Ethical issues in my research work and their implications

Snehal Bhayani

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1 Introduction

I am a student pursuing a doctoral program with the University of Oulu. My research is in the field of **3D computer vision** and pertains to solving various problems pertaining to the geometry of how cameras perceive and process various scenes in reality. The umbrella research group that I am working with comprises of the broad and interesting field of **Machine Vision and Signal Processing**.

Now, with the topic of my doctoral research being at the forefront of technology, I have an opportunity to collaborate with reseachers, both within the University of Oulu, as well as from beyond the university. In the past I have worked with and continue to conduct research from few universities other than the University of Oulu. Beyond this, there is a possibility in future, for collaboration with various research and development arms of certain industries. As a result of this, next I list out various ethical issues that can or may emerge during the course of my research.

2 Possible ethical issues that can emerge in my research

In my perspective, scientific research of any form briefly involves the following:

1. Propositions, literature survey and evaluation of existing techniques.
2. Work towards performing experiments that reinforce the propositions laid out.

3. Derive conclusions, perform comparisons and summarize the results.

4. Attempt to theorize the propositions based on the experiments.

5. Document the idea, the claims, and the novelty in the proposed approaches.

6. Meticulously outline the experiments performed, the tools and technology used for the same.

7. Document the proofs as well as the evaluations that compare with the existing technologies.

3 Ethical issues and their implications

As we look at the stages of the process of scientific research, I list out the issues that can arise when it comes to ethics.

1. The first stage itself has a strong issue that can occur during research. When it comes to literature survey, and drafting a novel idea, care must be taken to ensure that the idea pushes the boundaries of science. A change here or a change there, can though count as novelty, it doesn't aim to innovate in truth. Hence, the phase of ideation must be carefully handled.

2. Experiments are meant to provide a heuristic to claims laid out and so, the experiments must be as much general as possible and should cover all of the targeted area.

3. Conclusions and comparisons on the experiments with the existing state-of-art techniques must be done with suitable credit given to the researchers who performed the experiments for state-of-the-art techniques.

4. Documentation is a must for proper outreach of the research being performed and hence incomplete or shabby documentation is a strict no-no.

5. Due credit must be given to authors of tools and technology that is used while performing experiments.

6. Beyond this, when it comes to collaboration, I must ensure a clear ongoing communication with our collaborators and hence ensure that every personnel involved in the research has idea at all stages.

7. But beyond the group of personnel involved in research, due care should be taken to maintain strict confidentiality as and when required, but at the same time the information about the research can be carefully disseminated based on the nature of work.

8. As my research involves significant applications of field of mathematics, I should carefully prove as much as possible, the propositions laid out so that the experiments and techniques can be recreated by other members of the community.

These ethical issues if not handled properly can lead to many implications. In brief, I think,

1. Distrust can be created with my collaborators as well as with researchers that I aim to work with in the future. Especially this can happen if I fail to cite and credit theories, techniques, tools that my research uses.

2. Being unsure about the novelty of the proposed idea can lead to my research becoming irrelevant as well as being a wrong example for the community.

3. If experiments are not performed properly, the proposed claims can be incorrectly understood and so can lead to future work being based on invalid results. This leads to a potentially larger problem for future.

4. Incomplete documentation also leads to less understanding of other researchers about my work and hence either it can lead to invalidation over a period of time, or can also lead to unintended plagiarism by other researchers in future. In absence of clear understanding about my research it is difficult to expect credits from future researchers who build upon my published research.

4 How to be careful about the ethical issues

Well in my research I have been careful at the stages that I have covered until now. The basic idea is to be cautious when it comes to collaboration. And an elaborate literature survey is a first to ensure that my work is original, and does not impinge upon the existing publications as well as due credit goes out to the authors whose work I use in any form along the way. Proper documentation and in a regular fashion is a good way to keep notes and be sure that when it is time

to document, all of the due credit goes out to everyone involved. This also helps in maintaining a good communication with all of my collaborators. Additionally when it comes to experiments, I believe that the experiments have to be done by keeping in mind all of the edge cases so that is as much general as possible. As my research pertains to the field of computer science, the software that is written to perform the experiments has to be document well so that the results can be recreated in future. This would ensure that my research is a good candidate for others to build upon in future. Also, a system of regular updates among a research project group is a good idea for clea communication and handling. This ensures that all of those involved would have a good idea of what is going on and can stay updated with the results.

5 Summary

At the end of the day, good ethical scientific research is all about maintaining curiosity with good levels of honest attitude in terms of planning, experiments, proofs and documentation.