

# Machine Learning driven prescriptive analytics

## Project Description

Development of an application that tracks interactions between farming equipment in real-time, activities of farming equipment on locations and fields.

## Challenges

- Monitoring and changing the task statuses in databases for started and completed tasks by equipment location geo-fence data;
- Identification and processing of the performing equipment;
- Idling / Operating / Driving time calculation;
- ETA for task completion calculation;
- Identification of a position for equipment engagement/ disengagement based on GPS data;
- Processing and storing real-time data to an external database for live monitoring on user's mobile device.

### CUSTOMER

NDA

### INDUSTRY

Agriculture

### TYPE

Data science  
iOS

### TECHNOLOGY

Postgres  
Postgis  
Scala  
Apache Spark  
Apache Kafka  
Nifi  
MAGIC Java  
Scala Libraries

## Solutions

- **Monitoring**

To monitor which part of the field the device has processed, the field was divided into a multipolygon. The tractor was regarded also as a polygon, after which the polygon of the tractor was subtracted from the field, and a new shape of the field was calculated.

- **Real-time data collection**

We used Spark streaming to implement real-time data collection from the equipment and devices using GPS.

- **Testing**

To test the algorithm, we have been generating multi-polygons routes with coordinates and sent this data to the server.

## Summary

The application tracks interactions between farming equipment in real-time, activities of farming equipment on locations and fields was successfully developed.

**Among the capabilities of the present version:**

- Tracking the equipment interaction;
- Tracking the equipment entering / leaving locations/fields;
- Calculation of activities / cycles / tasks.