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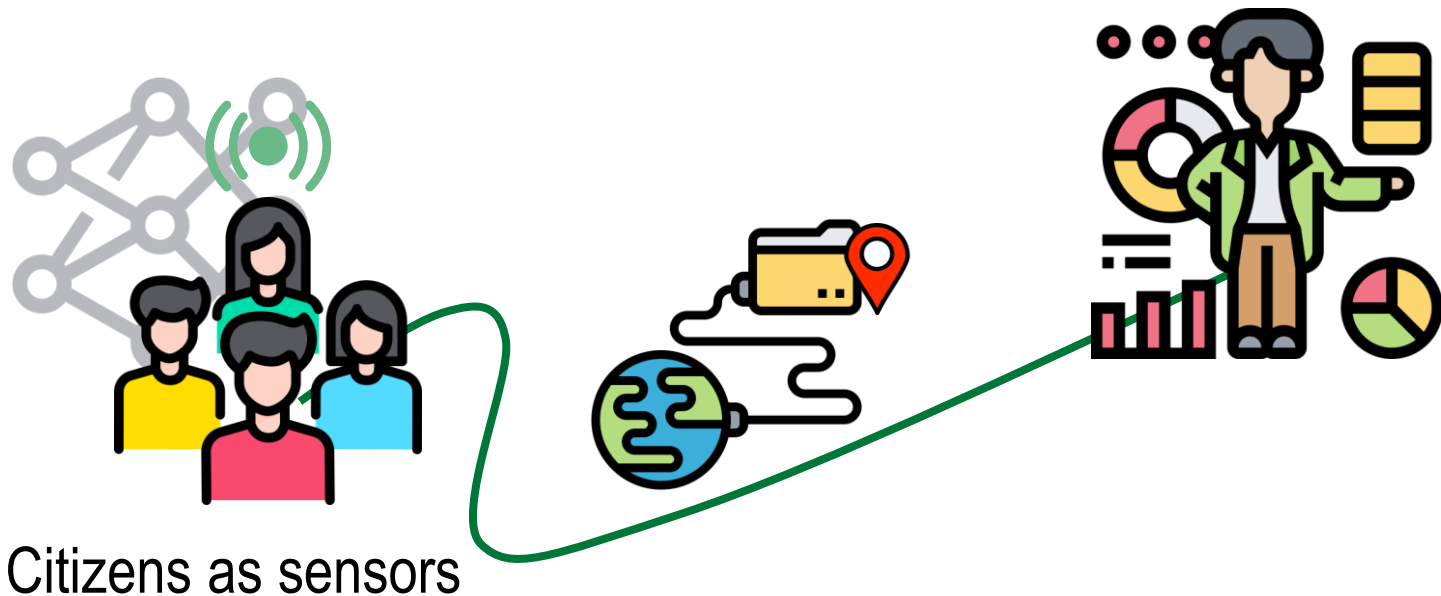
Transforming Citizen Science with Machine Learning and Intelligent Spatial Data Infrastructures

Silvia Cristina de Jesus



Introduction to Citizen Science

Definition: Public participation in scientific data collection, often with a geographical component.



Citizens as sensors

Introduction to Citizen Science

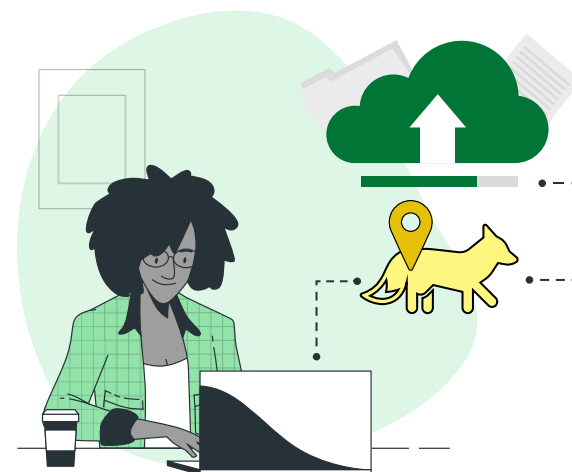


- It enables the collection of large volumes of data across extensive areas, which would be impractical with traditional methods;
- It allows for data collection over extended periods, providing valuable time series;
- It fosters public engagement and awareness.

Introduction to Citizen Science

Example: Biodiversity monitoring.

Importance: Scalability and cost reduction.



Study Aim

The objective of this work is to **review and categorize these challenges as identified in the literature**, focusing on **data validation, sustained engagement, privacy, and ethics**.

