A FOSS Web Mapping Solution for Disparate Precision Agriculture Data

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Objective of Project

• Address challenges of visualizing disparate data produced by precision agriculture operations
• Develop on-line mapping environment
  • Free and open source technologies
→Support independent farmer in their decision-making and analysis process
1) Ingest diverse precision agriculture-related data
2) Visualize spatially the ingested data
3) Generate reports and visualizations
## Precision Agriculture

- **Background**
- **Technology**
  - Enabled by highly-accurate position information
- **Auto-steering equipment**
- **Variable-rate technology (planting, treatments)**
- **Yield monitors**
- **Soil samples**
- **Benefits of precision agriculture**

### Precision Agriculture Data Challenges

- Data inconsistencies and complexity
- Collected using different vendor machinery
- Data formats and access

### Project Precision Agriculture Data Processing

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Source: Author

Source: [http://www.hullcoop.com/agronomy/grid](http://www.hullcoop.com/agronomy/grid)

Source: [http://www.kinze.com/planter.aspx?id=9ef5d4ec-a6f6-4926-a3d0-a8114d02f106&name=3600+planter](http://www.kinze.com/planter.aspx?id=9ef5d4ec-a6f6-4926-a3d0-a8114d02f106&name=3600+planter)


Precision Agriculture Data Challenges

- Vendor viewers, portals, static reports
- Challenges analyzing relationship between data

Data Processing: Scripting & Database

- Original data: sources and formats
- Processing: consistent data fields, importing raw data

Creating empty tables

Populating empty tables with raw data
Data Processing: Database

- Schema
- Final tables

Populate final tables

Spatially-enabled (points and swaths)

GeoServer

- Connection to PostGIS
- Utilize SQL Views
Web Mapping Application - Preparation

- Styling of layers - YSLD
- Web services
- Creation of tiles

Web Application

- OpenLayers3
- jQuery UI

HTML sample

Mockup created using Balsamiq - balsamiq.com
Web Application – Video Demo

- http://www.screencast.com/t/WYPxaF9d (Flash required)
Web Application

Web Application
Web Application

Web Application
Project Impact

• Prototype application to visualize disparate data by farmer  
  • Begin to visualize and understand relationships between variables

• Ability to connect producers, consultants, local dealers

• Open source-based web mapping and visualization application for disparate data  
  • No software licensing concerns

• Database prepared for continued analysis

Future Work & Analysis

• Generate custom reports, tables, visualizations
• Analyze change in yields

• Analyze relationships  
  • Soil – Seed – Yield

• Different methods to serve data to web map
Selected References


Misc. Resources

• Packt Publishing
  [https://www.packtpub.com/](https://www.packtpub.com/)

• Brackets text editor
  [http://brackets.io/](http://brackets.io/)

• Manning Publishing
  [https://www.manning.com/](https://www.manning.com/)

• Lucid Chart
  [https://www.lucidchart.com/](https://www.lucidchart.com/)
Questions

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