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Growth Monitoring for Soybean Smart Water Management and Production Prediction Model Development

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[Abstract]
With the development of advanced technology, automation of agricultural work is spreading. In association with the 4th industrial revolution-based technology, research on field smart farm technology is being actively conducted. A state-of-the-art unmanned automated agricultural production demonstration complex was established in Naju-si, Jeollanam-do. For the operation of the demonstration area platform, it is necessary to build a sophisticated, advanced, and intelligent field smart farming model. For the operation of the unmanned automated agricultural production demonstration area platform, we are building data on the growth of soybean for smart cultivated crops and conducting research to determine the optimal time for agricultural work. In order to operate an unmanned automation platform, data is collected to discover digital factors for water management immediately after planting, water management during the growing season, and determination of harvest time. A subsurface drip irrigation system was established for smart water management. Irrigation was carried out when the soil moisture was less than 20%. For effective water management, soil moisture was measured at the surface, 15cm, and 30cm depth. Vegetation indices were collected using drones to find key factors in soybean production prediction. In addition, major growth characteristics such as stem length, number of branches, number of nodes on the main stem, leaf area index, and dry weight were investigated. By discovering digital factors for effective decision-making through data construction, it is expected to greatly enhance the efficiency of the operation of the unmanned automated agricultural production demonstration area.

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