STFC Food Network Hackathon
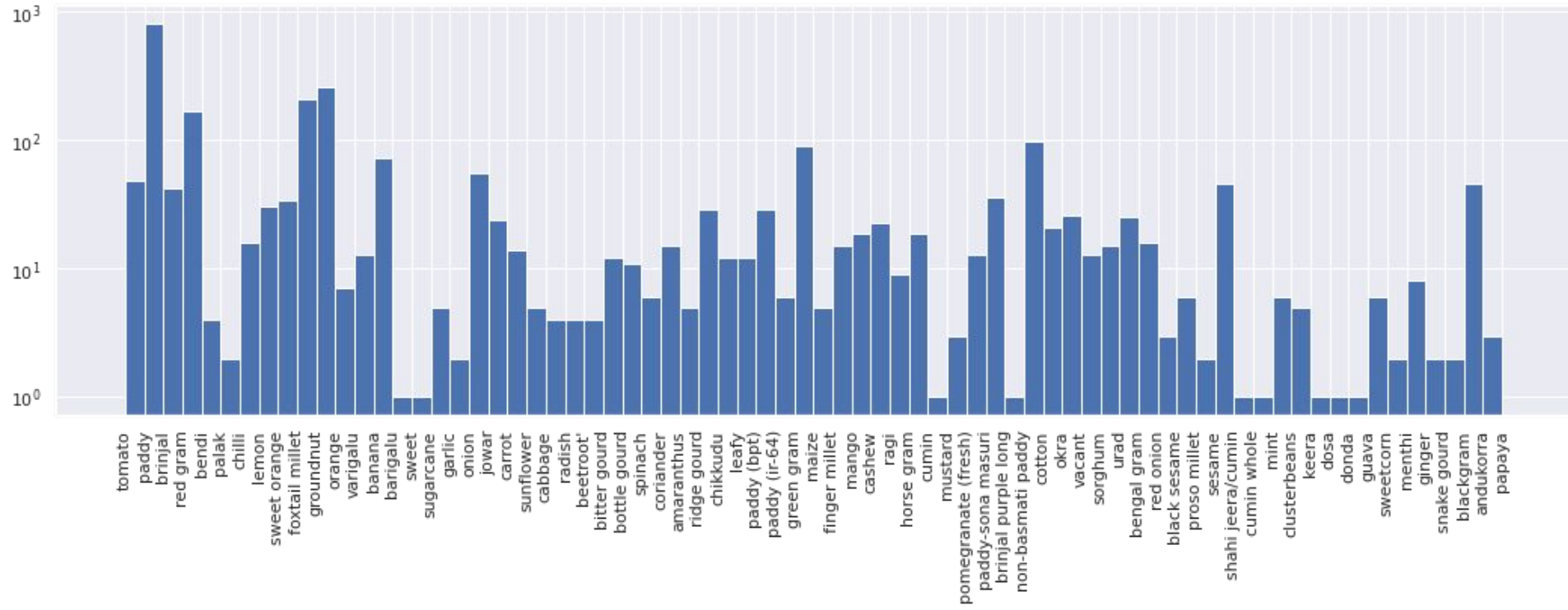
Sam Bancroft
@spiruel
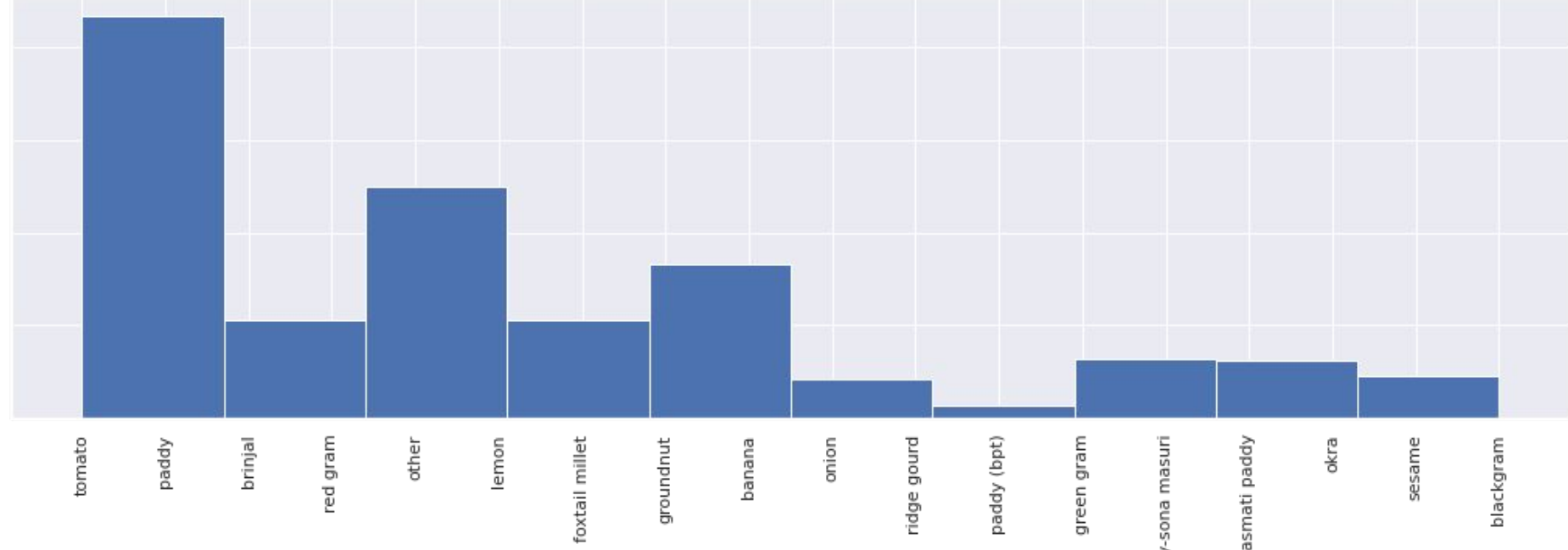
App features

