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Editorial

Foreword to the Special Issue on Advanced IoT Technologies in Agriculture

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In recent decades, the perception of the impact of humanity's ecological footprint has changed dramatically; it is now widely recognized that natural resources are limited and sensitive, and that their indiscriminate use is unsustainable and deeply impacts the well-being of people, animals and plants [1–3]. The awareness that in order to reverse this problem, we must Reduce, Reuse, and Recycle, leads to the emergence of new and disruptive paradigms in most aspects of human activity, including agriculture [4,5].

In fact, agriculture has a tremendous impact on food supplies for the world, but also on the environment, and can compromise the ecological balance, thus, endangering sustainability [6]. The search for new methodologies applied to agricultural production addresses recent technologies, most of which arise from the Internet of Things (IoT), enabling a massive and unprecedented deployment of digital devices and services in a range of application domains that always increases [6–8]. This trend, commonly referred to as Smart Farm, Precision Livestock Farm or Farm 4.0, consists of the use of a wide range of sensors that monitor the evolution of the impacted conditions in agriculture, transmitting these data through communication systems, typically wirelessly. These data are then analyzed, often using Artificial Intelligence techniques, supporting management decisions with the goal to optimize agricultural production, including economical aspects such as productivity, quality and profitability, and sustainability [9,10].

The management of agricultural processes is based on accurate information, both on current conditions and on the forecast of future developments, and it allows for gains in the efficiency of agricultural processes, both in terms of economics and environmental impact [7].

Indeed, we intend with this Special Issue on Advanced IoT Technologies in Agriculture to present developments in research, focusing on the application of new methods to pinpoint or solve problems and constraints in agriculture and livestock production, based on IoT, making use of emerging technologies such as large data, sensor networks, image analysis, unmanned aerial vehicles (UAV), mobile applications, cloud computing, robots or artificial intelligence.

Examples of the application of such technologies to irrigation, fertilization, seeding, soil management, pest and disease detection, animal feeding, breeding and welfare, impacting on farming productivity, profit and environment sustainability, are also welcome.

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