Review of: "Design and Fabrication of a Low-Cost Multi-Purpose Underwater Remotely Operated Vehicle"

Anusna Chakraborty

Potential competing interests: No potential competing interests to declare.

This paper discusses the construction and operation of a Remotely Operated Underwater Vehicle for multi-purpose applications. Some general comments on the whole paper.

1. References should be cited properly with author names and et.al for multiple authors. Google scholar provides a nice way to include references in the paper.
2. The paper has many repeated information, repetitive statements and sentences which can be removed or paraphrased so as to highlight the most important information.
3. A dedicated paragraph or even a itemized list providing the authors contributions are missing making it very difficult to understand where the literature survey ends and the authors start discussing their own contributions to the paper.
4. Some sections have too much redundant information whereas sections of importance like Robotic arm design (Page 6), Relays (Page 7), Design of the Camera calibration system (Page 7), Design of the mechanical claw (Page 7) are not explained well. These are the sections most useful for this paper and needs rework.

A comprehensive review of the article is listed as below:

1. In the Abstract, the authors mention that ROVs are simple in design and deployment - which I believe is not an appropriate statement as ROVs are inherently complicated in design and their deployment is more challenging as it is remotely operated and hence real time transmission of commands from the base station is necessary and is some cases quite challenging to achieve.
2. In the literature review, the authors have not discussed new AUVs which have performed deep-sea embedded oil line inspections like Hydroswarm.
3. In the literature review, the authors have provided a lot of background information on manned and unmanned exploratory underwater vehicles. However, the information is scattered and a concise paragraph dedicated to the comparison of the 3 types of systems - manned, unmanned, and remotely controlled will be benefitial for the paper.
4. On Page 3 under statement of purpose, the authors mention about deployment of fiber optic cables. Paragraph 1 on page 3 Lines 2 - 4 can be better explained as the context is lost (a reference to that incident) is useful.
5. On Page 4, the authors have mentioned different equations for the calculation of drag force and thrust force and provided references for it. Do these equations require any modification for the system proposed in this paper?
6. On Page 4, under Sealing and Waterproofing, the authors discuss depts of 50m. At that depth, how is the communication link maintained steadily? What safety measures are taken if for example the tether is damaged or if

signals are not sent to the ROV at real time speed?

7. On Page 5, Paragraph 1 the authors discuss emitting green light for attracting marine creatures for study. What is the goal of the vehicle developed in this paper? In the introduction, the focus was on design and operation. Are there specific tasks the authors want to deploy their vehicle for? That needs to be clearly mentioned in the paper.
8. On Page 7, under Limitations and Solutions, the authors have pointed out several potential restrictions with the current prototype. Some of them are particularly concerning like the user terminal. What is the difficulty in having an user terminal for verifying robot operations? Since this is a challenge, how does the current system monitor the ROV?
9. Under the same section, the robots battery life is also mentioned as a challenge. Can power be not supplied from the base station as the ROV is connected to it via a tether? Tethers are also used for aerial vehicle operations like high-rise window cleaning where the tether is not only used as a safety measure but also to serve as data link. Can those designs be explored for power?
10. On Page 8 under conclusions, the authors mention the development of user terminal module to issue commands to the robot. Why can the same terminal not be used to track the real time movement of the ROV?
11. Under the conclusion section the authors emphasize that the vehicle was developed for multi-purpose use which is the novelty. Have the authors thoroughly investigated already existing vehicles to re-purpose for different missions? The authors discuss briefly about a robotic arm and the placement of cameras for detection. How is this ROV more useful than humanoid robots?

Overall, the paper's flow is confusing and the main agenda is not clearly described. It is difficult to ascertain the contributions of this paper so a major rehaul of the paper structure and content is advised.