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Use of artificial intelligence in agriculture ppt

AI is transforming agriculture by leveraging intelligent machinery and smart farming techniques. With an AI-powered online course, individuals can break into various industries, including agriculture. The agricultural sector, worth \$5 trillion, faces a crisis due to the growing global population, which demands increased productivity. AI-based technologies are being utilized to enhance crop yield, irrigation management, soil content sensing, and crop monitoring. Agricultural robots are designed to deliver high-value applications of AI in this sector. By 2020, farmers will utilize 75 million connected devices, while by 2050, the average farm is expected to generate 4.1 million data points daily. The applications of Artificial Intelligence in Agriculture include: - Healthier crop yields through optimized growing conditions and disease management. - Improved soil monitoring and control of pests. - Data organization for farmers to streamline their workloads. - Enhanced agriculture-related tasks throughout the food supply chain. - Weather forecasting to plan sowing seeds, determine crop types, and optimize planting schedules. 1. Introduction Artificial Intelligence (AI) is revolutionizing agriculture, enabling farmers to automate their farming practices and improve crop yields while reducing resources. 2. Green Revolution The global population is projected to reach 10 billion by 2050, requiring a 70% increase in food production. AI can help address these challenges through innovative technologies. 3. How AI Is Used in Agriculture: Automated farming activities, such as monitoring soil quality and nutrient deficiencies using image recognition-based technology. This app identifies plant pests and diseases, enabling farmers to use targeted fertilizers for better harvests. 4. Soil and Crop Health Monitoring System AI-based apps can analyze soil quality, identifying nutrient deficiencies, plant pests, and diseases, allowing farmers to optimize fertilizer use for higher-quality crops. 5. Analyzing Crop Health by Drones SkySquirrel Technologies uses drone-based aerial imaging solutions to monitor crop health. Algorithms analyze captured images, providing detailed reports on farm health, helping farmers identify pests and bacteria. 6. Challenges Agriculture faces significant challenges, such as irrigation system absence, temperature changes, groundwater density, food scarcity, and wastage. AI can help address these difficulties through cognitive solutions and predictive analytics. 7. Future Scope AI in agriculture not only automates farming but also enables precise cultivation for higher yields while using fewer resources. Companies developing machine learning-based products will provide more applications to the sector, helping with global food production demands. Effective crop management involves anticipating disease outbreaks, monitoring biotic factors, abiotic stressors, and machine vision systems that analyze plant phenotypes for adjustments. Additionally, automating irrigation systems can optimize vegetable production by reducing costs, increasing yields, minimizing environmental impact, and conserving water. Automated irrigation systems have a significant effect on the industry, making it more competitive and sustainable while maintaining average yields and minimizing excess water usage. This approach also reduces labor input for maintenance and achieves substantial water savings compared to traditional methods based on historical weather conditions. Artificial intelligence and remote sensing technologies provide enhanced crop health monitoring capabilities through hyperspectral imaging and 3D laser scanning. These tools rapidly analyze plant metrics across vast areas, offering a spatial resolution that delineates individual plots or plants and tracking changes throughout the growing cycle. Conventional methods are often time-consuming and categorical in contrast to digital detection and analysis technologies categorized as remote sensing tools. The trained use of hyperspectral imaging, spectroscopy, and 3D mapping significantly increases scalable physical observables in the field, creating a virtual world of phenotype data where all crop observables become mathematical values. Artificial intelligence is also being utilized for autonomous early warning systems to detect oriental fruit fly outbreaks. This system captures environmental fluctuations using wireless sensor networks and GSM networks, incorporating machine learning techniques to automatically issue warnings via GSM networks. Furthermore, decision support systems utilizing AI techniques offer a promising approach to yield prediction, compared favorably with traditional methods. These systems involve Artificial Neural Networks (ANNs), Genetic Algorithms (GAs), and Grey System Theory (GST) for accurate predictions and informed decision-making in field management. Using advanced software and readily available technology such as sensors, radar, and GPS, an operator can remotely control a driverless tractor pulling a grain cart using a combine harvester. The system enables the operator to set the course of the tractor, position the cart for efficient grain collection, and then dispatch the loaded cart for unloading. The Hortibot is a compact, self-propelled device that uses GPS navigation and can identify 25 different types of weeds. It eliminates these weeds using specialized attachments and sprays herbicides directly above them to minimize waste. As an eco-friendly solution, the Hortibot weighs between 200-300 kilograms, making it light enough not to damage soil behind it. Additionally, it is more cost-effective than current weed-elimination tools since it can operate for extended periods. The application of AI in agriculture demonstrates its potential to optimize resource use and efficiency, addressing labor shortages and scarcity of resources. AI adoption in this sector could lead to a technological revolution, enabling farmers to make informed decisions and contributing to global food security as the world's population continues to grow.

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