Additionally, it proposes a **theoretical model** based on the analysis of challenges identified in the literature, aiming to **integrate Citizen Science with Intelligent Spatial Data Infrastructures (iSDIs) and Machine Learning (ML)** to enhance data quality, ensure sustainability, and strengthen privacy protection.

Methods and approach

Literature Review



Citizen Science



challenges

data quality

privacy

validation

error detection

machine learning

gamification

Challenges in Citizen Science



- Data errors and validation
- Sustaining public engagement
- Privacy and ethics
- Diversity and inclusion
- Data volume and scalability

Challenges in Citizen Science

These challenges have been restructured to focus on:



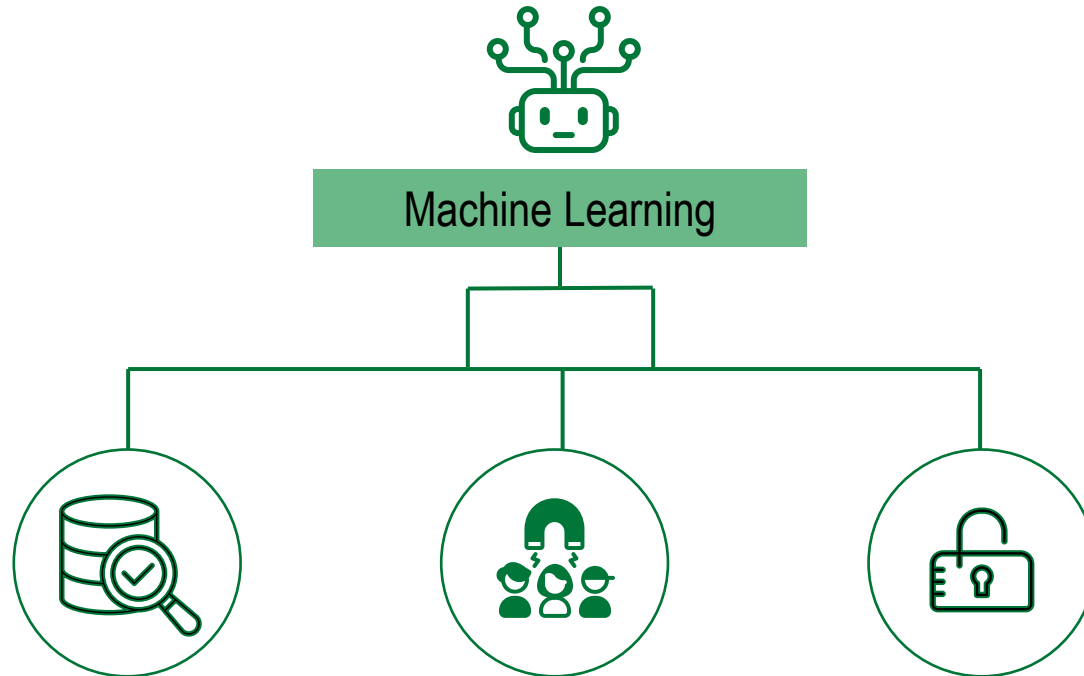
data validation, emphasizing the need for robust systems to ensure the accuracy and reliability of data gathered by non-experts;



sustained engagement, focusing on maintaining long-term interest and active participation from citizens;



privacy and ethics, which involve adhering to legal regulations and protecting participants' data.



Machine Learning as a solution

ML enhances data quality through:

Error detection.

Automatic validation.

Image recognition for species identification.

Benefits: Cost reduction and improvement in data quality.

