Preliminary and self-archivable version of: Bedón, H., Chicchon, M., Grados, B., Paz, D., Díaz-Nafría, J.M. (2024). QuinuaSmartApp: A Real-Time Agriculture Precision IoT Cloud Platform to Crops Monitoring. In: Guarda, T., Portela, F., Diaz-Nafria, J.M. (eds) Advanced Research in Technologies, Information, Innovation and Sustainability. ARTIIS 2023. Communications in Computer and Information Science, vol 1937. Springer, Cham. https://doi.org/10.1007/978-3-031-48930-3_13

QuinuaSmartApp: a real-time agriculture precision IoT Cloud platform to crops monitoring*

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Abstract. IoT networks, cloud based applications and the use of artificial intelligence models in precision agriculture present an important opportunity to increase production and optimize the use of water resources, which will allow the development of sustainable and responsible agriculture in the face of global food security. In order to provide real-time remote monitoring of quinoa crops, this article propose and implements an integrated architecture based on sensor networks, drones with multispectral and Lidar cameras and cloud computing based applications. The system has hardware and software applications that enable Quinoa crop monitoring during the different stages of its growth. Additionally, it counts with weather stations that provide real time data that permit actualize the predictive models that you can use for local climate change projections. The monitoring of the level of humidity in the crop field through soil stations feed the training database based on machine learning that allows generating the projection of water demand, which allows a more efficient and planned use of crop water. Additionally it implements a it implements a service of warning messages that are answered by experts connected to the system in order to receive technical recommendations to help deal with this issue in order to lessen the impact of pests and diseases in the field.

Keywords: IoT · Sensor Networks · Machine learning · Cloud Computing · Precision Agriculture.

1 Introduction

Precision Agriculture (PA) [9], designed to improve profitability and / or minimize environmental impact in the medium and long term [18], provides a localized management of crops and a studying of soil characteristics, crop behavior, phytosanitary, among others, of each portion of the fields.

Awareness of soil and crop variability started in the '70s and' 80s, where companies such as CENEX, FARMERS Central Union Exchange Inc. and Control Data Corporation, of Minnesota-USA, established the first concept of soil and plant variability and its benefits by management for zones instead of the entire planted area.

* Supported by Programa Nacional de Innovación Agraria (PNIA)