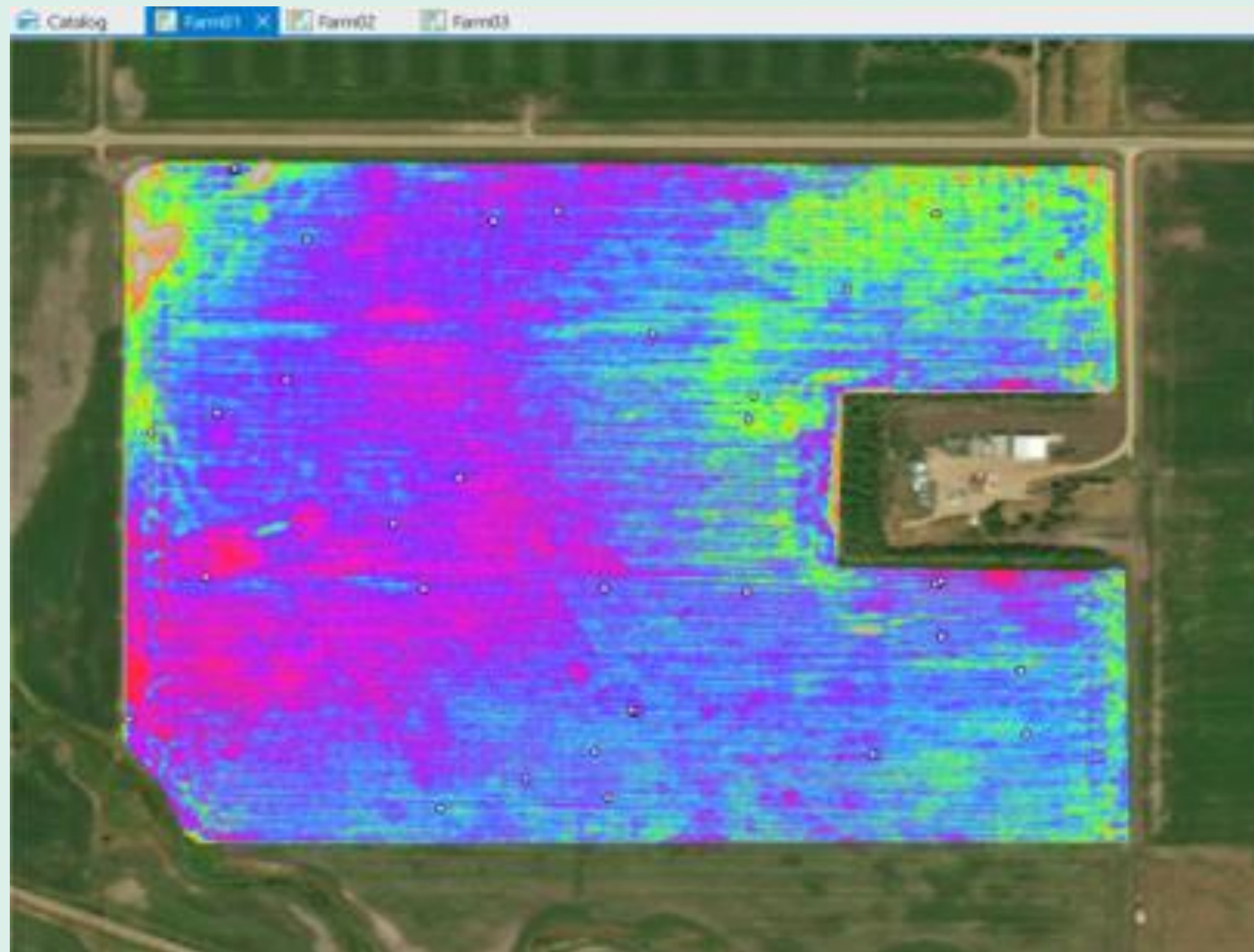


Carbon Sequestration Prediction

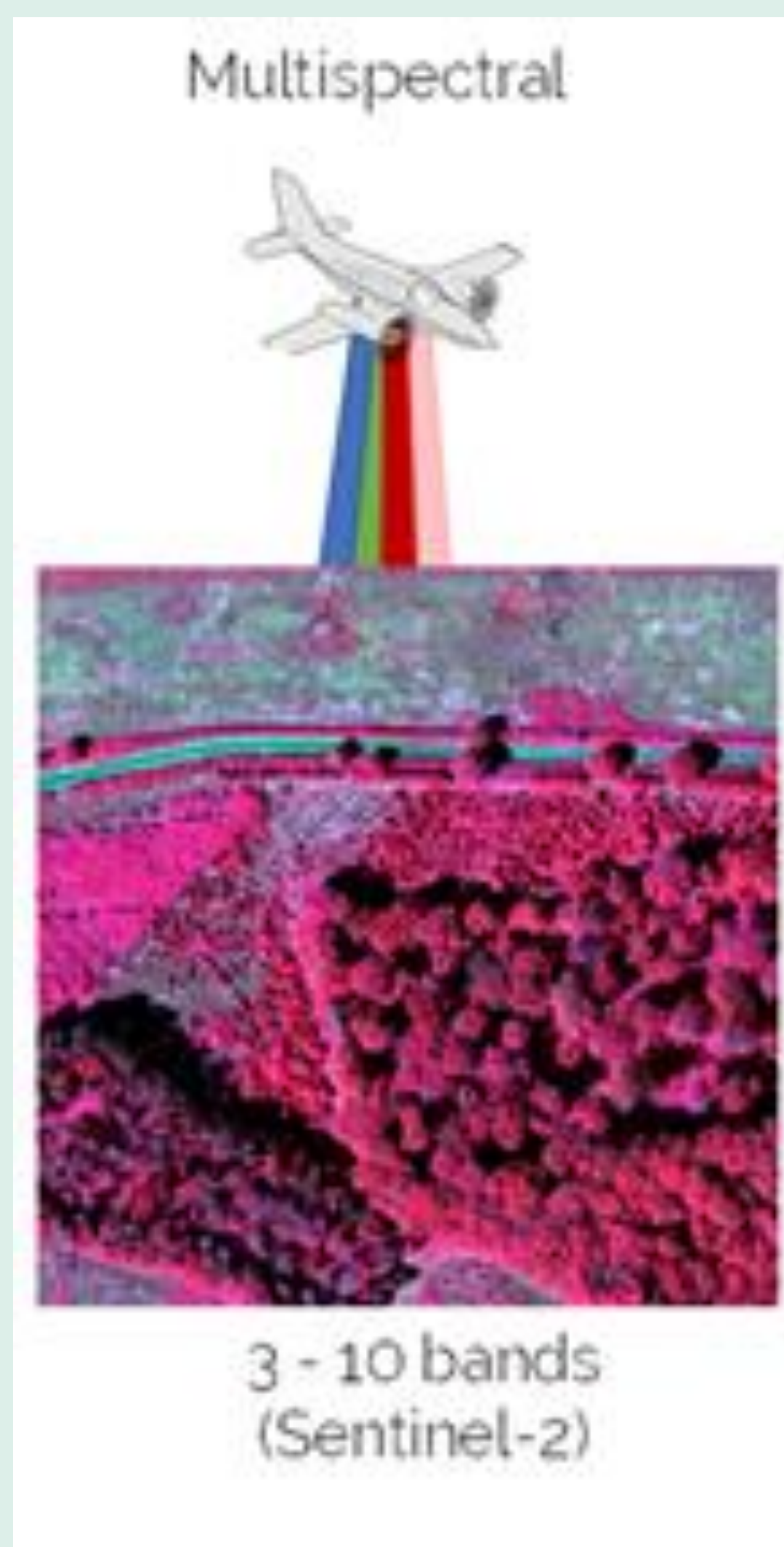
Team Members: Cindy Manikowski, Caleb Myhra, Jean Eckelberg,
Brandon Snyder, Quintin Fitzgerald
Sponsor: GrandFarm

Objectives:

Retrieve satellite data to use with drone images and field samples to determine models to predict carbon sequestration values.



NDRE Image



3 - 10 bands (Sentinel-2)



Multispectral Camera



Electrical Conductivity Measurement



GRAND FARM

Challenges:

- Adaptation of new technologies (FarmVibes, GDAL, GIS)
- New data formats (geospatial data, raster files, shape files)
- Catching up two new technical leads with the project
- Azure finance management for storage and VM's
- Multiple parties with an initially opaque goal.

Tech Stack:

