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(57) Abstract :

A cotton harvesting system (102) is disclosed that includes an autonomous apparatus (110) equipped with a mechanical arm and gripper for precise harvesting of mature cotton bolls. The apparatus (110) incorporates an image acquisition unit capturing visual data, hyperspectral sensors collecting crop parameters, and LIDAR sensors generating a 3D map of the agricultural field. The system (102) analyzes the received data, extracting features to identify crop maturity and health variations. Additionally, versatility is enhanced as the system adapts to terrain variations, enabling obstacle identification for optimal navigation. Addressing a spectrum of conditions, the system evaluates maturity statuses, including mature, unripe, and damaged crops, and monitors parameters such as crop health, maturity, and environmental conditions. Moreover, the system leverages the extracted features to generate crop yield predictions, transmitting valuable insights to a computing device, while ensuring comprehensive data storage in a server for further analysis and optimization.

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