

Project Summary

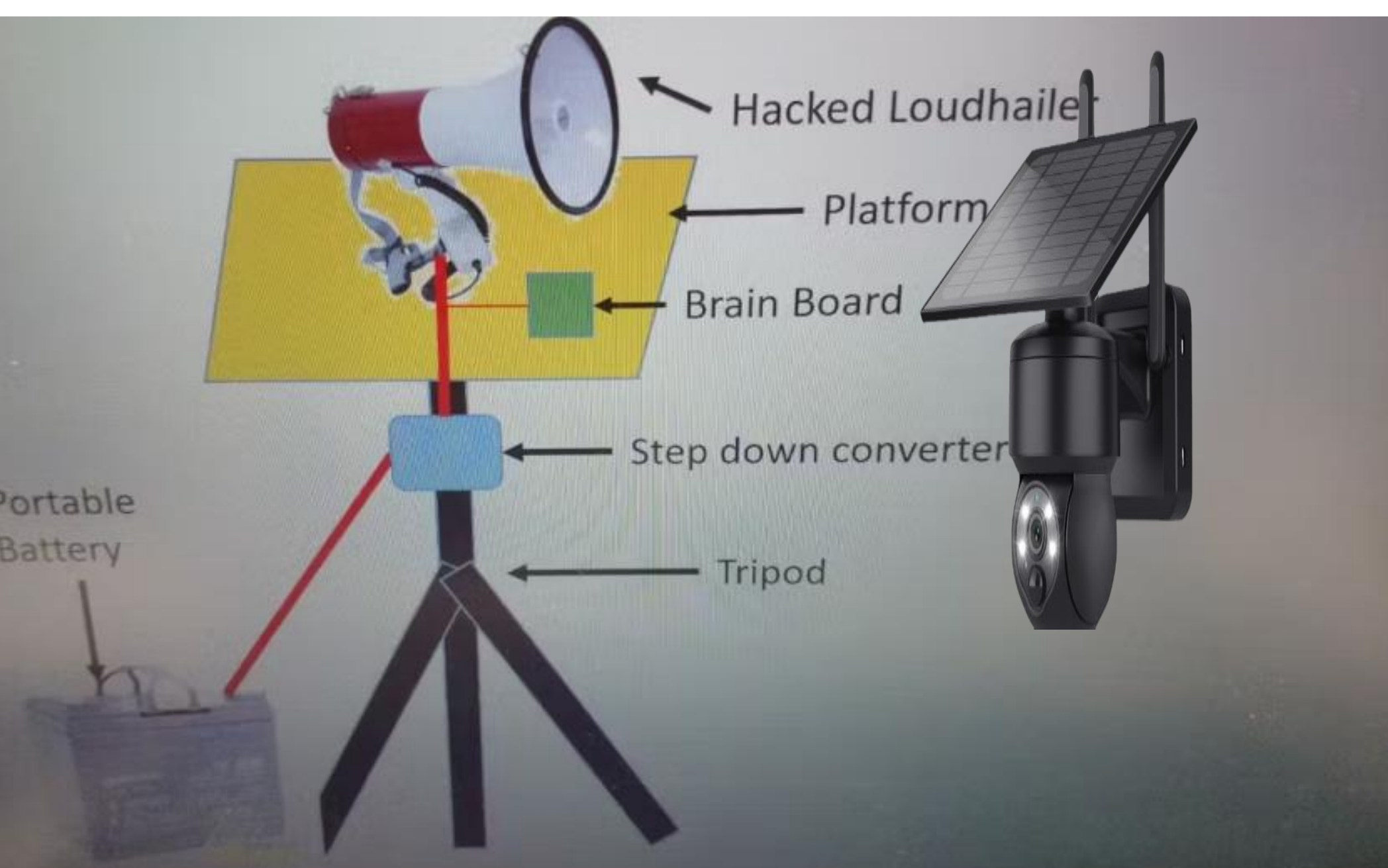
In recent years, farmers in Lesotho have faced significant challenges in producing grains due to bird infestations. Traditional methods of bird repelling have become ineffective, leading to reduced crop yields. AgrTek has developed SmartAgro, an innovative solution integrating Machine Learning (ML) and Internet of Things (IoT) technologies to repel birds and enhance crop production.

