RMIT
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Call for PhD Applications in Aerial Robotics at RMIT Vietnam
Advanced Autonomy for Aerial Robots in Ecological and Agricultural Environments

Project description

Aerial robots, or simply drones, offer significant potential for navigating, gathering, or sampling data in challenging environments, such as under dense forest canopies, in ecologically sensitive areas with limited ground access, or in dynamic environments like greenhouses. In these ecological and agricultural applications, obtaining accurate, real-time data from hard-to-reach areas is crucial and often inefficient by other means. With their ability to fly and hover, aerial robots can efficiently collect spatially and temporally spread data. However, navigating such complex and dynamic environments requires high levels of autonomy and adaptability. Dense vegetation, varying light conditions, changing features, and moving obstacles present considerable challenges to maintaining safe and efficient navigation for data collection, underscoring the need for advanced autonomous navigation capabilities.

While significant progress has been made in robotic autonomy, current literature highlights limitations in aerial robots' ability to navigate challenging and unstructured environments without human intervention. This research lies at the intersection of control and perception, focusing on exploring the use of new sensing modalities and developing a comprehensive autonomy pipeline for aerial robots. The work emphasizes end-to-end autonomy, encompassing the combination of differentiable components for control and perception, the integration of pretrained visual foundation models into existing control frameworks, and the development of new vision-to-action policies. The proposed pipeline seeks to optimize navigation tasks with minimal manual tuning, fostering a tighter integration between control and perception. This approach enables aerial robots to effectively learn from available datasets and adapt based on their own experiences. The research includes integrating new sensors and pretrained models, designing differentiable algorithms for control and perception, and validating the pipeline in both simulated and real-world environments. The outcomes will contribute to advancing autonomous navigation in aerial robotics, with applications in ecological monitoring and agriculture.

RMIT PhD programs

The program is open to students with either a Bachelor's or Master's degree in STEM. Applicants must have an IELTS score of 6.5 or equivalent. The program fully covers tuition fees and offers an **annual stipend of 10,000 AUD (or ~170 million VND)**, along with additional **funding for Research/Teaching Assistant duties**. It also includes a travel budget **to present at top conferences**. For international candidates, RMIT will provide a support letter to assist with the visa application.

Candidates will be co-supervised by faculty from RMIT University and the University of Liverpool. The PhD work will primarily be conducted at RMIT Vietnam's Saigon South Campus, with opportunities to visit RMIT's Australia campus and the University of Liverpool. The program is designed to be completed in 3–4 years, culminating in a **PhD degree awarded by RMIT University**.

For details on eligibility and benefits, visit: https://www.rmit.edu.vn/study-at-rmit/phd-programs.

Academic advisors

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How to apply

Candidates should send a detailed CV along with a motivation letter to Dr. Hai-Nguyen Nguyen (hainguyen.nguyen@rmit.edu.vn) and Dr. Anh Nguyen (anh.nguyen@liverpool.ac.uk). Applications will be reviewed in a rolling basis.