BIOSENSE INSTITUTE

Innovative solution - A robotic platform for soil sampling and analysis in the field

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Application of fertilizers represents a significant part of agricultural production. An excess of fertilizers has a very bad impact on the environment, while a shortage of fertilizers is reflected in a reduced yield at the end of the season. Classical methods for soil analysis include physically and time-consuming sampling procedures in the field and agrochemical analyzes in the laboratory in order to obtain the desired information. On the other hand, the systems for soil analysis in the field that currently exist on the market are limited to the expertise and ability of the people who use them, while in the case of automatic systems, the limitation is reflected in the measurement of only a few parameters and therefore the inability to provide a complete picture of the situation in the field.

The BioSens Institute is developing a system based on a robotic platform for autonomous soil sampling and analysis for nitrate concentration in the field. The system has the ability to accurately, quickly and reliably measure and map nitrates, which will enable the creation of fertilization recommendation maps. Based on the mentioned maps, the farmer will be able to make the right decisions, optimize his production and take full advantage of all the advantages of precision agriculture in terms of efficiency, increase in yield and sustainability of agricultural production.

In the next phase of development, the proposed solution will be equipped with a pH probe, a probe for measuring the electrical conductivity of the soil and a multi-ion-selective probe with which it is possible to determine macronutrients (nitrogen, phosphorus, calcium, magnesium) and micronutrients (chlorine), which would give a more complete picture of the state of the soil on the field.