

1. Title

Autonomous unmanned aerial robotic system for prediction of fruit production

2. Supervision

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3. Description

The application of unmanned aerial vehicles (UAVs) in agriculture has been concentrating many research efforts and we are on the verge of the massification of this kind of solutions for many different purposes. In this scope, one potential application of this kind of devices is the analysis of aerial images to predict the fruit production at particular fields, which will be useful for logistic purposes. Hence, the work plan for this dissertation comprises the determination of tree capacity and prediction of area and/or production volume, based on multispectral image data (visible and other spectra) acquired from UAVs in an autonomous way (see example in Fig. 1).

The tasks involving the development of this project include:

1. Up to date literature review with a focus on image processing in agriculture applications.
2. Preparation of scientific review publications (meta-studies) of the state of the art.
3. Development and test of the image classification and recognition algorithms for the determination of tree capacity and prediction of area and/or production volume.
4. Field tests.
5. Development of graphical interfaces for results analysis.



Figure 1: Example of an image of a peach tree, taken from a UAV.

Proposta de Dissertação de Mestrado

4. Workplan

- 1- Comparative study of the methods previously published in the scope of this dissertation;
- 2- Development, implementation and test of the chosen approach;
- 3- Publication of the proposed approach in an ISI-indexed International journal or conference.

5. Chronogram

	J	J	A	S	O	N	D	J	F	M	A	M	J	J
Gutierrez "PatternAnalysis"														
Matlab (OCR)														
Estado-da-Arte														
Resumo comparativo / crítico														
Abordagens propostas (T)														
Implementação														
Testes / Validação / Refinamento														
Elaboração publicação														
Tese (Redacção)														
Tese (Revisão)														

6. Prerequisites

- Basic skills in English writing/reading;
- Ability to use programming languages, specifically Python, C++;
- Previous knowledge about machine learning and artificial intelligence.