Predicting Functional Status Of Water Wells In Tanzania

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The Problem

- People rely on the wells for clean water
- Need better understanding of when repairs are needed
- Classify wells as functional, non functional, or needs repair through data

The Data

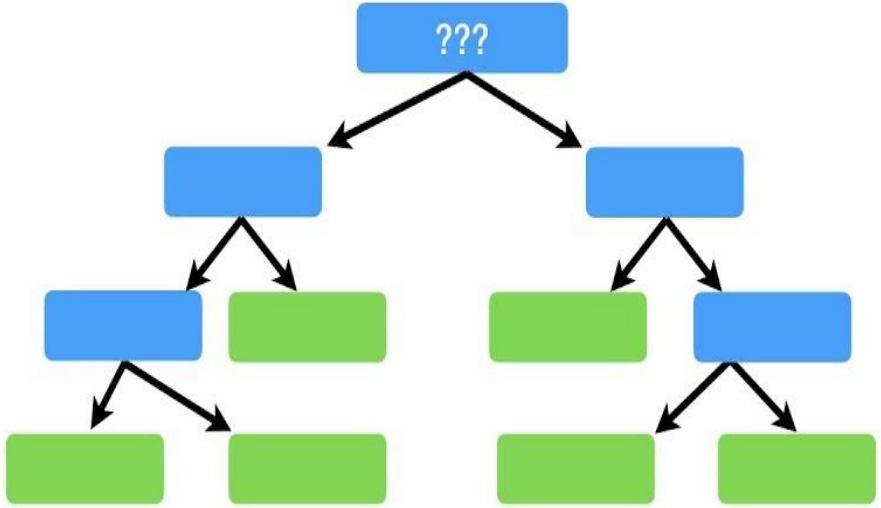
- From Taarifa and Tanzanian Ministry of Water
- Nearly 60,000 entries
- Contains information like:
  - Location
  - Type of water well
  - Water source

Methods

- Obtain
- Scrubbing
  - Null values
- Exploring
  - Get to know the data
- Modeling
  - Different types of models
- Interpretation

