UNIVERSITY OF ENERGY AND NATURAL RESOURCES

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DEPARTMENT OF INFORMATION TECHNOLOGY AND DECISION SCIENCES

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LITERATURE REVIEW

ASSIGNMENT

Download 10 papers of your choice and review it in Literature form.

In the study of (Han, Choi, & Choi, 2022), a variety-specific crop modeling approach was introduced using blueberries to demonstrate how intra-species variation affects photosynthetic efficiency. Their methodology involved SPAD measurements at different times and leaf positions to assess light response. The experiment revealed significant differences between cultivars, emphasizing the need for variety-level data in smart farming. However, the study focused solely on light as an environmental factor and did not explore broader variables like soil or nutrient dynamics, limiting its generalizability across crops and conditions.

In the work of (Lasseur, Laurenson, & Ali, 2023), a virtual reality-based decision support tool was developed to help livestock farmers visualize tree planting scenarios and assess trade-offs between carbon sequestration, profitability, and aesthetics. The methodology combined VR with biophysical and economic modeling on a 400-hectare farm. While innovative, the tool excluded long-term forestry revenue and carbon credit sales, limiting its financial realism and long-term planning utility.In a similar study, (Chicaiza, Paredes, & Sarzosa, 2023) conducted a methodological survey of smart farming technologies. They categorized components into sensors, actuators, gateways, power supplies, networking, data storage, and processing. The study was comprehensive and offered a solid taxonomy, but leaned heavily on frequency counts and lacked deeper performance benchmarking or empirical validation across technologies.

In the study of (Alturif, Saleh, & El-Bary, 2024), a deep learning framework was proposed to optimize IoT communication in smart agriculture. Using Lagrange optimization and a 1D-CNN model, they calculated ideal transmission distances between sensors and gateways to maximize energy efficiency and data throughput. The model was tested under varying SINR thresholds and interference scenarios. While technically robust, the framework assumes uniform transmission power across devices, which may not reflect real-world variability.In a related study, (Alturif, Saleh, & Osman, 2024) introduced SEED, a secure and energy-efficient data collection method using MD5 hashing and path optimization. The methodology was simulation-based and compared favorably with existing protocols. However, the use of MD5, a deprecated hashing algorithm, raises concerns about long-term security and scalability.In the work of (Osman, Saleh, & El-Bary, 2024), a deep learning model was developed to optimize IoT communication in smart farms. The system used Lagrange optimization and a 1D-CNN to predict ideal transmission distances under interference. The model was validated with MATLAB simulations and achieved high accuracy in estimating energy efficiency and data rate. However, the reliance on synthetic datasets may limit its generalizability to diverse farm conditions.In a follow-up study, (Chicaiza, Paredes, & Yoo, 2024) extended their previous survey with a statistical analysis of performance metrics, evaluating energy efficiency, data rate, and scalability across various IoT architectures. The study highlighted trade-offs between power consumption and communication reliability but lacked empirical field data, making it more theoretical than practical.In the study of (Han, Choi,

& Kim, 2024), variety-specific modeling was revisited with a focus on environmental response. SPAD measurements were used to assess photosynthetic efficiency across blueberry cultivars, reinforcing the need for fine-grained data in AI-driven smart farms. Yet, the study remained limited to a single crop and environmental factor, and did not explore multi-variate modeling or cross-crop comparisons.In another contribution, (Alturif, Saleh, & Osman, 2024) proposed a secure and energy-efficient data collection method for IoT networks. Using MD5 hashing and

path optimization, they improved throughput and reliability. The methodology was simulation-based and compared favorably with existing protocols. However, the use of MD5 raises concerns about long-term security.Finally, (Chicaiza, Paredes, & Zang, 2024) presented a comprehensive review of smart farming architectures, technologies, and performance metrics. Their work synthesized findings from over 80 studies and proposed a device selection strategy based on scalability, energy efficiency, and data processing capabilities. While methodologically rich, the study emphasized literature synthesis over field validation.

🗎 References

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