Heterogenous Swarming of RVR and BOLT Robots:

# Abstract

# Introduction

*Start with an attention-getting broad statement that establishes a general topic for the article.*

*Narrow the topic in successive sentences that outline the state of the art and introduce a gap in knowledge.*

*End the introductory paragraph with a general statement of the problem and optional supporting/specifying statements. Specify the general direction of the paper.*

(field of research, context and importance) As the field of robotics moved forward with advances in both the efficiency and capability of embedded systems utilised in robots so did the scope extend for robots to tackle an ever-growing set of larger and more complex challenges. An approach to these new challenges can be made through the implementation of swarm robotics, which is a branch of multi-agent robotics systems that is characterized by its emphasis towards the emulation of natural biological swarms, such as packs of wolves hunting prey; multi-agent swarms utilise a multitude of smaller and simpler agents that act together towards a global intent.

(Focus/scope) Heterogeneous swarming presents an opportunity to broaden the scope and applications of robotic swarms, enabling robots with differing degrees of computational power, sensors and mobility to work together. While many classical tasks of robotics swarms, which are loosely based on patterns found in nature, such as path finding and

Research needs (gap in knowledge)

purpose/aim (objectives of research)

# Background Info

## Swarming model and formations

## Swarming algorithms

The **boids** model was initially conceptualised by Craig Reynolds in 1986, which simulated the flocking motions of birds,

## Symmetric & asymmetric swarms of heterogenous robots

# Literature Review

*Cite the most significant historical sources that form the foundation underlying the topic that will be extended in your report. The seminal literature.*

*Focus on the cutting-edge knowledge base and the significant differences between the work that has already been published and the new contribution that your report is presenting.*

*Guiding principle:*

*“The literature review identiﬁes the seminal historical contributions, outlines the state of knowledge, and justiﬁes the novelty of the article’s contribution.”*

Reasons:

* there are currently no papers on boid-based heterogeneous emergent formations
* No swarming applications of low-cost easily accessible robot platforms (Sphero BOLT and RVR)

Swarm Robotics

Heterogeneous Swarms

# Project Management

**Methodology**

**Research Design**

**Background Theory and Analysis**

**Timeline**

[insert Gantt chart]

**Current Progress**

* Investigations into SPHERO BOLT and RVR capabilities
* Testing SPHERO BOLT running off of RVR Pi
* Testing full swarm under ViCON

**Future Work**

* Final Product and Evaluation

# Conclusion

Objective

Summarise the research proposal

Summarise work done and future work

Value of research, including responding to the gap in literature