Model

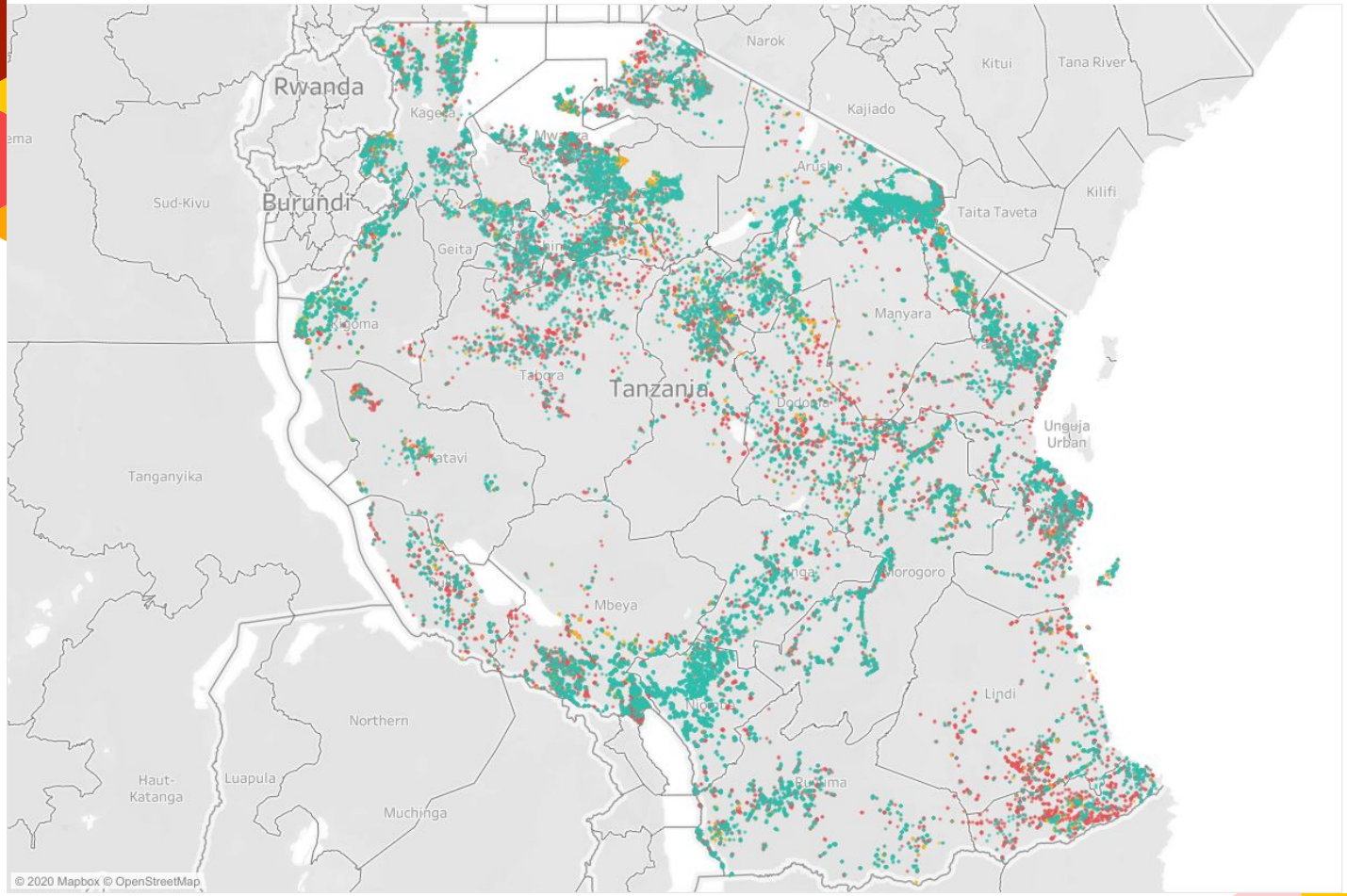
- Random forest
- 78% accuracy



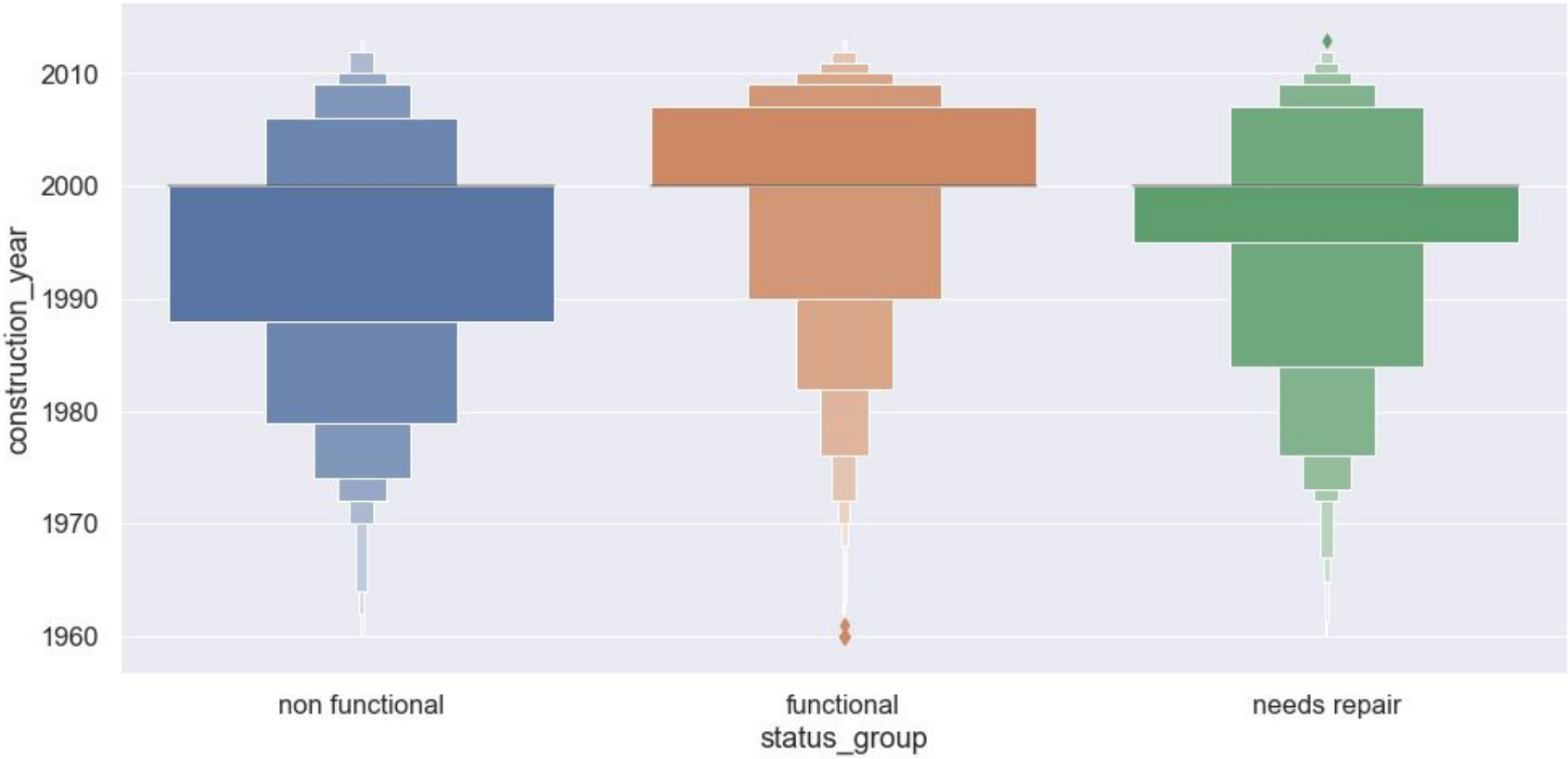
Findings

- Most important features include many based on location
- Construction year
- Water quantity
- Waterpoint type
- Major city and water lab

Water Well Status By Location



