

Harnessing Robotics, XR/AR, and 5G for a New Era of Safe, Sustainable, and Smart Agriculture

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New EU Project Launched to Elevate European Agriculture Through Robotics and AR/XR Technologies

With a €4.97 million grant from the European Commission, the AgRibot project is strategically designed to address some of the most pressing challenges in European agriculture, including labour shortages, unsafe working conditions, and the pressing demands for both enhanced productivity and greater sustainability.

[Thessaloniki, Greece] Launched on November 1, 2024 and coordinated by AgroApps, in the next four years AgRibot will develop and field-test six state-of-the-art robotic systems throughout Europe, demonstrating their adaptability to a variety of agricultural operations, including weed management, precision spraying, harvesting, and pruning. More than just automating tasks, AgRibot integrates AR/XR technologies to improve farmer training, support operations in real-time, and foster better interaction between humans and machines.

Solving Labour Challenges and Driving Sustainability

The agricultural sector faces several challenges, including a fatality rate 233% higher than other industries and a rapidly declining workforce, projected to drop from over 10 million in 2010 to just 7.9 million by 2030. This labour shortage leads to unharvested crops, rising labour costs, and reduced food availability, driving sharp price increases. High land costs and unpredictable weather further discourage new entrants, while the average farmer's age rises from 59 to 67 years. AgRibot addresses these issues by automating labour-intensive tasks, improving safety, and enhancing working conditions, making agriculture more attractive to younger generations. The project also supports sustainable farming by reducing chemical use and optimising resource management, aligning with the Farm-to-Fork Strategy and the Common Agricultural Policy.

A Leap Toward Safer, Smarter, and More Sustainable Farming

AgRibot will conduct pilot tests of six robotics technologies across Europe, including:

- • Weed identification and spot spraying in Greece;
  • Robotic spaying of weeds in potato and volunteer potatoes in Denmark & Switzerland;
  • Robotic fertilisation management for leafy vegetables in open field conditions in Italy;
  • Robotic technologies for crop monitoring and management in soilless tomato cultivation in Italy;
  • Robotic harvesting in orchards in Belgium;
  • Robotic pruning and thinning with XR in orchards in Spain & Belgium.

Central to AgRibot’s systems is the Farming Intelligence and Robotics Management Platform (FIRMP), which integrates all robotics using edge computing and a Multicloud Orchestrator for real-time data processing. Combined with a private 5G Farmers Network Community, FIRMP ensures robustconnectivity, enabling efficient remote operation and tailored decision-making support even in rural areas. Powered by machine vision using Explainable AI (XAI) techniques, the robots reduce chemical use, improve safety, and optimise resources - cutting pesticide use by up to 85% in potato crops and enhancing crop yield with precision fertilisation in leafy vegetables.

For on-ground training and assistance, AgRibot employs AR/XR technologies that overlay critical information about crop health onto their physical environment. These immersive applications also offer realistic training simulations to help farmers effectively collaborate with robots and integrate them into daily practices.

The project is also developing an Impact Assessment Tool (IAT) to help farmers measure the economic, environmental, social costs and benefits of these innovations, promote beneficial adoption of smart farming technologies and showcase potential positive impacts on resource efficiency, pesticide reduction, and labour savings.

Collaboratively Driving Sustainable Change

> “AgRibot is a transformative project for European agriculture, combining robotics, artificial intelligence, and augmented/extended reality to revolutionise farming practices. By leveraging these cutting-edge technologies, we are tackling today’s challenges while shaping a future of smarter, safer, and more sustainable agriculture.” says Gregory Mygdakos, AgRibot’s project coordinator. “Our mission is to deliver robotic solutions that will empower farmers, improve efficiency, adaptability, and environmental responsibility.”

Led by AgroApps, the consortium brings together 18 leading organizations in robotics, AI, AR/XR, social science and agricultural sciences. These include Consiglio Nazionale Delle Ricerche, Katholieke Universiteit Leuven, Politecnico di Bari, Fundacio Eurecat, Geoponiko Panepistimion Athinon, AgriRobot APS, CYENS Centre of Excellence, University of Macedonia, Digyone GmbH, Erevnitiko Panepistimiako Institouto Systimaton Epikoinonion kai Ypologiston, Università degli Studi di Bari Aldo Moro, Nova Telecommunications, Teknologisk Institut, Københavns Universitet, bSpoke Solutions, InoSens and EcoRobotix SA. This multidisciplinary consortium ensures that the project delivers innovative solutions that are technologically advanced and

practically viable, benefiting farmers across Europe.

AgRibot represents more than a technological evolution, it's a step towards a fairer, safer, and sustainable agricultural sector. By integrating advanced robotics and digital tools into farming, the project equips European farmers to overcome evolving challenges.

For more information about what AgRibot is and its mission to reshape agriculture, visitagribot-project.eu.

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   Dissemination & communication of AgRibot project results.

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