Smart Agriculture App

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General Description

Desktop app to help with the cultivation of plants.

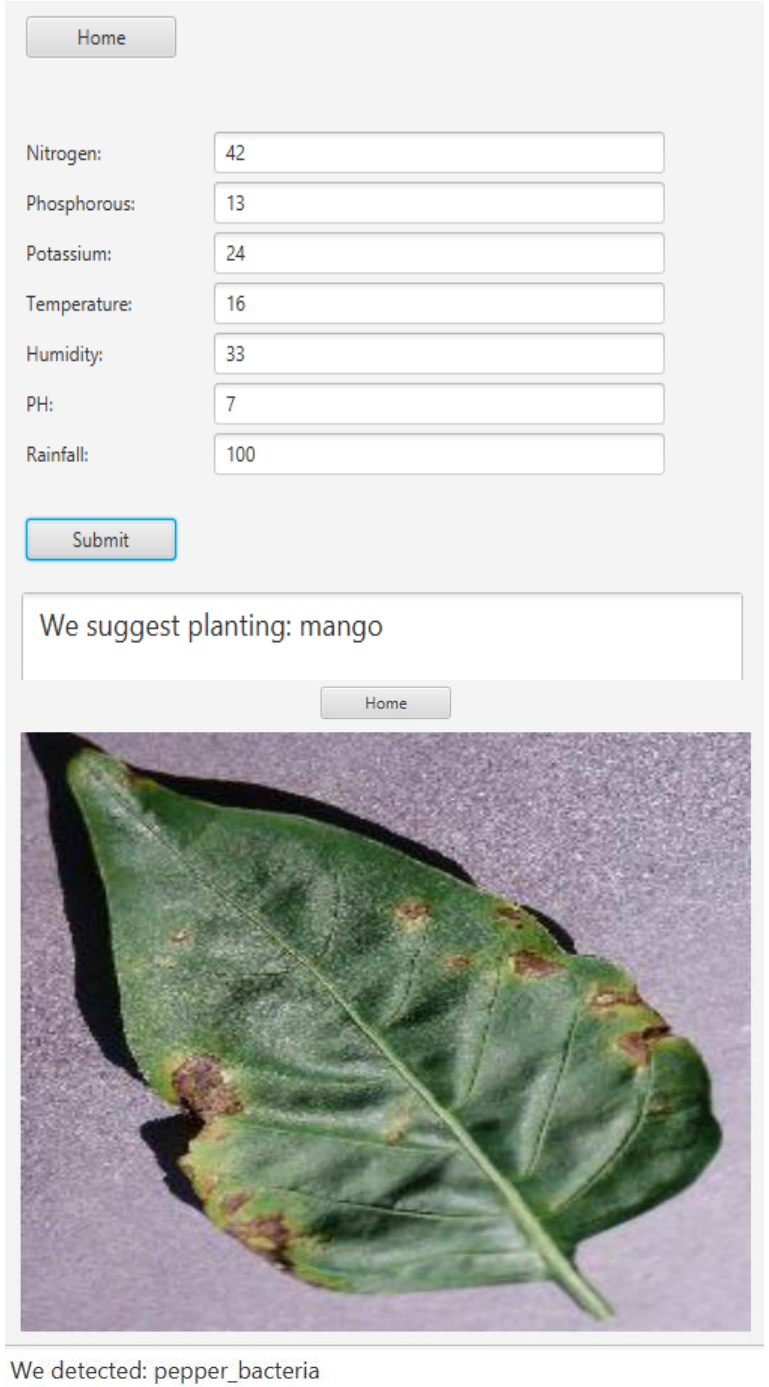
Using:

- Java: client side of the app
- JavaFX: user interface
- Python: AI model training
- Flask: server functionalities

Key Features

- Automated plant suggestions based on soil characteristics using self-trained classifier model.

- Automated plant disease detection from an image using self-trained image recognition model.



Unique Value Proposition

Automating (some of) the difficulties of farming and gardening

Target Clients & Pain Points

- Lifelong Farmer
- Has been planting the same plants every year
- Old age and bad vision may hinder plant disease detection

- Hobby gardener
- Looking to plant new things
- May lack experience in disease detection

Market Opportunities

- **Business Model Overview:** A business to consumer app that targets the expanding market of agriculture and gardening.
- **Competitive Edge:** Integrating both soil analysis and disease detection sets us apart.
- **Wide Target Audience:** Our app caters to a wide user range, from experienced farmers to hobbyist gardeners.
- **Innovative Technology:** AI-driven plant suggestions and disease detection
- **Market Channels:** App stores and dedicated website.

