Multi-disciplinary Research, including Drones, Prosthetics, and Mobile Systems

Combining techniques for solving probelms

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Multi-disciplinary research is considered by many European, UK and USA researchers and institutions, as an approach to failure, as one is not focussed in one specific research area. The above statement has proven not to be true. Exploring different research areas, has resulted in using principles in the one research area, to solve a problem in another research area. The span of some of the different professions and research areas that have been learned, researched, developed and pursued includes: firefighting, first responder, rescue diver, aviation, amateur radio operator, vehicle accident investigation, bio-medical, prosthetics, medical operating devices, exoskeletons, search and rescue robots, industry robots, navigation, ballistics, unmanned aerial vehicles (UAVs), automated vehicles, education robotics, to name a few.

Whether it is a South African culture, or the author's characteristic, the key is to always be willing to learn something new, and not to be afraid to pursue a new endeavour. The Stopforth Mechatronics, Robotics and Research Lab has housed the Mechatronics, Robotics and Research Group's (MR^2G) Search and Rescue Division and the MR^2G Bio-Engineering Unit, both headed by the author, since 2008 and 2009 respectively. The focus of the research has been to perform R&D on topics that have an application and solve international problems.

Even though the research are has been broad, there has been two focus areas that are described below. The possible collaboration is also explained under each section, yet not limited to the topics nor the research areas. Further details of the research interests can be found under the Research Links section at the end of this summary.

I. Unmanned Aerial Vehicles (UAVs) or Drones

This research area researches UAVs that can be used for realistic applications such as searching for rhino poachers, inspecting dangerous or difficult to reach areas, and to perform tasks that people have to risk their lives generally with manned aerial vehicles. The author is also the first academic in the world to obtain a Remote Pilot License (RPL), with South Africa being the first country to initiate regulations and licenses for drones. This research is funded by Eskom TESP and by the Department of Science and Technology (DST) in South Africa, through the CSIR. The project is a national project, with links to the Robtoics Center of South Africa (RASA) and the Robotics Center of South Africa. Research collaboration is encouraged. Unfortunately the funding is mainly to be used for South African students, but the different aspects of the research can be performed by different research groups and countries.

Some of the research collaboration has been with Prof Theo van Niekerk and Prof Russell Phillips at the Nelson Mandela University. Some of the research pursued at the Nelson Mandela University is stability control and landing, and a 4-meter fixed-wing UAV being constructed.

The research areas where collaboration is possible is on the different localization and mapping, point-cloud detection of faulty or defected parts, poachers detection, etc.

II. Prosthetic and Human Assisting Devices

The Touch Hand has been reported in an article in the USA, in 2015, as being one of the most advanced, low cost, prosthetic hands in the world. The research has resulted in numerous international awards and funding, allowing for a spin-off company called Touch Prosthetics. The aim of the Touch Hand is to develop a prosthetic hand that is low-cost and affordable in the third world countries, yet having the ability to have the human functionality.

The research has allowed for collaboration with companies and institutions such as BunnyCorp, Horne Technologies, Kings College London, to name a few. Different versions of the hand has been developed over the years, and the goal is to have an entry into the 2018 Cybathlon Olympics Prosthetic Hand Series (which might be hosted in South Africa) and the 2020 Cybathlon Olympics challenge in Switzerland.

Research Links

Research Gate: www.researchgate.net/profile/Riaan_Stopforth
LinkedIn: https://za.linkedin.com/in/riaanstopforth
Google Scholar:
http://scholar.google.com/citations?user=tUXn5HIAAAAJ&hl=en
Google Plus: http://plus.google.com/+RiaanStopforthResearch
Academia.edu: https://ukzn.academia.edu/RiaanStopforth
Touch Prosthetics: http://www.touchprosthetics.com
Facebook: www.facebook.com/Stopforth.Research
YouTube: https://www.youtube.com/channel/UCUfaKz94nJTI_7vIKsSEEog
Robotics Association of South Africa (RASA):
https://www.facebook.com/Robotics-Association-of-South-Africa-298753050143370/