Construction_Year and Status_Group



Recommendations

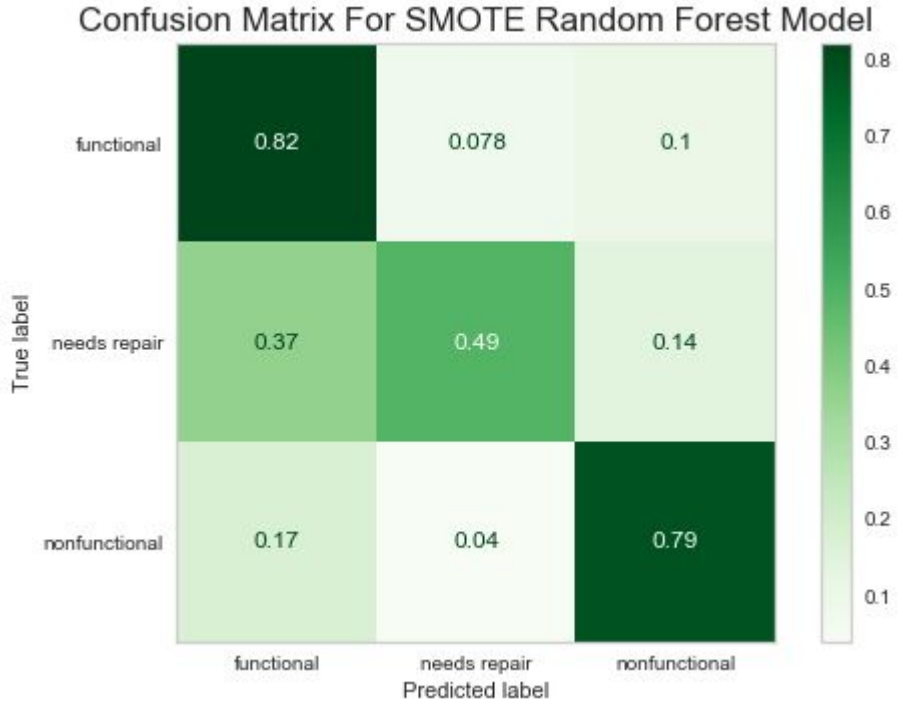
- Nearest city and servicing water lab
- Disparity in location should be addressed
- Set up servicing schedule
- Adding features
  - Date well was last serviced
  - Repairs record