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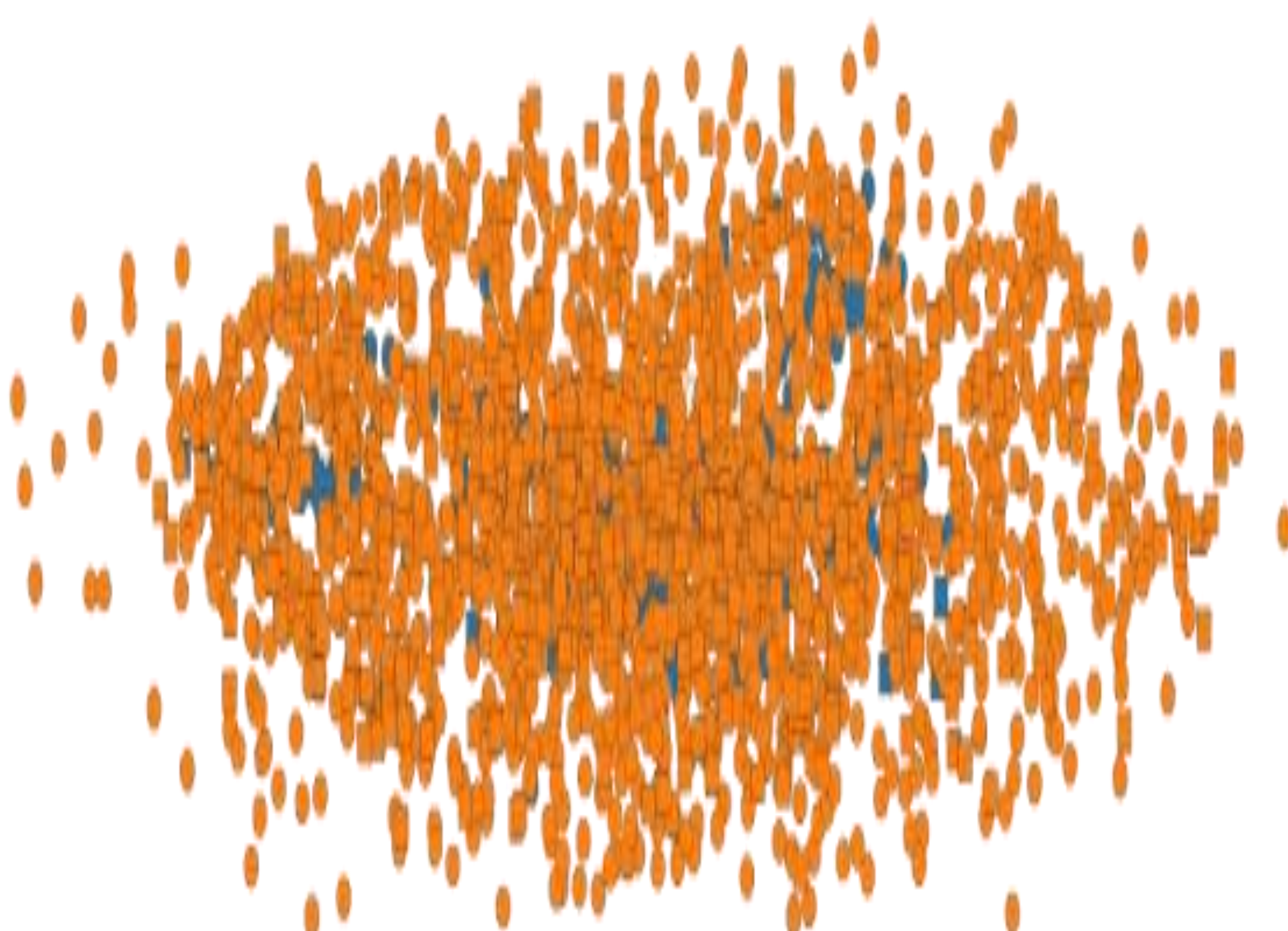
❖ **Challenge:** Farmers in Lesotho face significant crop damage due to bird infestations, leading to reduced yields and economic losses.



