

Paper 431 summary

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Track Name: ICCIC2025

Paper ID: 431

Paper Title: A Machine Learning-Based Decision Support System for Precision Crop Recommendation in Smart City Urban Agriculture

Abstract:

The rapid pace of urbanization catalyzed by the Smart City became an attractive opportunity and highlighted the critical flaws in traditional food supply chains, making Urban Agriculture (UA) a truly urgent strategy for urban food security. However, significant knowledge deficits arise within urban non-expert farmers, resulting in challenges to blanket adoption, despite its potential benefits. This work presents a data-driven Decision Support System (DSS) that explicitly aims to address the knowledge gap by providing high-accuracy crop recommendations with precision. The DSS is built on a dataset of 2200 data instances and uses seven agronomic features, soil Nitrogen (N), Phosphorus (P), Potassium (K) levels, temperature, humidity, pH, and rainfall. After extensive comparative analysis between multiple supervised ML classifiers, the most responsive model for this classification task was identified, with the Gaussian Naïve Bayes model achieving the best performance with 99% accuracy. The high-accuracy prediction model serves as the primary input for the accessible DSS. The DSS presents an opportunity for urban farmers to utilize data-driven predictive algorithms to transform crop selection and resource efficiencies, enhancing UA's profitability. This work is a tangible step toward creating secure, resilient smart cities aligned with UN Sustainable Development Goals 11.

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Submission Questions Response:

1. Paper Title

A Machine Learning-Based Decision Support System for Precision Crop Recommendation in Smart City Urban Agriculture

2. Abstract:

The rapid pace of urbanization catalyzed by the Smart City became an attractive opportunity and highlighted the critical flaws in traditional food supply chains, making Urban Agriculture (UA) a truly urgent strategy for urban food security. However, significant knowledge deficits arise within urban non-expert farmers, resulting in challenges to blanket adoption, despite its potential benefits. This work presents a data-driven Decision Support System (DSS) that explicitly aims to address the know

3. Keywords:

Smart Cities, Urban Agriculture (UA), Food Security, Machine Learning (ML), Crop Recommendation, Precision Agriculture

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6. Paper Length Confirmation:

Yes

7. Manuscript Originality Declaration:

Yes

8. Plagiarism Check Confirmation:

Agreement accepted

9. Ethical Compliance Statement:

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10. Self and Relevance Citation Declaration:

Agreement accepted

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Generative AI tools were used to assist with proofreading, grammar correction, and rephrasing sentences for improved clarity and readability. All AI-generated suggestions were critically reviewed, edited, and rewritten by the human authors to ensure the final text was accurate, technically correct, and preserved the original intent. The authors retained full responsibility for the final content.

14. Conflict of Interest Disclosure:

No

15. Author Consent:

Agreement accepted

16. Presentation Commitment:

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