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**SMART AGRICULTURE: A FUTURISTIC VISION OF APPLICATION
OF THE INTERNET OF THINGS (IOT) IN BRAZILIAN
AGRICULTURE**

**Claudio Leones Bazzi¹, Rodrigo Araujo Catão¹, Eduardo G. de Souza², Kelyn
Schenatto², Alan Gavioli², Nelson M. Betzek²**

¹Computer Science Department, Federal Technological University of Paraná (UTFPR), Av. Brasil 4232, 85884-000, Medianeira, Paraná, Brasil;

²Technological and Exact Sciences Center, State University of West Paraná (UNIOESTE), Rua Universitária 2069, 85819-110, Cascavel, Paraná, Brasil;

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Abstract. *With the economy based on agribusiness, Brazil is an important representative on the world stage in agricultural production, either in terms of quantity or cultivated diversity due to a scenario with vast arable land and favorable climate. There are many crops that are adaptable to soils of the country. Despite the global representation, it is known that the Brazilian agricultural production does not yet have a modern agriculture by restricting the use of new technologies to farmers with better financial conditions and higher producing areas. Thus, it was considered the situation of producers in terms of usability of technological resources applied to agriculture such as internet and smartphones, the Brazilian agricultural context in a systemic way and how this technological platform can help producers to be more competitive. Brazil is the sixth largest consumer of the world's smartphones and although it is a developing country, the use of these devices in the farmed environment is quite present as well as the availability of internet, even in the houses of small farmers. In the systemic context, the country has developed a rich network of agro-industrial cooperatives that support the majority of producers, on the purchase of inputs, technical support, marketing, among others, providing the integration of a technological platform for the sector, improving productive scenario through knowledge generation. With the integration of these data in a single environment, one can employ expert systems, simulators and analyzers generating knowledge and advantages both to those involved in agricultural process such as sector companies and cooperatives, and producers, improving their farming practices and making a better management of their property.*

Keywords. *precision agriculture, agribusiness, agriculture technology.*

Introduction

In the Brazilian agricultural segment, the economic status of the producers is quite heterogeneous, especially when it comes to the size of the production areas and the use of technologies. While there is an intense concentration of small producers (up to 5 ha of arable land) in certain regions, there are large producing areas in other regions (over 1000 ha). As the technological investments are more economically viable for the biggest producers, the small producers segment end up having lower levels of production and consequent worst financial results, what brings difficulties to their competitiveness in the market. This work presents a future vision of what is expected from the Brazilian agricultural sector in terms of using technological resources and introduces an integrated software solution, which have been developed by Brazilian universities for the collection, storage, management and mining of agricultural data in Brazil.

