
Using artificial intelligence systems for intensive safe cultivation of crops-short communication

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Abstract The modern artificial intelligence systems for intensive safe cultivation of crops is proposed. Predicted crop is based on platforms of vitisFlower, vitisBerry and FruitSize). The expert assesses economic and environmental impacts for profitability of agro-industrial production. Results are significantly increased in the sustainability of the company to reduce the production costs, obtained an environmentally friendly product. Artificial intelligence systems are created a tool for a simplified of precision farming systems in small companies with the ability to access the platform. The project can be focused to develop and distribute the precision farming systems that supports companies' decisions about the risk of actual production and disease prediction models. The result should be corresponded to decrease the production inputs, and created the low cost hardware / software "data package" within the full cycle of agro-industrial production.

Keywords: Artificial intelligence systems, Farming systems, Safe cultivation of crops, Agro-industrial production

Introduction

One of the most important factors associated with climate change in recent years is the use of environmentally friendly agricultural methods associated with the correct use of biodiversity of soil, water, energy resources, selection of optimal technologies in order to reduce the impact on the environment. Over the past 50 years, the practice of aggressive farming has intensified due to population growth and demand for food around the world. This policy has led to a reduction in the biodiversity of natural ecosystems and pollution of the environment by by-products that provoke pollution and soil decommissioning. There is also good news: a breakthrough in modern digital technologies every day increases the potential for helping the agro-industrial complex, primarily using artificial intelligence technologies in combination with elements of precision

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farming. Talaviya *et al.* (2020) stated that agriculture plays an important role in the economic sector. The automation in agriculture is mainly concerned emerging subject through the world. The population is increasing tremendously with the demand of food. The traditional methods have been used by the farmers; it is not sufficient enough to fulfill food requirements. A new automated methods were introduced to satisfy the food demand. Artificial Intelligence in agriculture has targeted to agriculture revolution. Also, Melissa *et al.* (2017) stated that global demand for food in the worldwide standard of living. Meanwhile, climate change is a threat to agricultural production because of the impact on quality of crops and water availability etc.

It is clear understood that a rational distribution of resources leads to better agricultural results. Farmers have no longer needed to make intuitive decisions. By choosing to use artificial intelligence, they gain a multifaceted tool that provides insight into the health of crops at all stages of development. This allows agro-growers to choose the optimal means for processing plants in real time, based on individual soil and climatic conditions and needs. Thanks to the use of a set of information data, they will be able to adapt the process of plant growth, rationally use resources - program crop parameters, ensure phytosanitary protection of plants, and avoid soil pollution. We offer complex systems that provide an effective, informed choice of balanced fertilizers, microelements, plant protection products, applying them at the exact time and at the specified place in the required amount. Using the original package of precision farming tools: digital platforms, artificial intelligence programs, sensors with feedback, instrumentation for the preparation and point delivery of these components to the plants, the product reaches the maximum set of nutritional parameters. Melissa *et al.* (2017) stated that the global impacts of climate change on agricultural to specific climate change adaptation and mitigation will be limited by climate variability and food security. Meanwhile, 14.5% of global greenhouse gas (GHG) emissions drive the climate change.

Artificial intelligence platform

The package for using the artificial intelligence platform is based on the analysis and management of variable parameters: microclimate / development of pathogens and their management, physicochemical composition of soils, growth force and development of plants and much more determined at the stage of the technical task. As a result, a lot of advantages are obtained as the maximum volume of a high-quality crop per unit of surface, managing the nutritional potential, health of the soil as a renewable source, maximizing carbon capture through soil organic matter, preserving the ecosystem, and reducing greenhouse gas emissions. Specifically, we can offer within the framework of this project which has

designed for 36 months, the implementation of the following activities: - soil mapping and analysis are related to GPS field area measurement, soil sampler and nitrogen index; and continuous monitoring of the trend of vegetative energy. Talaviya *et al.* (2020) explained that artificial Intelligence in agriculture can be protected the crop yield from various factors like the climate changes, population growth and the food security problems. It concerns to various applications of Artificial intelligence in agriculture for irrigation, weeding, spraying with sensors and embedded in robots and drones. It will save the excess water supply, pesticides, fertility of the soil. However, Santiteerakul *et al.* (2020) stated that sustainable development is of growing importance to the agriculture sector because the current lacking utilization of resources and energy usage, together with the pollution generated from toxic chemicals, cannot continue at present rates. Sustainability in agriculture can be achieved through using less (or no) poisonous chemicals, saving natural resources, and reducing greenhouse gas emissions. Technology applications could help farmers to use proper data in decision-making, which leads to low-input agriculture. The role of smart technology would be implemented in sustainable agriculture. The plant factory using intelligence technology enhances sustainability performance to increase production productivity, product quality, crop per year, resource use efficiency, and food safety, as well as improving employees' quality of life.

Development and implementation of a targeted digital prototype for culture are necessary tasks as diagnostics and protection of agricultural crops, phytosanitary monitoring in certain phenological phases e.g. Plantix, Bioleaf, E-Accord, ADAMA Bullseye, PMapp, Plant Disease, ImScope and Agrobase. The crop growth and land cover are managed by VitiCanopy, Easy Leaf Are, Canopy Cover Free, Canopeo, PocketLAI, Sentinel-2 NDVI Maps, OneSoil Scouting and Smart fLAIr. Application of essential fertilizers and nutrients is done by Dropleaf, Ag PhD Crop Nutrient Deficiencies, Yara TankmixIT, SpraySelect, SnapCard, EcoFert and Smartirrigation Cotton). Irrigation and watering is based on intelligent platforms (pCAPS and EVAPO). Moreover, step-by-step analysis of agricultural crops for a comprehensive assessment of the quality characteristics and residual content of maximum permissible concentration of pesticides and chemicals are required. Sharma *et al.* (2020) stated that agriculture plays an important role in sustaining all human activities. Major challenges such as overpopulation, competition for resources poses a threat to the food security of the planet. In order to increase the problems in agricultural production systems, advancements in smart farming and precision agriculture offers important tools to address agricultural sustainability challenges. Moreover, Jha *et al.* (2019) reported that agriculture automation is mainly emerged for every country as the world population is increasing at a very fast rate and the need for food increases.

The automation practices like IOT, artificial intelligence can be solved to control the harmful pesticides, irrigation, pollution and environment. Automation of farming practices can be helped to increase yields.

Conclusion

Predicted crop volume and quality parameters are based on platforms (vitisFlower, vitisBerry and FruitSize). Expert assessment of economic and environmental impacts is needed for the profitability of agro-industrial production in general. Achievement of the set results are significantly increased in the sustainability of the company's activities to reduce the production costs, obtained an environmentally friendly product, nutritional and organoleptic properties, minimizing negative external effects. Creation of a tool for a simplified and inexpensive implementation of precision farming systems in small companies with the ability to access the platform of artificial intelligence systems are concerned. The based knowledge and analytical management would return on investment (ROI) forecast. The project can focus on the development and distribution of precision farming systems that support companies' decisions about actual production risk based on disease prediction models. The result should be corresponding to reduce and rationalization of cultivation, phytosanitary interventions and production inputs. In this regard, the main goal of the project is created and transferred the low-cost hardware / software "data package" related to surveys, analysis and decision support systems within the full cycle of agro-industrial production. An example of the new implementation and the results of applied work are ready to provide on demand.

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