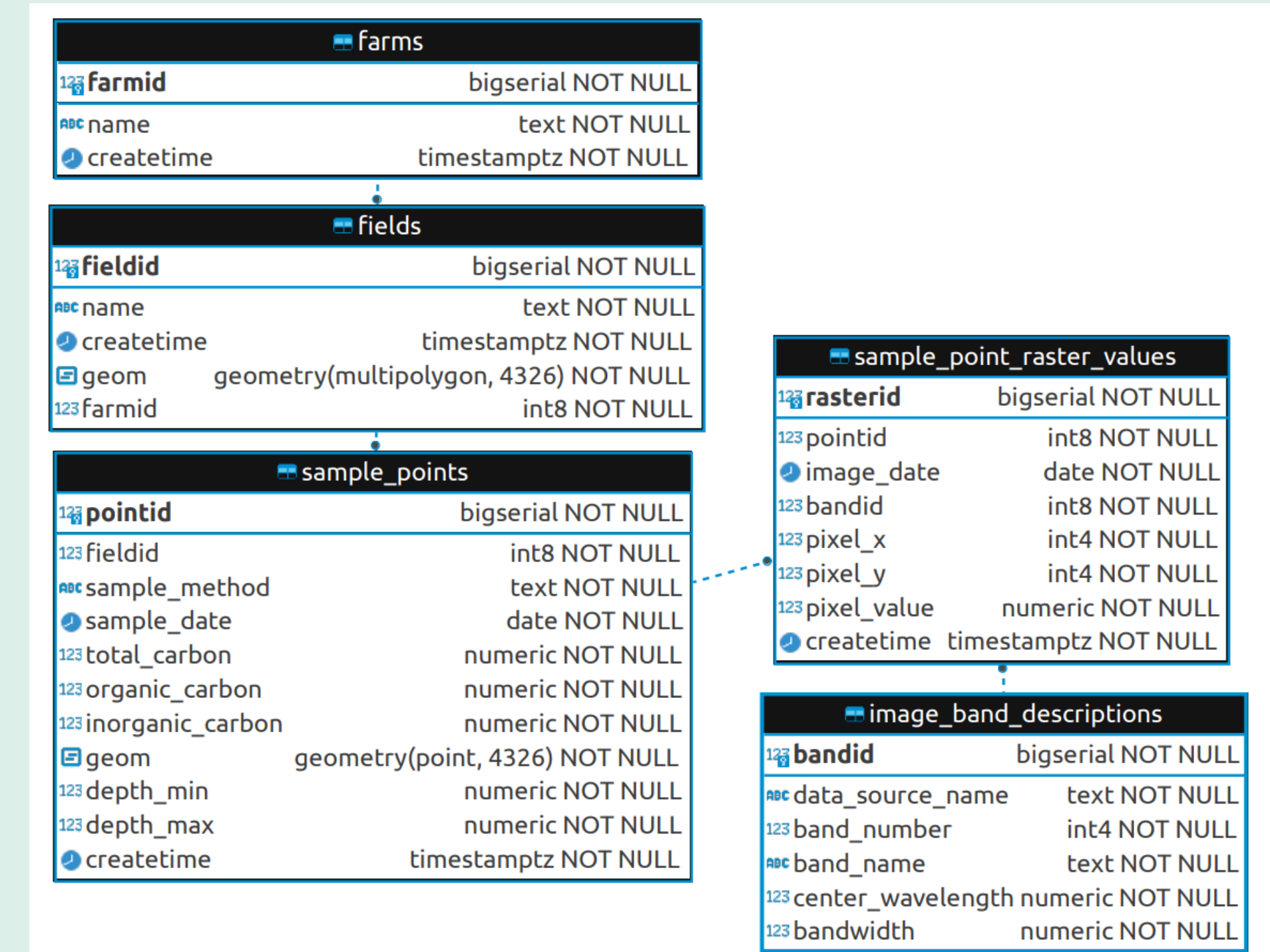


Deliverables:

NDSU Agriculture:
Model prediction accuracy

Model	Adjusted R-Squared	R-Squared	RMSE	Time Taken
GradientBoostingRegressor	0.70	0.81	15.61	0.20
ExtraTreesRegressor	0.68	0.80	16.05	0.27
XGBRegressor	0.67	0.80	16.20	0.21
RandomForestRegressor	0.66	0.79	16.00	0.47
LGBMRegressor	0.66	0.79	16.60	0.11
HistoricalGradientBoostingRegressor	0.66	0.79	16.62	0.55
AdaBoostRegressor	0.65	0.78	16.78	0.18
BaggingRegressor	0.63	0.77	17.16	0.00
RANSACRegressor	0.66	0.73	18.76	0.19
RidgeCV	0.52	0.70	19.56	0.03
LassoLarsCV	0.50	0.69	20.00	0.10
LassoCV	0.08	0.69	20.04	0.13
LassoLarsIC	0.09	0.68	20.19	0.00
TransformedTargetRegressor	0.48	0.68	20.45	0.03
LinearRegression	0.48	0.68	20.45	0.03
KernelRidge	0.47	0.67	20.61	0.03
Ridge	0.47	0.67	20.61	0.03
WaterRegressor	0.45	0.66	20.96	0.12
DecisionTreeRegressor	0.44	0.66	21.12	0.03
BayesianRidge	0.41	0.64	21.71	0.00
ExtraTreeRegressor	0.39	0.62	22.18	0.03
LarsCV	0.33	0.58	23.18	0.07
LinearSVR	0.32	0.58	23.02	0.03
LassoLars	0.31	0.57	23.55	0.03
Lasso	0.31	0.57	23.55	0.03
ElasticNet	0.31	0.57	23.57	0.03
TweedieRegressor	0.29	0.56	23.80	0.09
OrthogonalMatchingPursuit	0.29	0.56	23.93	0.10
OrthogonalMatchingPursuitCV	0.29	0.56	23.90	0.04
ElasticNetCV	0.29	0.56	23.93	0.10
MLPRegressor	-0.03	0.36	28.69	0.44
GaussianProcessRegressor	-0.27	0.21	31.90	0.04
NeighborhoodRegressor	-0.21	0.21	31.94	0.04
PoissonRegressor	-0.34	0.17	32.83	0.09
Huber	-0.53	0.05	35.01	0.03
SVR	-0.65	-0.02	36.37	0.04
DummyRegressor	-0.65	-0.02	36.38	0.03
QuantileRegressor	-0.67	-0.03	36.58	1.56
PassiveAggressiveRegressor	-0.99	-0.23	39.96	0.03
Lars	-0.9911	-0.9910	43.20	0.04
SGDRegressor	-4184285216177426.00	-2593078162138123.00	1031360466.31	0.03

Grand Farm:
PostgreSQL database & GitHub repo



Microsoft FarmVibes:
Feedback Document