Perspective of IoT use in the Brazilian Agriculture

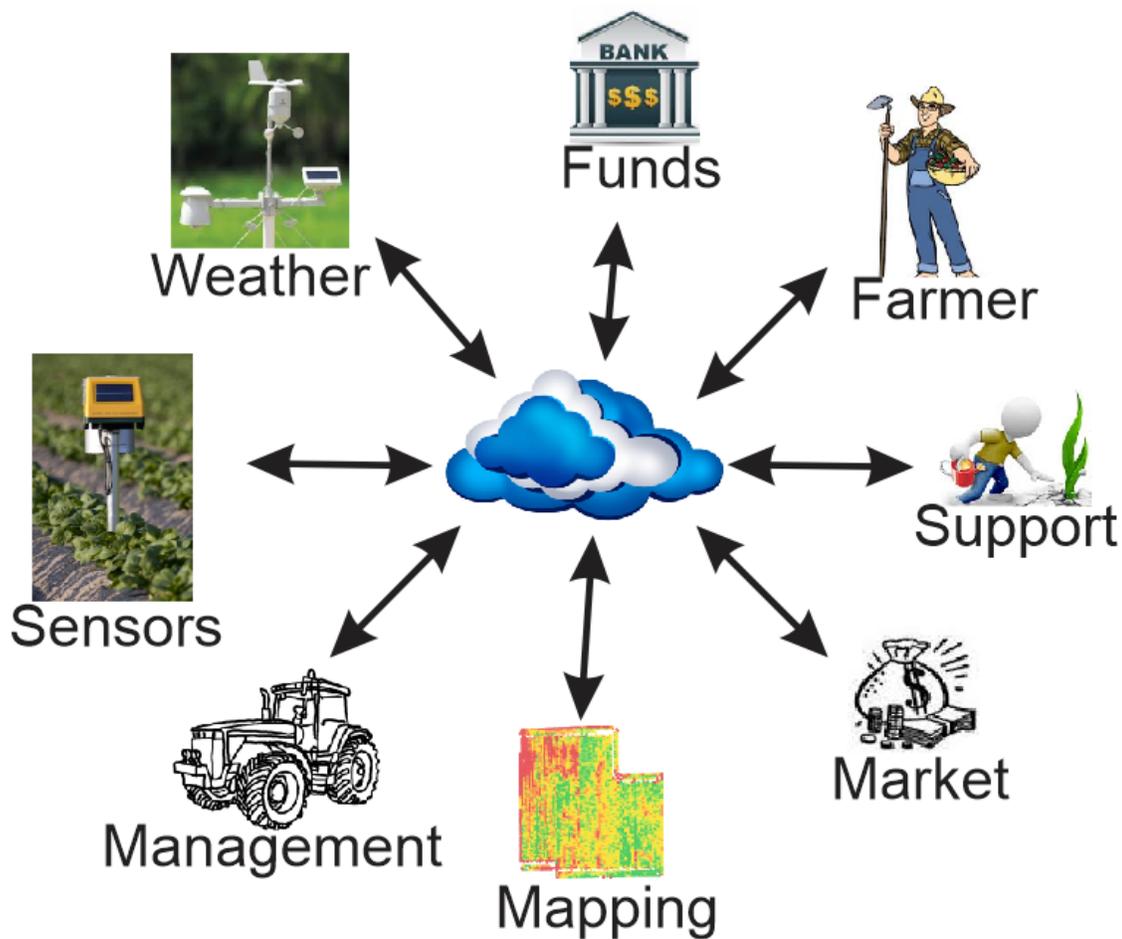
The use of technology in the Brazilian agricultural sector is quite restricted for small producers due to the cost associated with the acquisition and maintenance. Nevertheless, cooperative systems, fairly present in Brazil, have been broadening the use of these resources in order to make the acquisition and integrated use of machinery, equipment and devices that aim to benefit the production systems, both in productivity and quality of products produced as well as in increasing the profitability of producers. It has also significantly increased the number of companies providing service, though, there is the unpreparedness of most professionals of the sector and mistrust from the producers to invest and do not get the expected return.

After all, the trend is that the use of technological resources in the agricultural environment grow strongly in the coming years considering beside the costs reduction on adoption and use of technological resources, the necessity of keeping competitive in the market and "produce more with less" and the presence of producers and their children with more technical and professional knowledge (the new generation of producers has increased level of technical knowledge about the use and advantages of using technology in agricultural production). Therefore, the use of IoT in the agricultural segment is expected to increase significantly in the coming years to improve the quality and quantity of what is produced in Brazil, as well as providing opportunities for new commercial and technical areas. Due to the large number of small producers, who still does not benefit from technological resources, devices and low-cost equipment tend to be used on a large scale for monitoring, data collection and automation of procedures currently performed manually.

The prospect is that the use of sensors, samplers and other apparatus used in the agricultural environment still generate an expressive amount of data to be stored, processed and analyzed using various existing data mining techniques. Therefore, the research team of the West of Paraná (PPAT) universities is developing a platform that will provide storage, management, analysis and applications resources for the data that will be obtained from the application of IoT in agriculture.

The platform for store and analyze of the data

The platform being developed is based on an integrated environment data storage of different types about producing areas, which can be obtained from various sources, including specialist softwares for analysis and data processing applications for smartphones, as well as features of hardware programmed for real-time data collection from sensors applied in the field, machineries and equipments. Among the planned data are climate data, field operations data, financial data, thematic maps generated through data collection and analysis, management zones, equipments and involved professionals, services, among others.



The platform, developed with free tools will be available by the end of 2016, free of charge and in three languages. There are meetings planned, with interested Brazilian producers and companies engaged in agribusiness.

Conclusion

The integrated data collection environment, storage, management and analysis will be very useful for farms management, providing resources so that even producers with less economic capacity can maintain a good profitability in their crops.

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