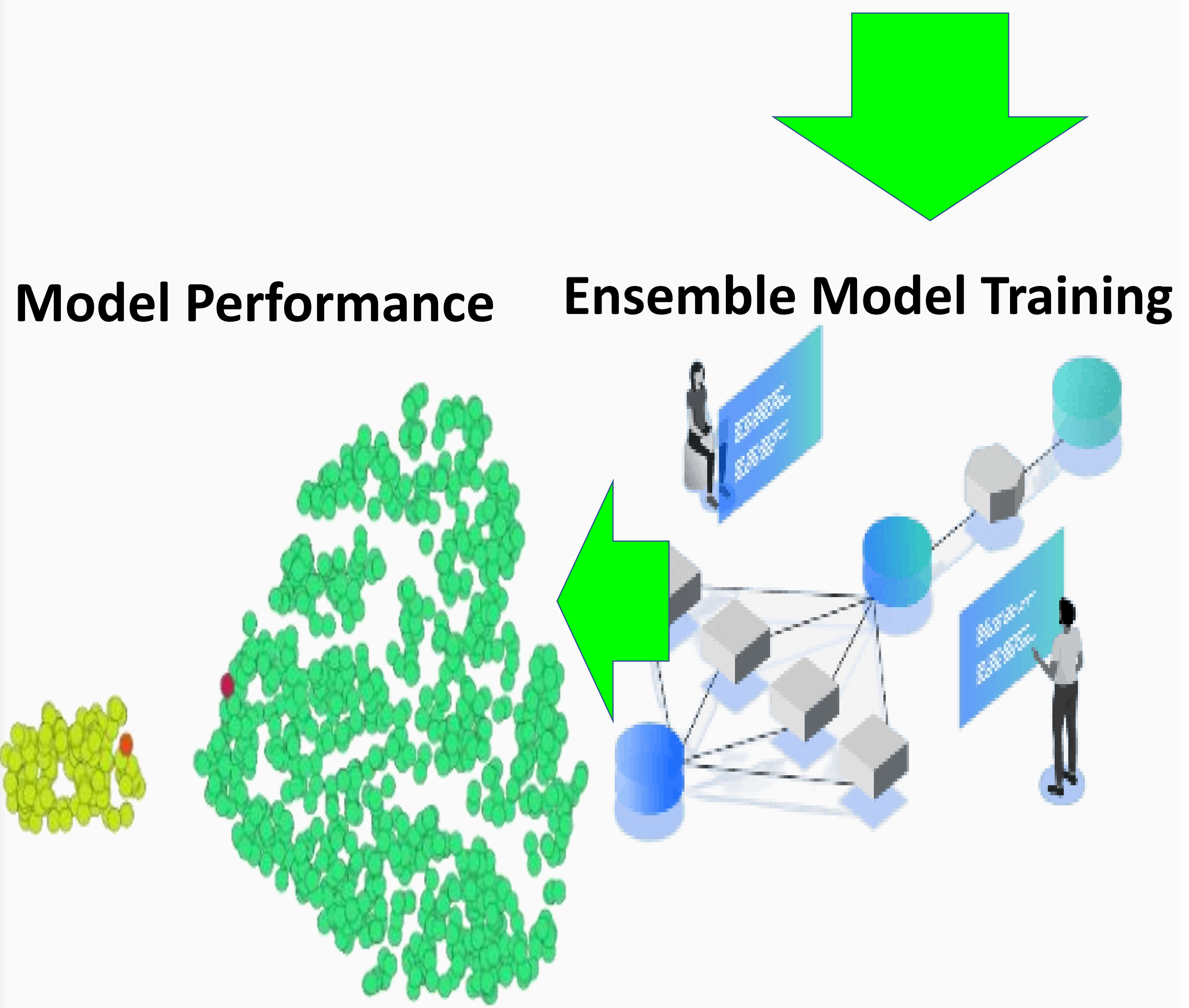
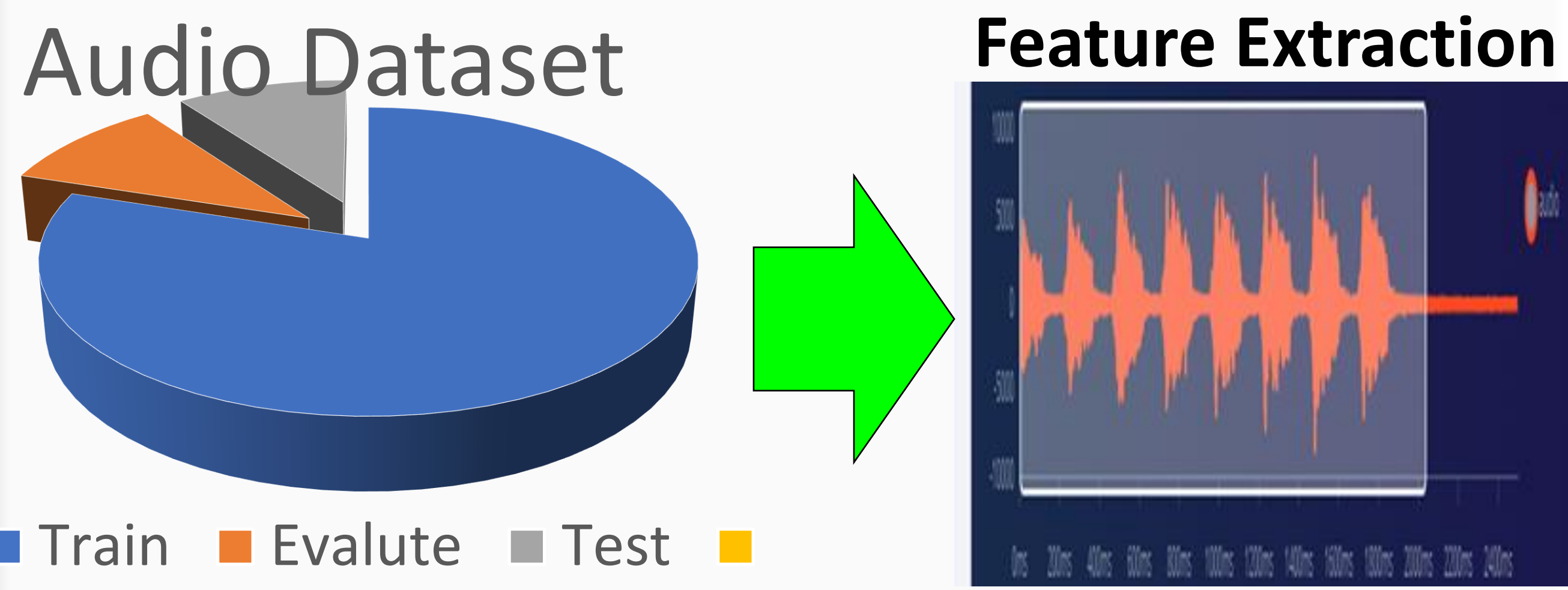
❖ **Solution:** SmartAgro integrates Machine Learning (ML) and Internet of Things (IoT) technologies to create an effective bird deterrent system.