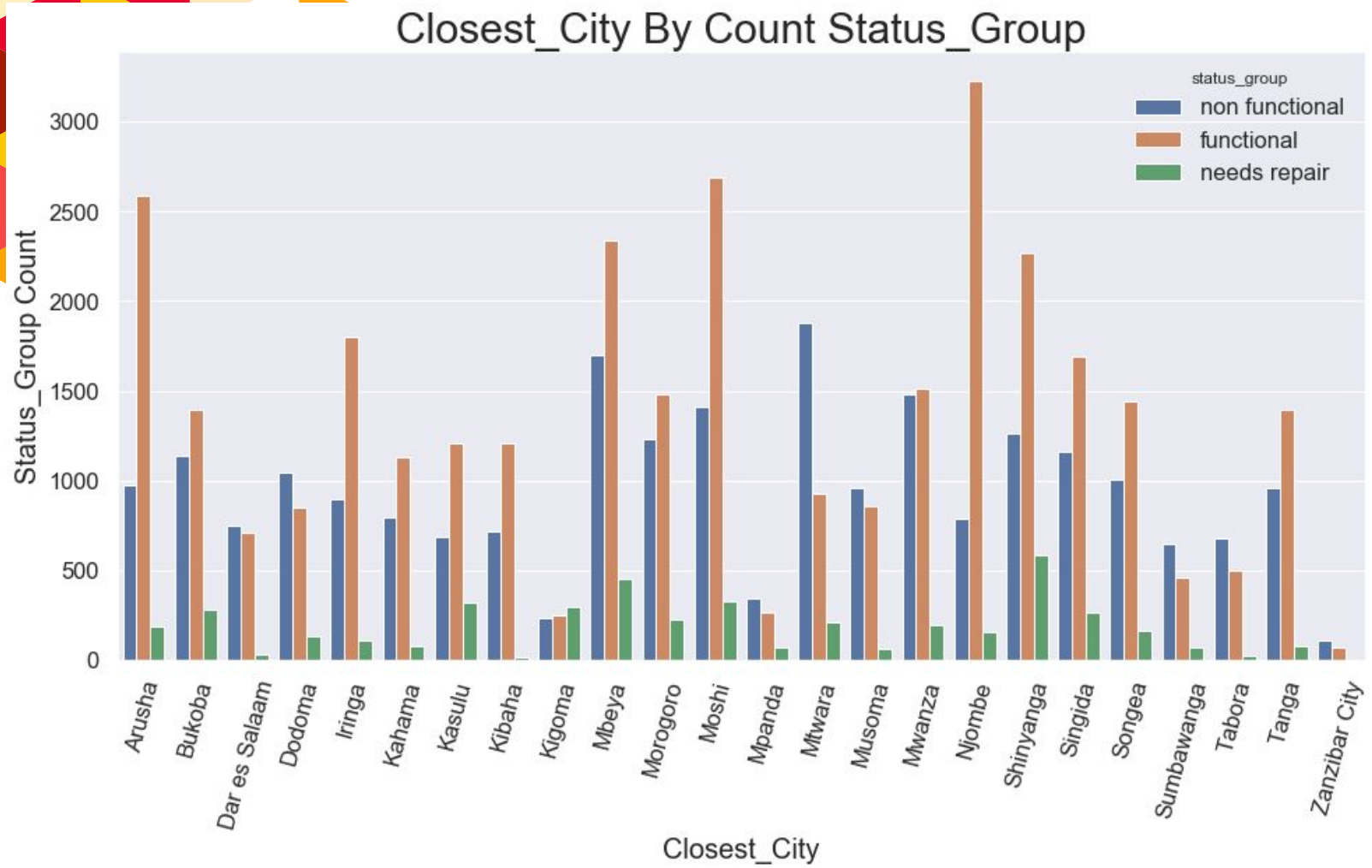
Thank You For Your Time