https://share.streamlit.io/spiruel/stfc-food-network-cop26-hackathon

- Crop type recommendation
- Fertiliser advice
- Local crop market data analysis
- Crop sowing and harvest date observations from satellite data

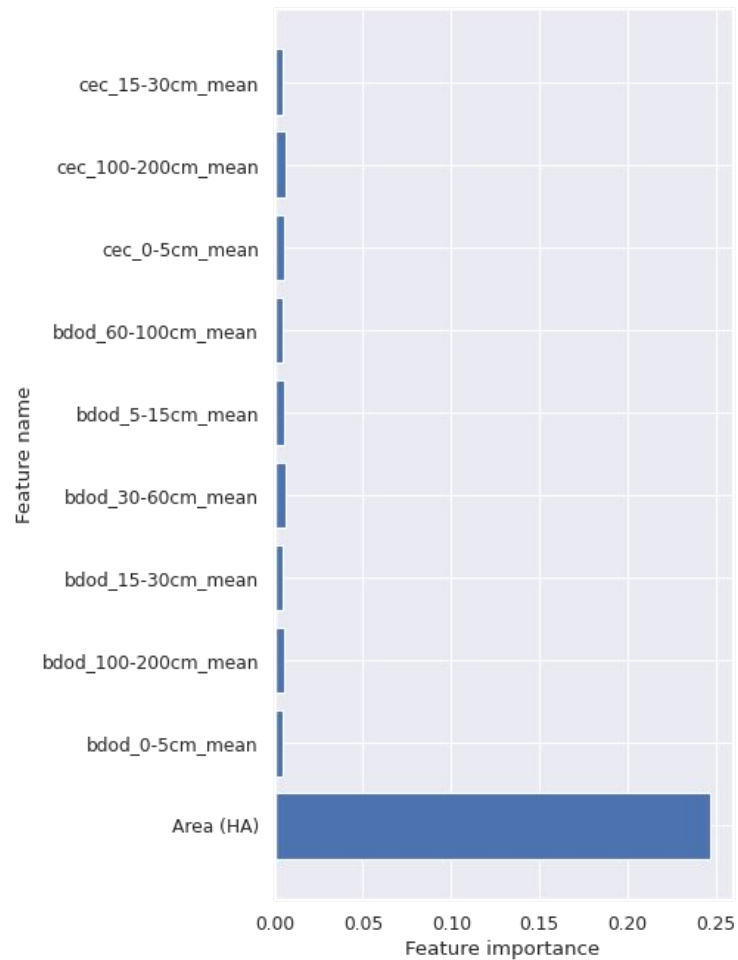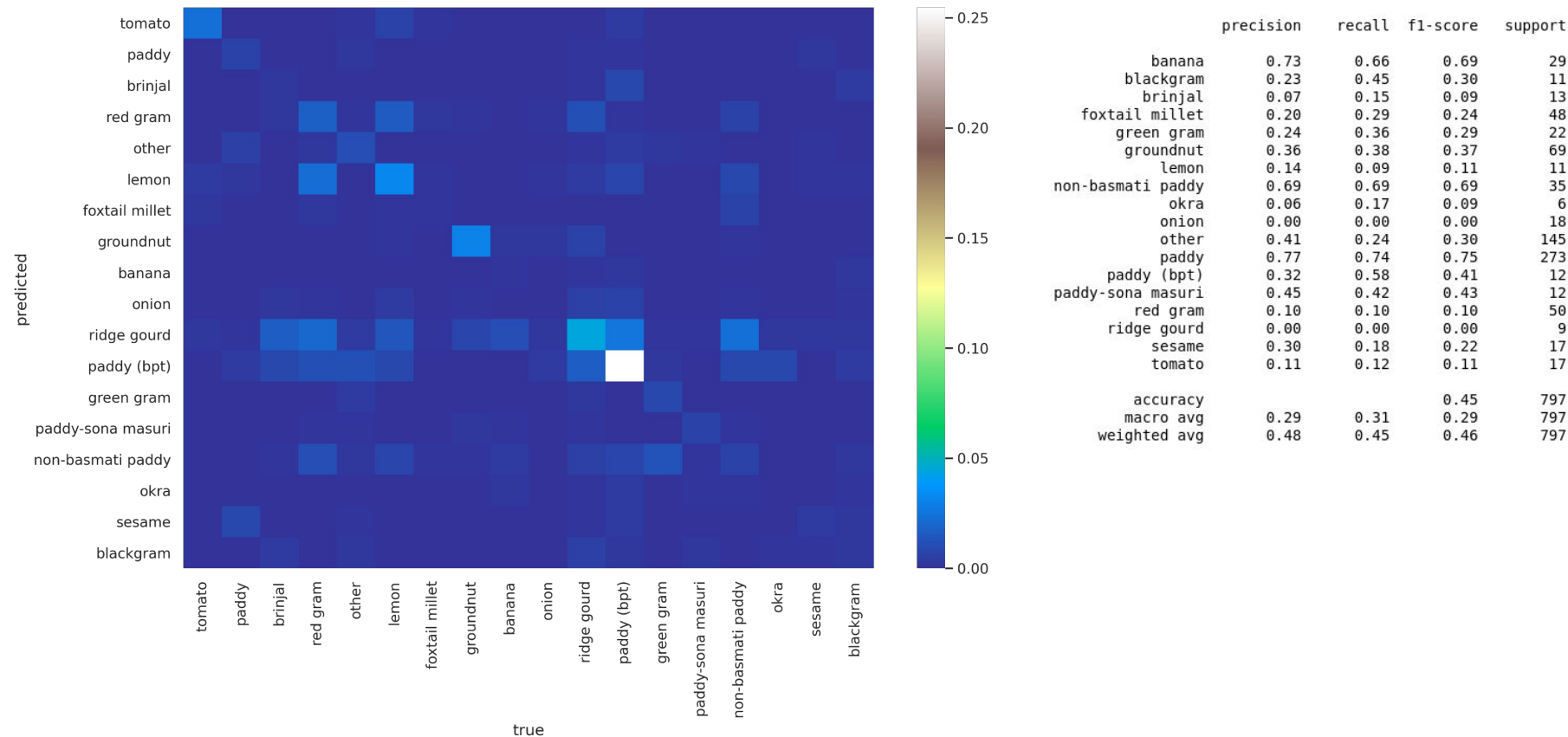Presentation will walkthrough how I built the crop type recommendation classifier

Crop type recommendation model

- Random forest classification

- Want it to predict from natural soil and weather variables - independent of year, geolocation etc

