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MicroBreeze

A plant-by-plant solution to dynamic conditions

Contents

Introduction

The interest in how weather and other factors impact a vineyard came about was due to a hail storm that only hit the neighboring vineyard. While I believe this project and spatial correlation could be further done to all type of farming from corn, to orchards, I have decided to focus on vineyards and the issues they present due to my lose ties to the field.

Problem Statement

Variables and conditions of a farm are spatially correlated causing different outcomes of fruit

Difference In Vines

Same grape on each vine

Leaves are Health Indicator

Vines <10ft apart

Factors that could lead to difference

Water, Elevation, Soil, Direct Sun, Vine Age/Root Depth, Disease?

Disease

- Disease in Vines appear in certain external conditions
- Well tracked by Dr. Mizuho Nita of Virginia Tech
- In conjunction with Cornell research can show if an entire Vineyard could have been susceptible to conditions that would allow for certain diseases.
- While helpful how could this be improved?
- On a 15 acre farm that is a lot of work to scan the entire vineyard
- Spatial calculations to find which plants on the vineyard were susceptible and grade them
- Can be predicted by Leaf Wetness calculation

Future Growth

Determine Individualized Water Needs

- Water crisis on west coast
- Saves money
- Agriculture uses 65% of global water, 45% wasted

Predictive Conditions for Future Vineyard Expansion

- Use collected Data to find best spots to plant

Predictive Harvest Conditions

- Use collected Data to predict pH and Sugar content of individual vines

Current Competition

Efficient Vineyard Project

- Allows block zone creation to group vines
- Interpolates data across Vineyards

Newa Cornell

- Collects weather data on various farms
- Uses weather data to predict Various factors on farms
- Does not differentiate throughout farms
- Predicts if conditions are correct for different diseases

Spatial Extrapolation of the Vine Water Status

- Lays out Ways to extrapolate water data over an entire vineyard
- Minimizes data collection locations needed
- Research by: C. Acevado-Opazo

Potential Problems

- Participating vineyards for data collection
  - Theoretical data is all that should be needed
- Accurate predictive data across farms
  - Many research papers are readily available on how to calculate
- Hardware
  - Prototype weather collection could prove concept, furthermore hypothetical data could prove concept works before hardware is needed
- Biology Experience
  - Research papers readily available to read
  - Could consult with different departments

Citations

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