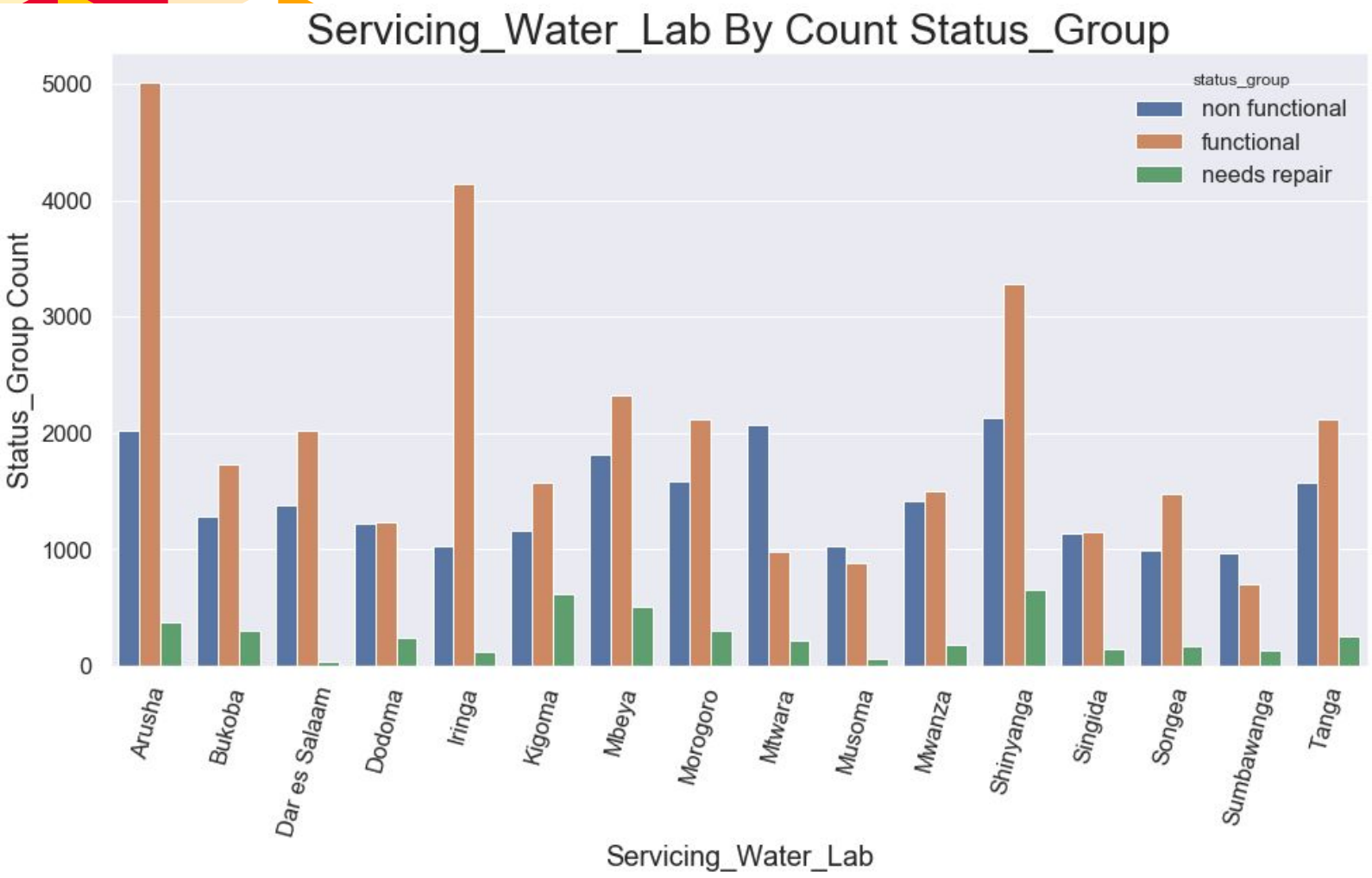
Any questions?

