

Spatio-temporal graph neural networks for late blight disease forecasting

Name: Yagya Raj Pandeya, Roshan Subedi, Kumar Lama, Harish Chandra Bhandari
 Affiliation: Kathmandu University, Dept. of Artificial Intelligence and Dept. of Agriculture
 Contact number: +977- 9848542617 | Email address: yagya.pandeya@ku.edu.np

Introduction

This study presents the development and deployment of a GNN-powered mobile application for predicting late blight risk in Nepalese tomato and potato crops. The application utilizes NASA satellite weather data and a GNN model to provide accurate forecasts for farmers. Field validation and laboratory analysis confirmed the app's effectiveness in identifying high-risk areas and detecting *P. infestans*.

Research questions

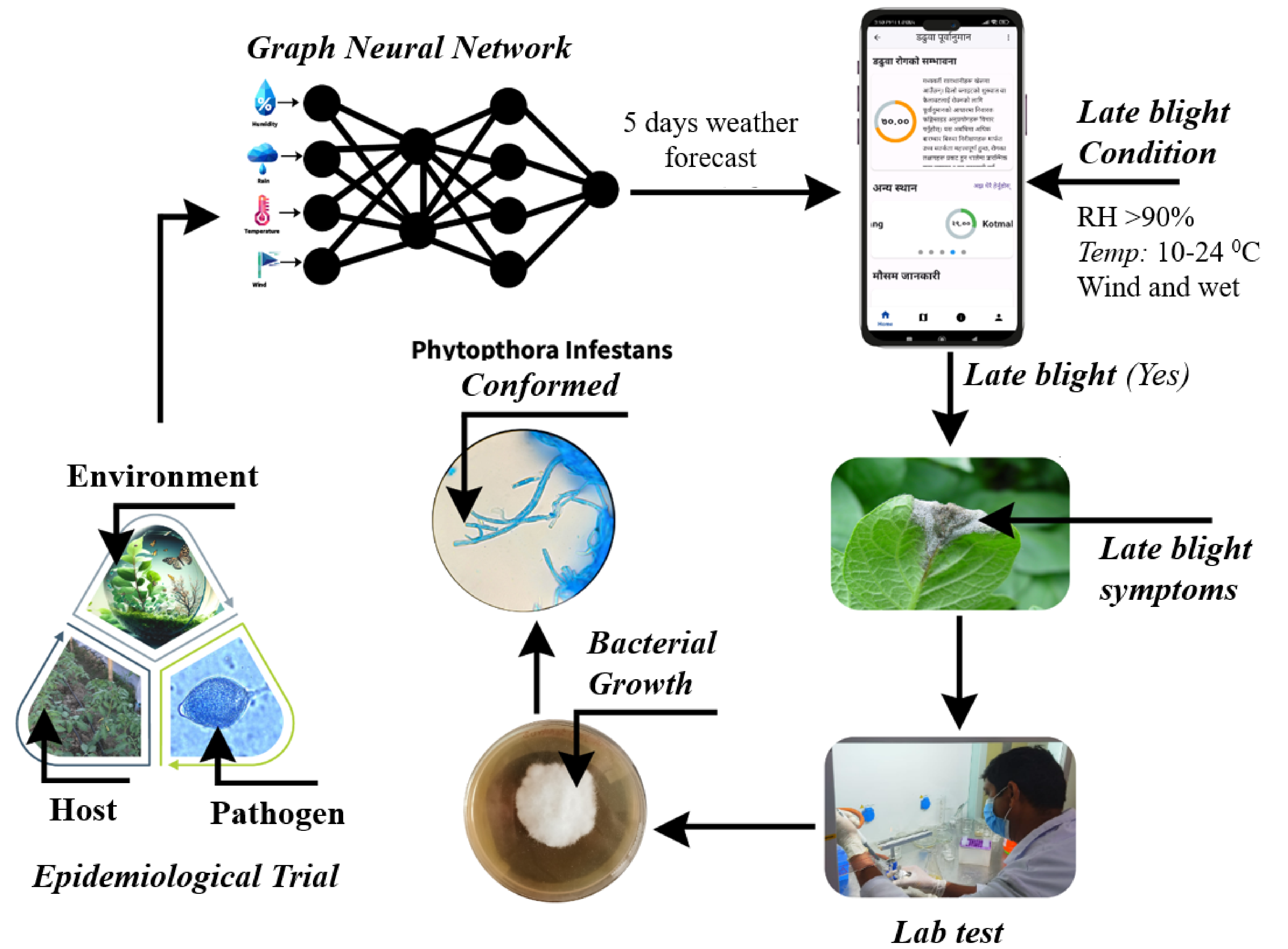
- Can a GNN model accurately predict late blight risk in Nepalese tomato and potato crops using NASA satellite weather data?
- How effective is the mobile application in disseminating late blight risk information to farmers?
- What is the impact of the application on late blight management practices in Nepalese agriculture?

Methodology

We have successfully developed a robust late-blight forecasting model powered by Graph Neural Networks. This user-friendly system helps Nepalese farmers reduce the overuse of chemical pesticides. The mobile application is now available for download on the Google Play Store.

Key findings

This study demonstrates the successful development and deployment of a GNN-powered mobile application for late blight risk assessment in Nepal. The application empowers farmers with accurate forecasts, reducing the need for excessive pesticide use and contributing to sustainable agriculture.



Conclusion

The combined application of chemical fertilizer, compost and bio-fertilizers increased crop growth and grain yield by 4.01% and 19.69% over control, while promoting sustainable agriculture and reducing reliance on chemical inputs. Local communities should be sensitized on using chemical fertilizers, compost manure and bio-fertilizers through workshops, seminars and public awareness programmes.

