Using RGB Imagery to Identify N-Deficient Corn Leaves

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Minneapolis startup specializing in precision agriculture and remote sensing:

• Sensors
• **Image Analytics**
• Drones
Multispectral Ambiguity
Take a closer look

Fly low and see if we can identify the deficiency
Utilize Visual Characteristics

- Yellow (color)
- ‘V’ shape (shape / texture)
- High in-field variability of images

Deep Learning

Healthy

Nitrogen Deficient
Machine Learning

Machine Learning on Cloud

a. Bring custom ML to mass production fast
b. Platform of interest → Web
Successful for Tassel Detection
Overlay of RGB on NDRE

Growth Stage V12

Growth Stage R1

Few N deficient leaves

Many N deficient leaves
Nitrogen Deficiency - Sample Results
Nitrogen Deficiency - Sample Results
Overlay of RGB on NDRE

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Nitrogen Deficiency - Sample Results
Merit

• Additional layer of information
  • Verification of nitrogen deficiency

• Easy development of object detection models
  • Only ‘bottleneck’ is the data collection
Open Qs - Collaboration Opportunities

• Is it late when the N deficient leaves are visible?
  • Agronomists have different opinions
• What are the financial benefits to the grower?
  • Late season application cost
  • Equipment availability
• How to incorporate into current solutions?
  • Identify cost effective use cases
• How to estimate absolute deficiency values?
Thank You

QUESTIONS?
Overlay of RGB against NDRE

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