Proposed theoretical model

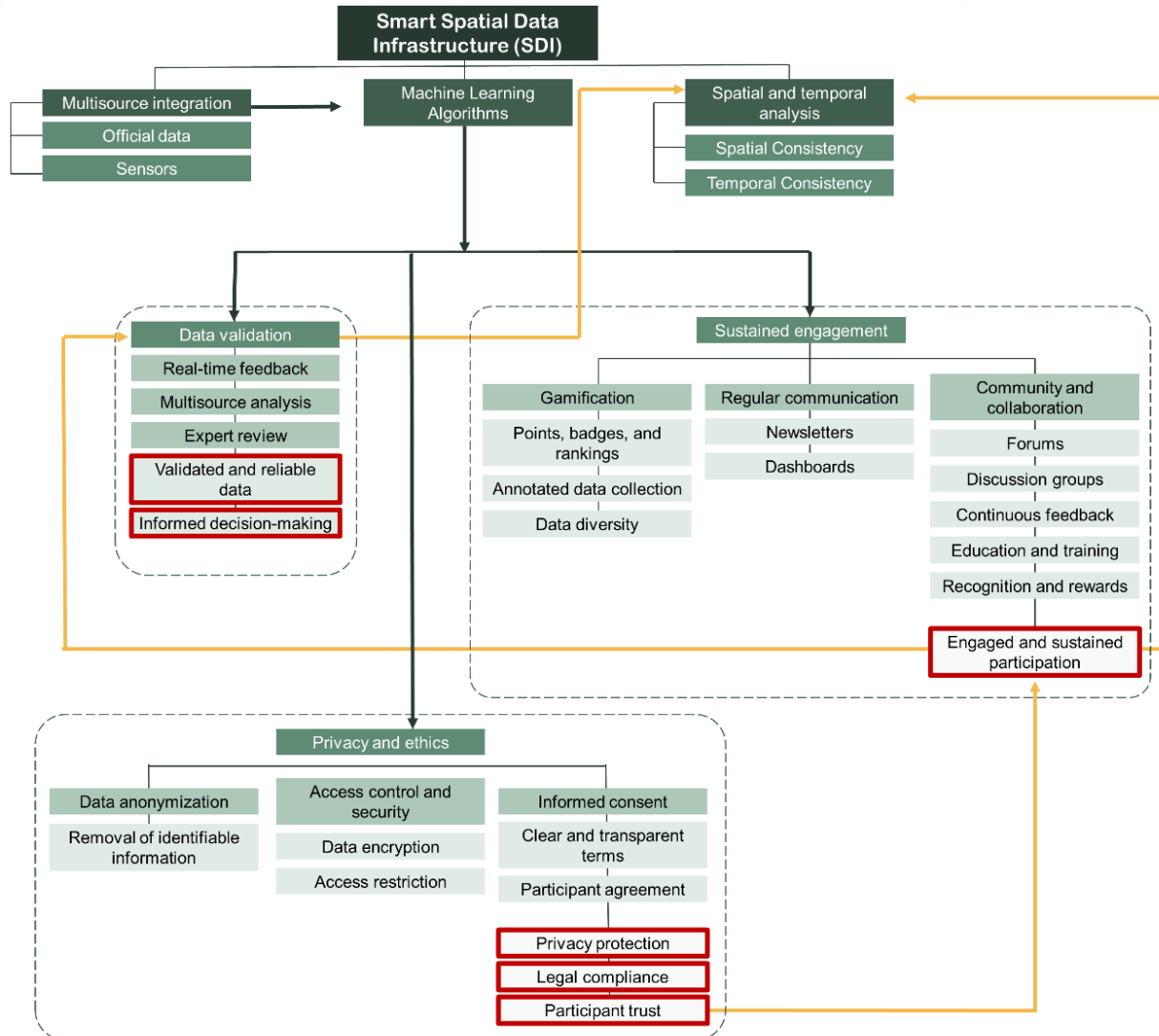
Integration of Citizen Science with iSDIs and ML.

Expected benefits:

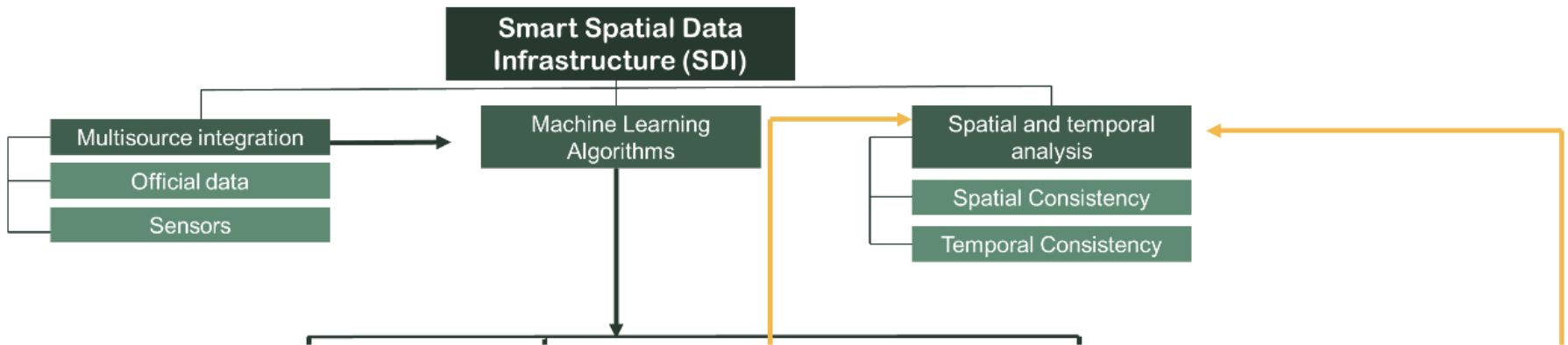
Sustainability.

