

Research Plan

Environmental Remote Sensing Using UAVs

keywords: autonomous, information-based, spatiotemporal processes,
environmental monitoring...

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Abstract

Max. 1/2 page abstract ...

1 Introduction

- *What is this research plan about?*
- *What are the (high-level) research gaps?*
- *What is the overall goal?*

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- (Scientific) importance of environmental monitoring spatio-temporal phenomena
 - Advantages of using autonomous systems
 - Current research gaps (→ connect to related work sections)
 - Planning paths for efficient data-gathering given constraints (vehicle mobility, time, fuel)
 - Adaptive sampling
 - Operational issues, cooperative planning?
 - The proposed research aims at providing (IPP) solutions for environmental monitoring using aerial robots
 - Section 2 of this research plan overviews related work in the field. The proposed approach, and its scientific contributions, are detailed in Section 3. Finally, Section 4 outlines the planned time schedule of the thesis.

How application-specific? e.g. monitoring fields vs monitoring in general

Should I focus on one application for the plan?
Be more specific.

2 Related Work

- *Which major works consider a similar context?*
- *Which works are addressing same/similar problem and why are these works insufficient (Gaps in state of the art)?*
- *Which works use a similar methodology?*

40 references

To discuss:

2.1 UAVs for environmental monitoring

- General overview of applications
- Focus on agriculture

2.2 Informative path planning

- Motivate IPP development, define IPP
- Connect to static sensor placement problem
- 3 ingredients for model-aided path planning
 - Environmental model: GPs, occupancy grids
 - Objective function: submodularity, entropy-based/alternative formulations
 - Planning algorithm: continuous vs. discrete, adaptive vs. non-adaptive

How generic should the following subsections be?

Am I re-searching one aspect in detail?

Where are my contributions?

2.3 Adaptive sampling

- Spatio-temporal phenomena, dynamic processes
- What has to be done to account for environmental model changing over time?

Should I decide where to do further research

2.4 Operational issues?

Localization, control issues, systems.

2.5 Cooperative monitoring?

Consider problems with multiple agents.

3 Proposed Approach

3.1 A subtopic

- *What approach will be used?*
- *Why is the approach promising?*
- *What are the expected results?*

The proposed research will focus on developing an informative path planning framework, able to ...

Application-specific?

This section needs to be discussed.

Define work packages?

3.2 Expected contributions

This thesis aims at providing the core scientific contributions ...

4 Time Schedule

- *How can each topic be subdivided into meaningful tasks?*
- *What is the time schedule?*
- *Which publications are planned (list of planned publications)?*

Example Gantt chart shown in fig. 1.

References

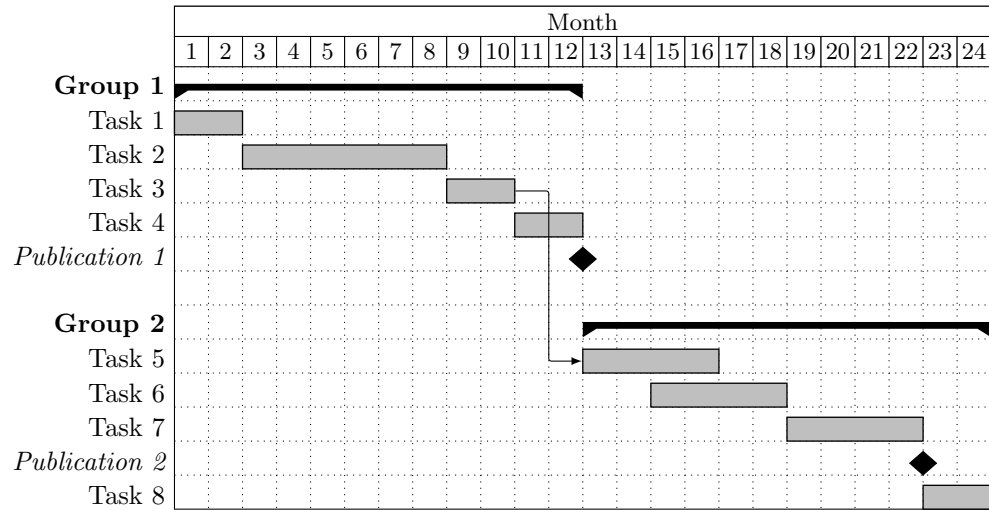


Figure 1: Gantt Chart