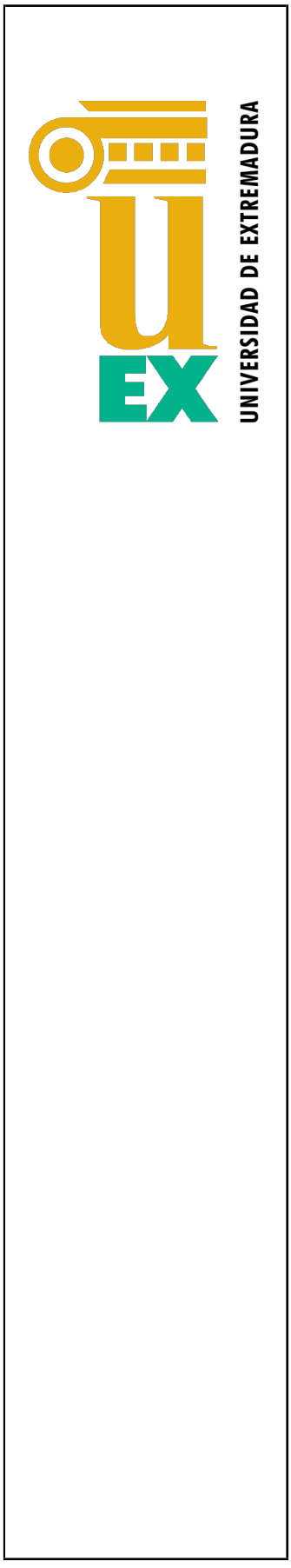

University of Extremadura

Faculty of Science

Physics degree

Degree Final Project

Developement of a FIWARE-based application

for tree species monitoring (dendrometry)

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Abstract

This document gives a detailed description of this project, which is focused on researching possibles low-cost alternatives for wireless dendrometry systems. Currently there exist a lot of expensive and professional systems in the market, that's because this project is intended to reduce costs and increase the versatility, scalability and accessibility.

In order to reach these objetives the project will be supported over free software such as FIWARE[1] or free hardware such as Arduino[2] and RaspberryPi[3].

1 Introduction

This project arises itself from a direct interaction with professionals inside forestal sector. The original idea was to give technical coverage for particular necessities which professionals in this sector had to face off with. At this point is easy to notice this solution will need to be a distributed solution, due high samples dispersion. **As can be seen**, there are even remote techniques to predict this sample density/dispersion using remote methods which predicts **between** 157-170 **specimens per hectare**[4] (depending on the used model). So according to this required resolution it will be needed a big wireless network of distributed devices.

This is more or less, the definition of the IoT (Internet of Things) concept; according to [5] IoT concept comes from an earlier concept called M2M (Machine-to-Machine) communications. However, also according to [5] there is not an official definition for IoT concept, but

> "based on the traditional information carriers including the Internet, telecommunication network and so on, Internet of Things (IoT) is a network that interconnects ordinary physical objects with the identifiable addresses so that provides intelligent services." [6]

References

[1] e. FIWARE Foundation. (2020). Fiware home,
[Online]. Available: `https://www.fiware.org/` (visited on 05/2020).

[2] A. company. (2020). Arduino,
[Online]. Available: `https://www.arduino.cc/` (visited on 05/2020).

[3] R. P. Foundation. (2020). Raspberry pi,
[Online]. Available: https://www.raspberrypi.org/ (visited on 05/2020).

[4] J. Mohammadi, S. Shataee, and M. Babanezhad, “Estimation of forest stand volume, tree density and biodiversity using landsat etm + data, comparison of linear and regression tree analyses”, *Biophysical Chemistry - BIOPHYS CHEM*, vol. 7, pp. 299–304, Dec. 2011.
DOI: 10.1016/j.proenv.2011.07.052.

[5] A. Abdul-Qawy, E. Magesh, and S. Tadisetty, “The internet of things (iot): An overview”, Vol. 5, pp. 71–82, Dec. 2015.
[Online]. Available: https://www.researchgate.net/publication/323834996_The_Internet_of_Things_IoT_An_Overview.

[6] H.-D. Ma, “Internet of things: Objectives and scientific challenges”, *J. Comput. Sci. Technol.*, vol. 26, pp. 919–924, Nov. 2011.
DOI: 10.1007/s11390-011-1189-5.