Plant Suggestion Implementation

- K-Nearest Neighbours (KNN)
- Step 1: Data collection and setting the value of K
- Step 2: Calculating the distance
- Step 3: Identifying neighbours
- Step 4: Classification decision

Disease Detection Implementation

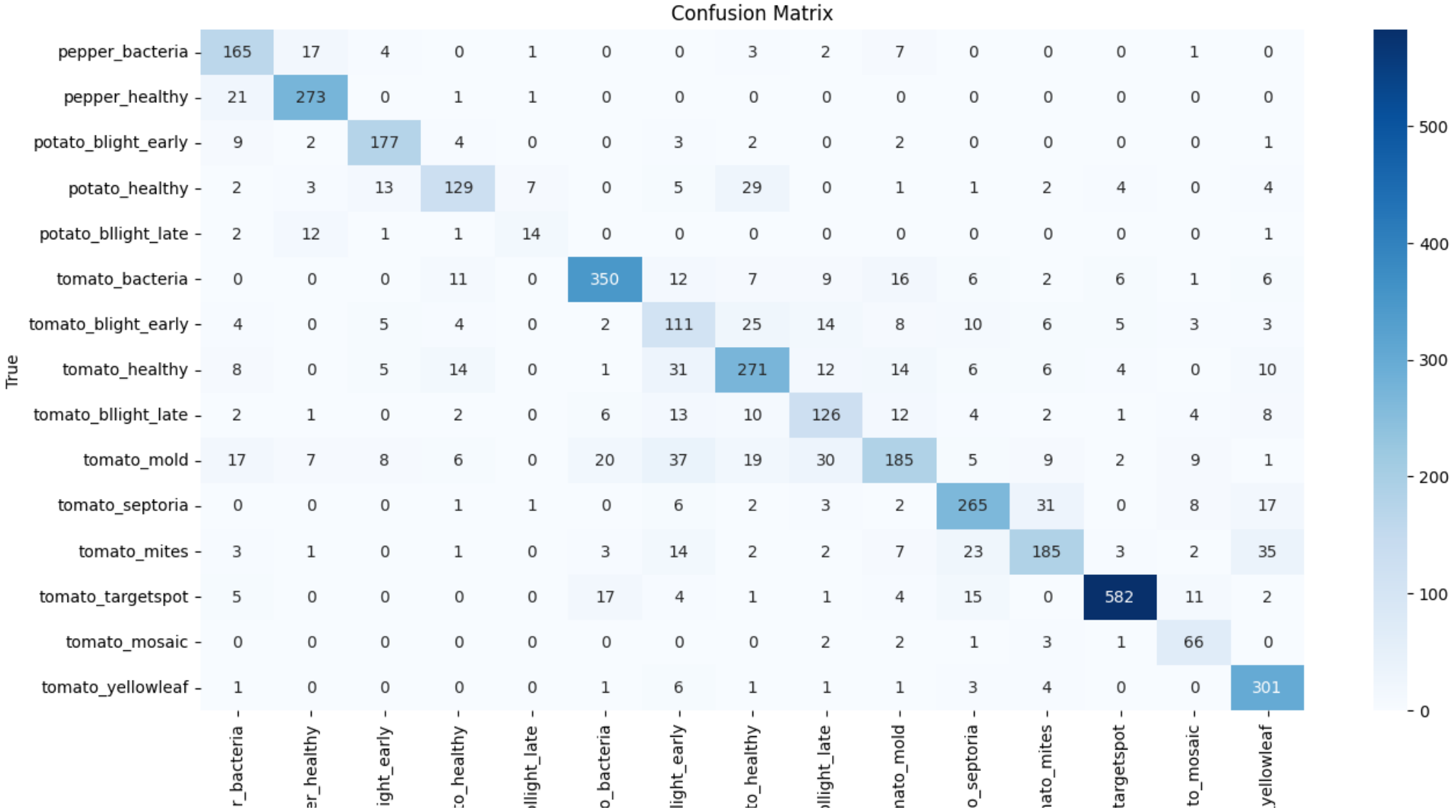
Classification Report:

	precision	recall	f1-score	support
pepper_bacteria	0.69	0.82	0.75	200
pepper_healthy	0.86	0.92	0.89	296
potato_blight_early	0.83	0.89	0.86	200
potato_healthy	0.74	0.65	0.69	200
potato_bllight_late	0.58	0.45	0.51	31
tomato_bacteria	0.88	0.82	0.85	426
tomato_blight_early	0.46	0.56	0.50	200
tomato_healthy	0.73	0.71	0.72	382
tomato_bllight_late	0.62	0.66	0.64	191
tomato_mold	0.71	0.52	0.60	355
tomato_septoria	0.78	0.79	0.79	336
tomato_mites	0.74	0.66	0.70	281
tomato_targetspot	0.96	0.91	0.93	642
tomato_mosaic	0.63	0.88	0.73	75
tomato_yellowleaf	0.77	0.94	0.85	319
accuracy			0.77	4134
macro avg	0.73	0.74	0.73	4134
weighted avg	0.78	0.77	0.77	4134

Libraries: TensorFlow, Keras

Multi-layered sequential model with convolutional layers and fully connected layers.

Disease Detection Implementation



Future possibilities

Biggest improvement: Mobile port

Others:

- Visualisation of suggested plants and detected diseases
- Ability to suggest plants based on less soil characteristics
- Offering more detailed suggestions, including: quantity of crop, maintenance tips
- When detecting disease to also offer potential solutions/cures
- Filter for which type of plants to suggest (flowers/fruit trees/vegetables/etc.)