Data validation.

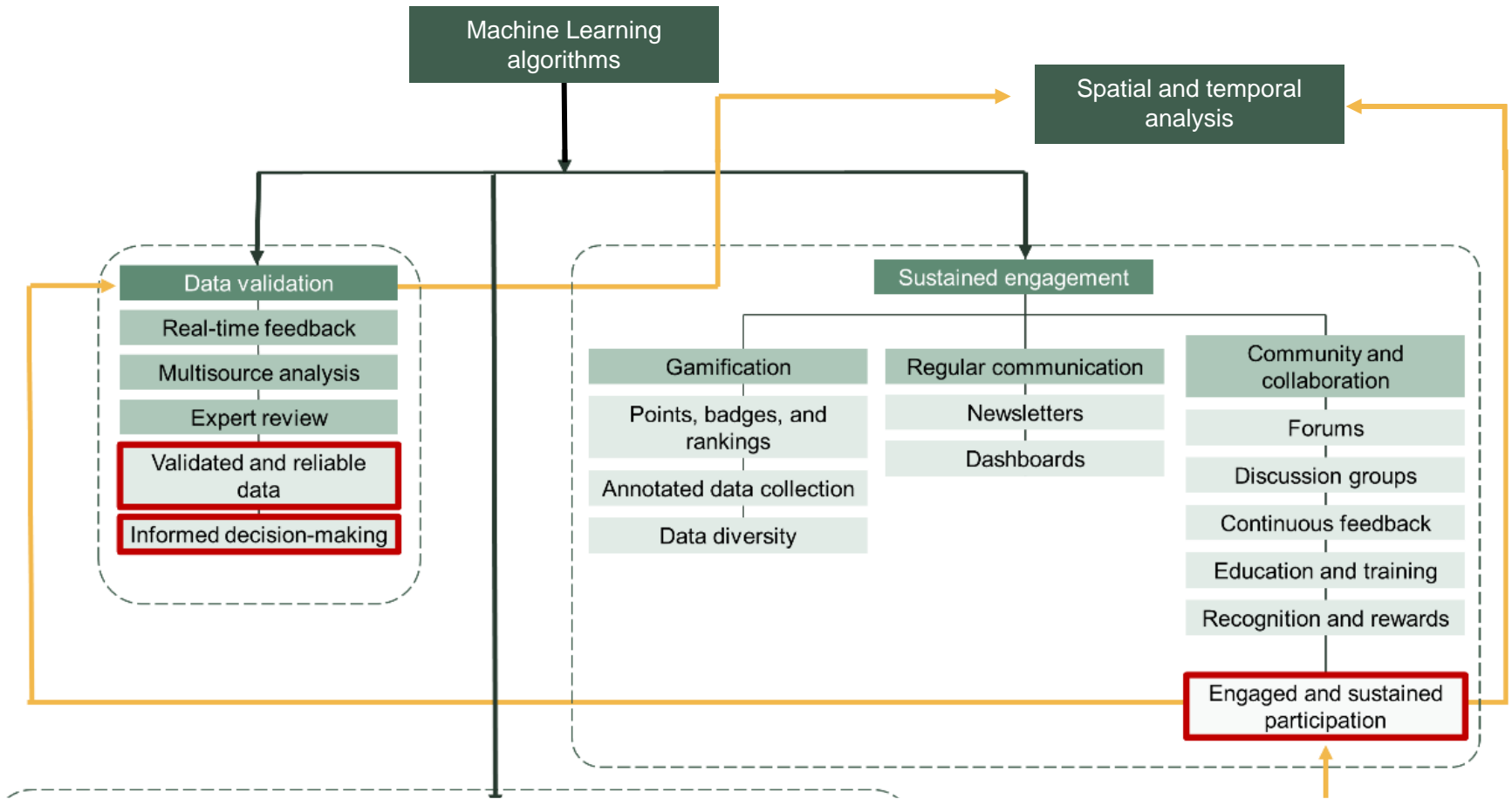
Improved participant engagement.



