



Doctoral Thesis Title: Development and implementation of a management system, resource optimization, and decision-making through sensing and cloud processing with Artificial Intelligence for the service and maintenance of urban green areas

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Student:

Abstract: Accelerated urbanization of cities and climate change have underscored the significance of the presence of green areas as a key element to enhance the quality of life in urban areas. Green infrastructures play a fundamental role in the resilience of cities, mitigating climate change by absorbing CO₂ and reducing the heat island effect to adapt to change. However, effective maintenance is essential to ensure their functionality and sustainability, preventing potential accidents and reducing possible inconveniences that may cause to users. The proposed management system utilizes advanced sensors to monitor key variables in plant development such as air and soil moisture, temperature, soil conductivity, and plant health. Furthermore, since soil contamination is a pressing issue in both agricultural and urban environments in our society, sensors detect contaminant levels and allow managers to take timely measures to preserve vegetation health, and protect soil and its inhabitants. Artificial intelligence (AI) algorithms will be employed for the analysis of the collected data and the making of optimal decisions, including efficient irrigation scheduling, early detection of plant diseases and adaptation to changing weather conditions. An innovative approach is proposed for the management of urban green areas, using advanced technologies with sensors and AI to optimize resources, preserve environmental health, and improve the quality of life in cities. This approach has the potential to address critical issues such as soil pollution, climate change, and the improvement of the urban ecosystem, thereby contributing to the creation of more sustainable and resilient smart cities in the future.

Available Means: It is proposed to carry out this doctorate with the mention of industrial doctorate. A pilot project will be developed at QUALITAS OBRAS SERVICIOS E INGENIERÍA, SL company, where the student is currently hired and working. The enterprise tutor will be the technical director Mr. José Manuel Vila Gómez.

References:

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- Townsend-Small, A., & Czimczik, C. I. (2010). Carbon sequestration and greenhouse gas emissions in urban turf. *Geophysical Research Letters*, 37(2), n/a.
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