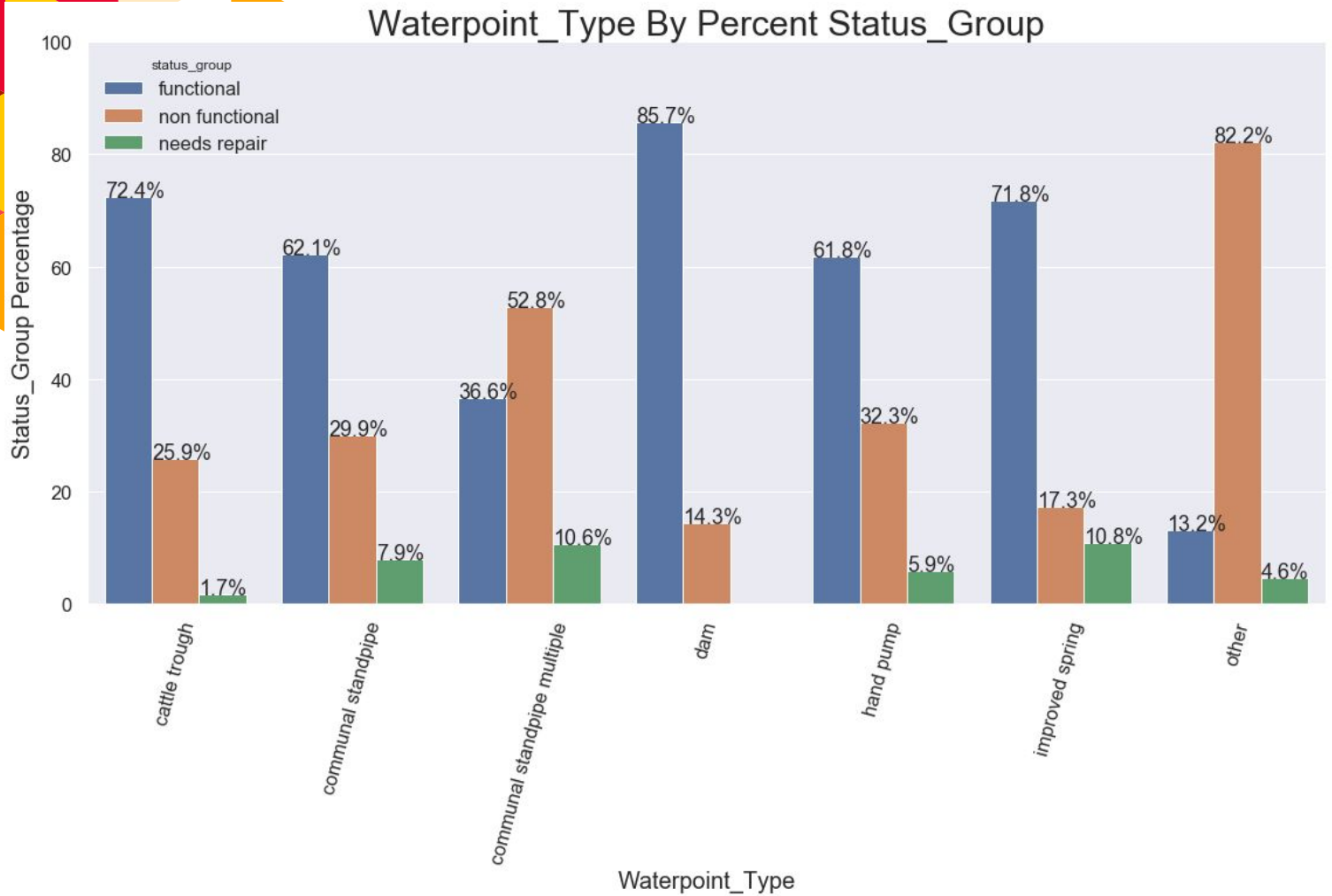
Appendix

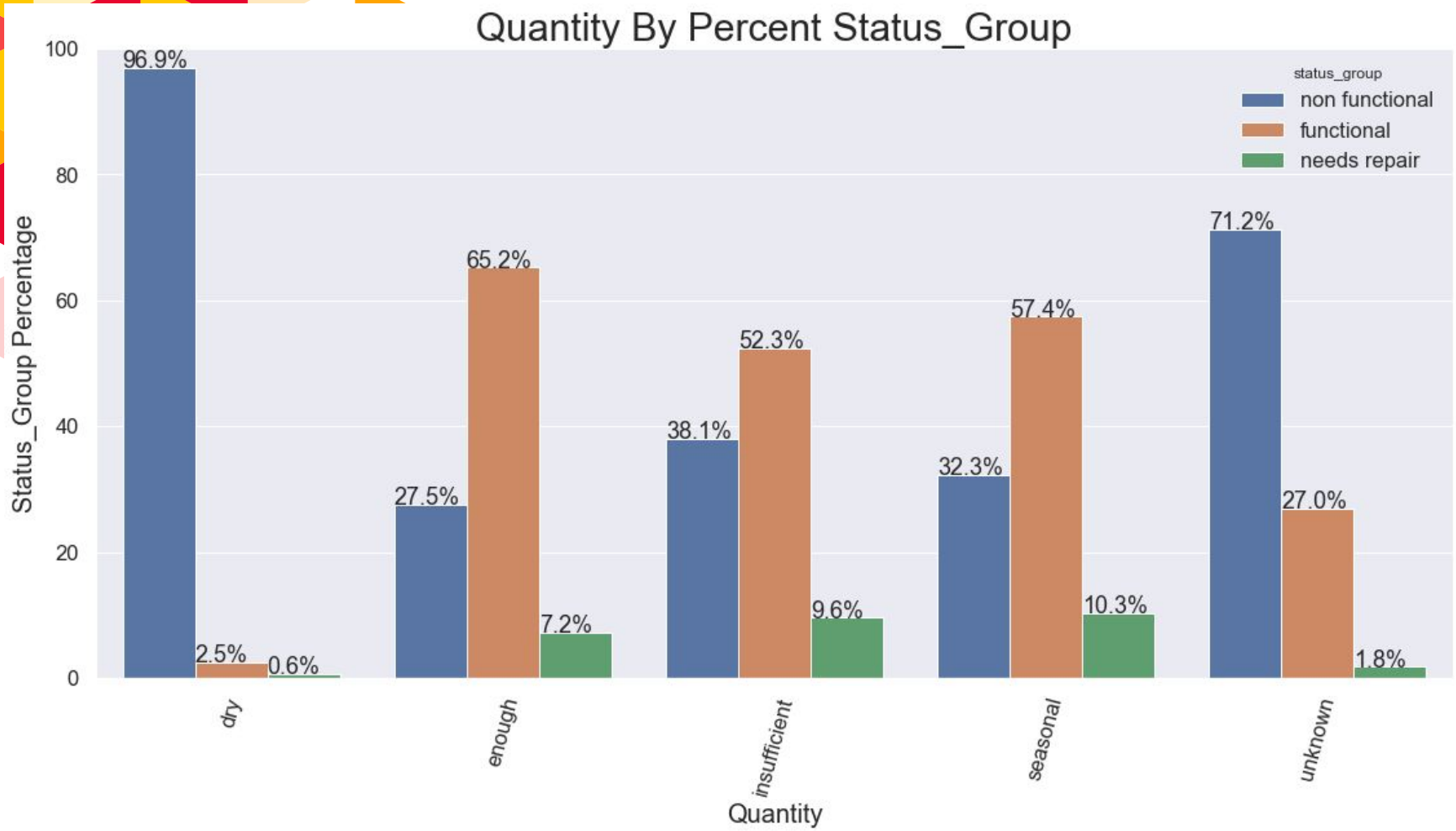
Extra visuals for those who want to know more


Confusion Matrix For SMOTE Random Forest Model
functional
needs repair
nonfunctional
True label
0.82
0.078
0.1
0.37
0.49
0.14
0.17
0.04
0.79
functional
needs repair
nonfunctional
Predicted label
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1


Closest_City By Count Status_Group
status_group
non functional
functional
needs repair
Status_Group Count
0
500
1000
1500
2000
2500
3000
Arusha
Bukoba
Dar es Salaam
Dodoma
Iringa
Kahama
Kasulu
Kibaha
Kigoma
Mbeya
Morogoro
Moshi
Mpanda
Mtwara
Musoma
Mwanza
Njombe
Shinyanga
Singida
Songea
Sumbawanga
Tabora
Tanga
Zanzibar City
Closest_City


Servicing_Water_Lab By Count Status_Group
status_group
non functional
functional
needs repair
Status_Group Count
5000
4000
3000
2000
1000
0
Arusha
Bukoba
Dar es Salaam
Dodoma
Iringa
Kigoma
Mbeya
Morogoro
Mtwara
Musoma
Mwanza
Shinyanga
Singida
Songea
Sumbawanga
Tanga
Servicing_Water_Lab


Waterpoint_Type By Percent Status_Group
status_group
functional
non functional
needs repair
Status_Group Percentage
Waterpoint_Type
cattle trough
communal standpipe
communal standpipe multiple
dam
hand pump
improved spring
other
72.4%
25.9%
1.7%
62.1%
29.9%
7.9%
36.6%
52.8%
10.6%
85.7%
14.3%
61.8%
32.3%
5.9%
71.8%
17.3%
10.8%
13.2%
82.2%
4.6%


Quantity By Percent Status_Group
Status_Group Percentage
100
80
60
40
20
0
status_group
non functional
functional
needs repair
96.9%
2.5%
0.6%
27.5%
65.2%
7.2%
38.1%
52.3%
9.6%
32.3%
57.4%
10.3%
71.2%
27.0%
1.8%
dry
enough
insufficient
seasonal
unknown
Quantity