- Class balancing

- Soil data sourced from SoilGrid250m via GEE - what profiles to use?
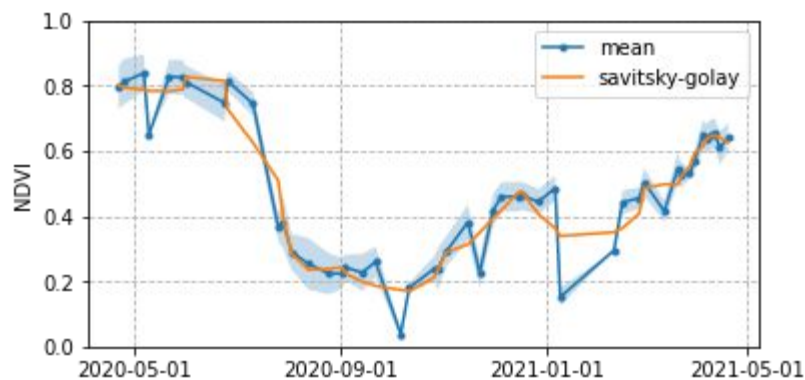
- ERA5 meteorological data via GEE

Top 10 feature importances

Model suitability

	precision	recall	f1-score	support
banana	0.73	0.66	0.69	29
blackgram	0.23	0.45	0.30	11
brinjal	0.07	0.15	0.09	13
foxtail millet	0.20	0.29	0.24	48
green gram	0.24	0.36	0.29	22
groundnut	0.36	0.38	0.37	69
lemon	0.14	0.09	0.11	11
non-basmati paddy	0.69	0.69	0.69	35
okra	0.06	0.17	0.09	6
onion	0.00	0.00	0.00	18
other	0.41	0.24	0.30	145
paddy	0.77	0.74	0.75	273
paddy (bpt)	0.32	0.58	0.41	12
paddy-sona masuri	0.45	0.42	0.43	12
red gram	0.10	0.10	0.10	50
ridge gourd	0.00	0.00	0.00	9
sesame	0.30	0.18	0.22	17
tomato	0.11	0.12	0.11	17
accuracy			0.45	797
macro avg	0.29	0.31	0.29	797
weighted avg	0.48	0.45	0.46	797

Sowing & harvest dates

	S.No	District	Peak Sowing Season for Kar/Kuruvai/Sornavari Rice variety	Peak Harvesting Season for Kar/Kuruvai/Sornavari Rice variety	Peak Sowing Season for Samba/Thaladi/Pishanam Rice variety	Peak Harvesting Season for Samba/Thaladi/Pishanam Rice variety	Peak Sowing Season for Navarai/Kodai Rice variety	Peak Harvesting Season for Navarai/Kodai Rice variety
0	1	Kancheepuram	June-July	September-October	November	January-February	January	March -April
1	2	Thiruvallur	June-July	September-October	August-September	December-January	December-January	March -April
2	3	Cuddalore	May-June	August-September	August-September	December-January	December-January	March -April
3	4	Villupuram	May-June	August-September	August-September	December-January	December-January	March -April
4	5	Vellore	May-June	August-September	August-September	December-January	January	March -April
5	6	Tiruvannamalai	May-June	August-September	September-October	December-January	January	March -April
6	7	Salem	May-June	August-September	September-October	December-January	January	March -April
7	8	Namakkal	May-June	August-September	September-October	December-January	January	March -April
8	9	Dharmapuri	May-June	August-September	September-October	December-January	January	March -April
9	10	Krishnagiri	June	September	October-November	January-February	January	March -April
10	11	Coimbatore	June-July	September-October	October-November	January-February	NaN	NaN
11	12	Tiruppur	June-July	September-October	October-November	January-February	NaN	NaN
12	13	Erode	July	October	October-November	January-February	January	March-April
13	14	Tiruchirappalli	June	September-October	October-November	January-February	January	March-April
14	15	Karur	NaN	NaN	October-November	January-February	January	March-April
15	16	Perambalur	June	September-October	October-November	January-February	January	March-April
16	17	Ariyalur	June	September-October	October-November	January-February	January	March-April
17	18	Pudukkottai	June	September-October	October-November	January-February	NaN	NaN
18	19	Thanjavur	April-May	July-August	September-October	December-January	January	March-April
19	20	Tiruvarur	July	October	October-November	January-February	January	April
20	21	Nagappattinam	May-June	September-October	October-November	January-February	January	April
21	22	Madurai	July	October	October	January	January	April
22	23	Theni	July	October	October	January-February	NaN	NaN
23	24	Dindugul	July	October	October	January-February	January	April

Live demo time!

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Thanks

Want to collaborate?: @spiruel on github, twitter etc