses not only the actuation styles, but also the actuation technology, the environment of the research, the control style, and the strength/speed of the motion across several domains. In particular the tables between sections address the breadth of inclusion as well as organizing the expansive amount of information in a relatively readable format. There are also other areas that the paper succeeds in. The brief descriptions of the technologies and locomotion methodologies are also in depth enough to provide understanding of the work without being overwhelming in terms of technical knowledge. The analysis at the end provides a helpful discussion from individuals in the field that I personally appreciated to have some qualitative thoughts on the work done. Lastly the usage of bio-inspired comparisons makes it possible to quickly identify at least a general idea about how a robot is going to function.

There are however several weaknesses to the paper. As mentioned earlier the captions that prefaced some of the papers were not always enough for me to grasp the technology or intention. I often found the included images to be unclear without the context of the papers that they were connected to and did not contribute to my overall comprehension of the ideas or technologies being used in the work. My last critique is that the results of the included works were difficult to contextualize without reference to conventional rigid systems. In particular the paper claims in the conclusion that the soft robots perform worse than their rigid counterparts, but without a metric to definitively measure by. Many of the soft robots don’t have the same goals as contemporary rigid robots, and the paper would benefit from some graphs comparing different elements of performance between the two.

Going forward the paper does provide a great deal of reference for inspiration. I found the ideas of integrating soft mechanisms as secondary parts (either other soft methods or other types of motion) to be a potentially exciting idea moving forward. The use of hybrid mechanisms or semi-soft robotics seems like a fantastic way to combine the benefits that come from both rigid and soft robotics. Soft materials could be used to make a “foot” on a rigid walking mechanism could be used to improve the balance of a bipedal or quadrupedal system. Using traditional thrust generation mechanisms with the addition of flexible wings and airfoils opens the door to non-conventional control that is potentially more agile than traditional control surfaces. After reading this review I feel like currently the applications of soft robotics on their own needs some development before it will be independently viable, but they do however have potential to integrate with existing technologies to improve their functionality.