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VINETO: EMPOWERING WINEMAKERS

Abstract

Vineto: A Decision Support System for Sustainable Wine Production using Earth Observation and Machine Learning. Wine production is a major economic activity in Italy and other countries, but it faces several challenges due to climate change, pests, and diseases. Among the most serious threats to vineyards are Flavescence Doree and Black Wood, two phytoplasma diseases that cause severe damage and losses to grapevines. Current methods of detection and prevention are often costly, labor-intensive, and ineffective. Therefore, there is a need for innovative solutions that can improve the monitoring and management of vine health and quality. In this paper, we present Vineto, a decision support system that combines Earth observation satellite imagery and machine learning to provide timely and accurate information on vineyard exposure to Flavescence Doree and Black Wood. Vineto uses high-resolution Plaiades images to identify and localize areas with sick plants by analyzing optical and thermal infrared data. By integrating weather data and early diagnosis from field observations, Vineto can also provide recommendations for targeted interventions, such as removing infected plants, applying treatments, or managing weeds and wild vines that host the insect vectors of the diseases. Vineto aims at enhancing the efficiency and sustainability of wine production by preventing large scale infections of vineyards, allowing for an increased yield and quality of grapes. To make Vineto a ready-to-use tool for wine makers, future work will involve enhancing the technical performance of the system, simplifying the data processing from satellite images to actionable information, and testing and validating Vineto on larger scales.