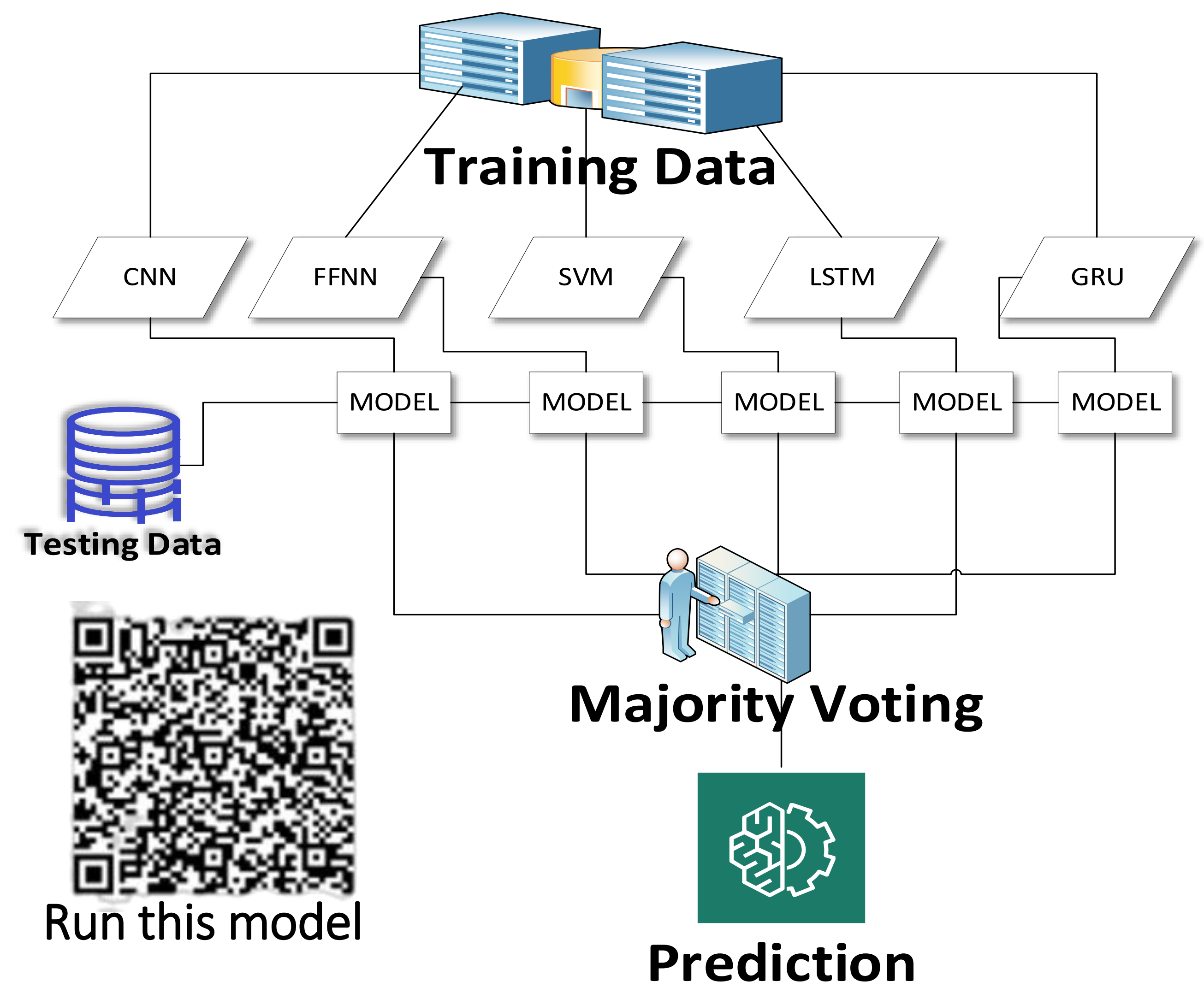
Collected Audio Data



Machine Learning Model Overview



Majority Voting Ensemble architecture



Results

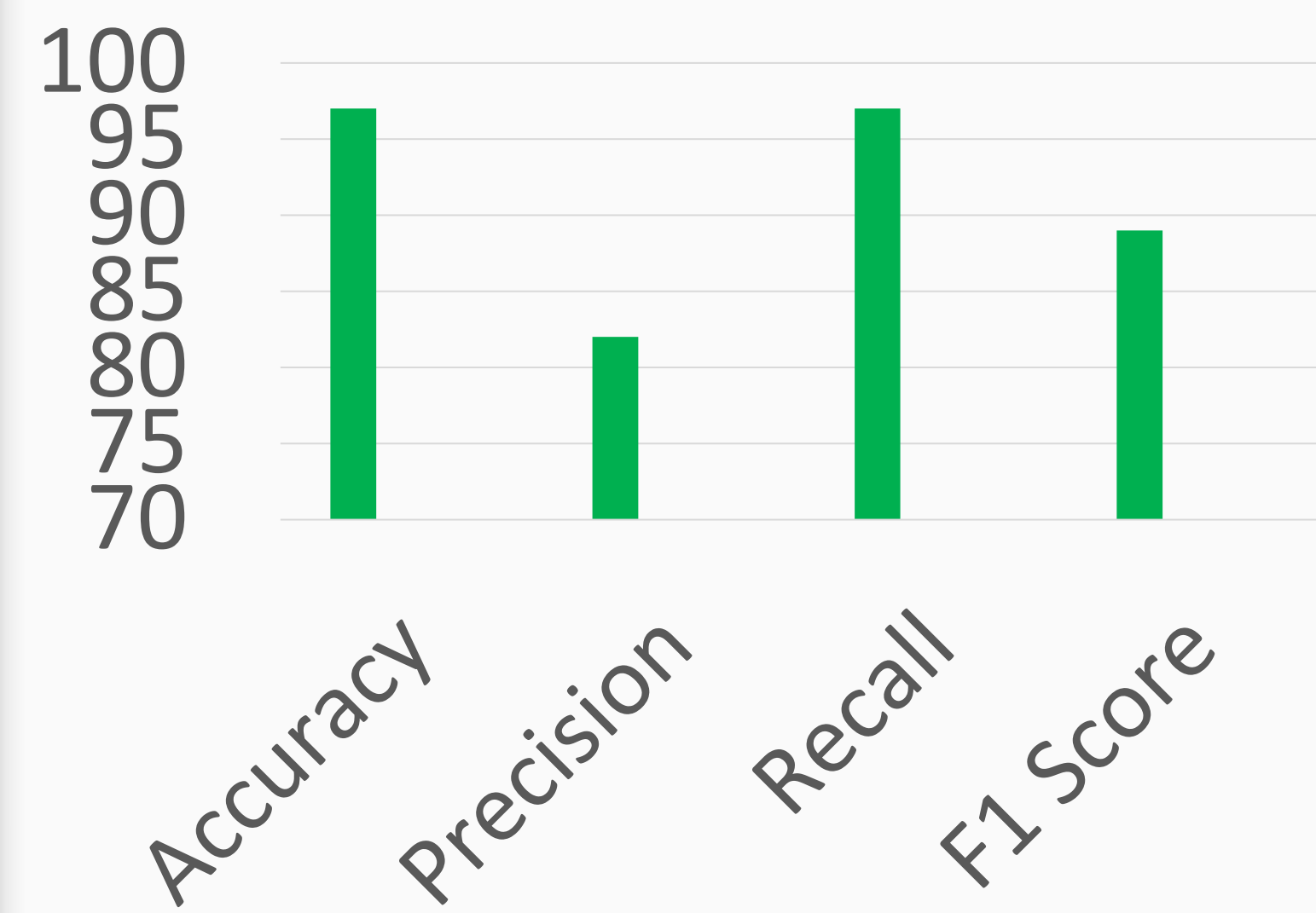
Classification Report

	Precision	Recall	F1-score	Support
Not Bird	1.00	0.97	0.98	239
Bird	0.83	0.97	0.90	40
Accuracy			0.97	279
Macro avg	0.91	0.97	0.94	279
Weighted avg	0.97	0.97	0.97	279

Confusion Matrix

	Not Bird	Bird
Not Bird	231	8
Bird	1	39

Model Performance Metrics



Conclusion

SmartAgro showcases the transformative potential of machine learning in agriculture. Our AI-powered bird deterrence system has demonstrated significant promise in minimizing crop damage and enhancing yields. While still under development and testing, the early results are encouraging and point towards a scalable, sustainable solution for modern farming.

References

- ❖ BirdLife International. (2023). "Impact of Bird Species on Agriculture."
- ❖ Brownlee, J. (2019). "Ensemble Learning to Improve Machine Learning Results." Machine Learning Mastery.
- ❖ Raschka, S. (2015). **Python Machine Learning**. Packt Publishing Ltd.

Acknowledgements