MicroCART Mini

Ethics and Professional Responsibility

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Client & Faculty Advisor: Dr. Phillip Jones

Project Overview

MicroCART: Microprocessor Controlled Aerial Robotics Team

- Design a code-based mini quadcopter platform to be used in CPRE 488 and for Controls & Embedded Systems researchers
- Develop mini quadcopter printed circuit board (PCB), containing a Microcontroller, RF, IMU, and Wi-fi chip
- Develop software to stabilize and communicate movements
- Develop base-station to communicate with quadcopter
- Create and improve documentation and video tutorials for future teams



CrazyFlie micro-quadcopter

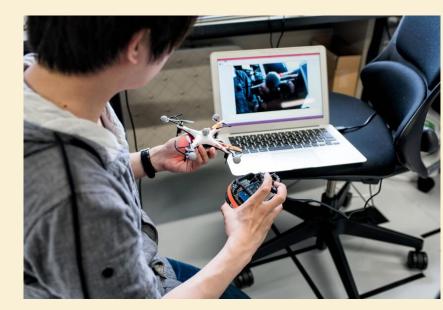
Our Project Goals

- Design/Improve a code-based quadcopter platform integrating both hardware and software to be used for hands-on learning in CPRE 488's lab.
- Ensure both remote
 accessibility and usability
 for future users through
 documentation and
 tutorials

Social Responsibility

<u>Education</u>:

- Core aspect of our project is creating teaching materials for a CPRE 488 Lab
- Improvement after utilization:
 - Reducing bugs
 - Increasing clarity
 - Improving documentation



Work Competence

- Absences and being late to meetings
- Mediocre quality of work produced
- Negligence towards due dates set
- Changes to be made:
 - Creating GitLab issues to enforce getting work done before due dates
 - Enforcing a no tardy policy for meetings
 - Have our work created checked by our advisor before closing the issue

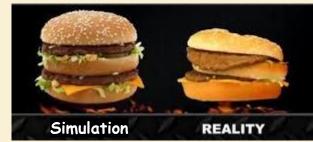




Four Principles	Beneficence	Nonmaleficence	Respect for Autonomy	Justice
Public health, safety, & welfare	Project helps improve the learning of all who are involved	Design promotes safe practices (ie: Test Stands)	Implementation provides a framework, that participants are expected to complete	Design allows for access to all parties
Global, cultural, & social	Brings different communities together to learn	Implementation harms no one indirectly	Design does not affect cultural practices	Benefits are shared equally amongst all parties
Environmental	Mini Quadcopters, are small, decreasing potential environmental impact	Rechargeable batteries and non-toxic, minimally processed materials ensure low environmental impact	Open-source design allows replacement parts to be sourced according to user's desires	Implementation does not harm the environment
Economic	Project teaches job-applicable skills	Project largely uses pre-existing open-source design parts	CrazyFlie is an open-source drone that can be found outside the school	Custom drone will not infringe upon any private sales; CrazyFlie software only affects our items

Potential Ethical Issues

- Being truthful to the public (Honesty)
 - Scholar's day presentation: A previous team used a simulation instead of the real positioning of the quadcopter
 - Guaranteed 'result' vs Reality
- Work Outcomes (Integrity)
 - Covering up mistakes versus creating actual fixes
 - ie: Wooden slab covering up a hole in the sidewalk vs
 - Concrete replacement





Conclusion

Even though our project has few ethical risks in regard to the outcome of the project, us as the project team must remain watchful of ourselves. How we present ourselves and our project will be important to ensure that we uphold a moral integrity and deliver worthy work.



• Jones. "CprE 488 - Embedded Systems Design." Iowa State University,

https://class.ece.iastate.edu/cpre488/schedule.asp