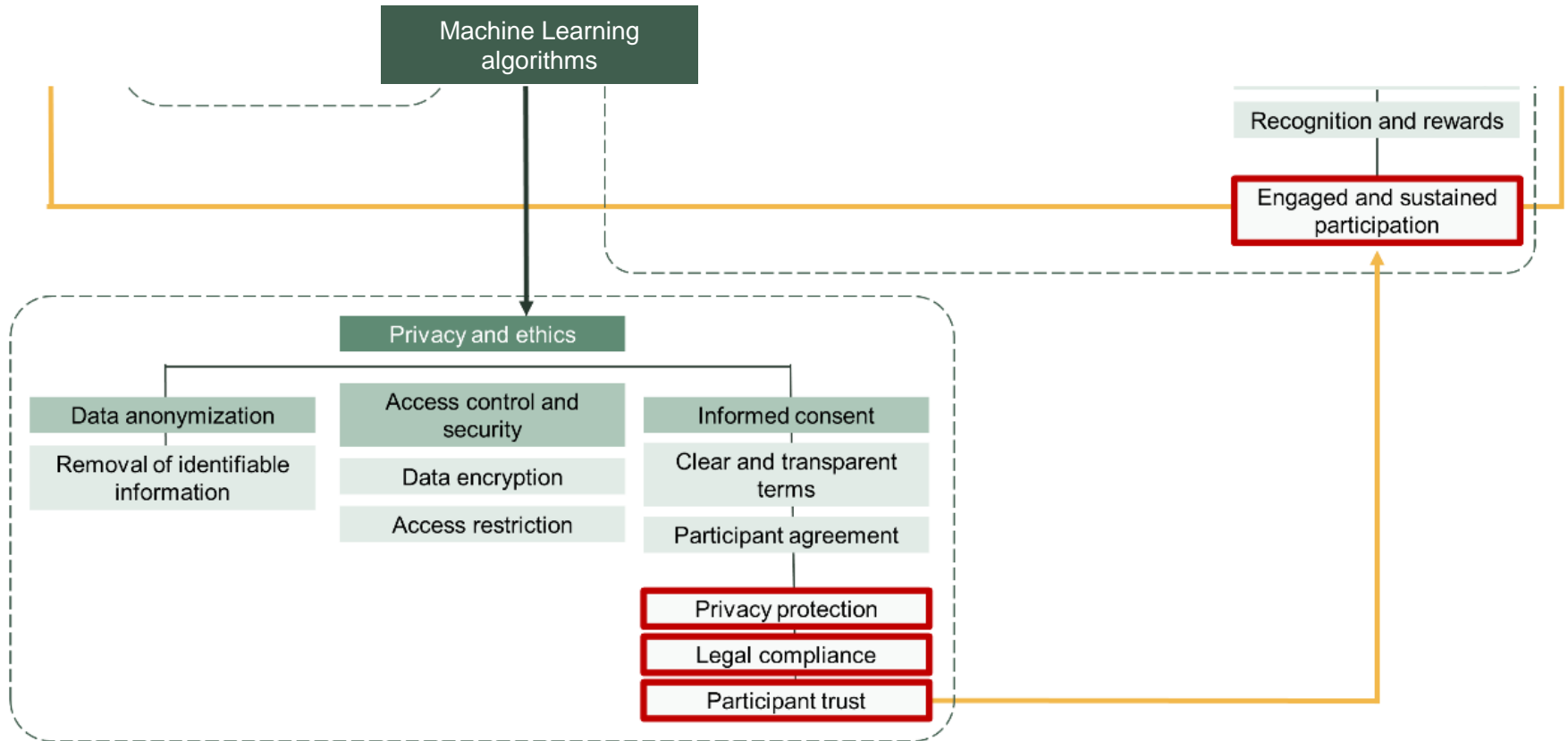
Integration of iSDIs and ML as a solution to the challenges of Citizen Science



Integration of iSDIs and ML as a solution to the challenges of Citizen Science



Integration of iSDIs and ML as a solution to the challenges of Citizen Science



Next steps

Prototype development.

Pilot tests and practical validation.

Ongoing education and training.

Success evaluation based on:

Data quality.

Engagement.

Sustainability.



Conclusion

The integration of iSDIs and ML in Citizen Science can significantly enhance data collection and analysis.

Public engagement, data quality, and privacy protection are the pillars of the proposed model.



Thank you for your attention!
Open to questions and discussion.

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