Tanzania Water Wells

Client: Tanzania Government, Ministry of Water and Irrigation

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Overview

- The Tanzania is a developing country with a population of over 57,000,000.
- The government wants to improve the water supply in the country by maximizing on the functional waterpoints and repairing the non-functional water points.
- We aim to use Machine Learning Models to help predict which factors are contributing to the condition of the water points.

Business and Data Understanding

- Our objectives include:
  - Identifying the top five factors contributing to the condition of the waterpoints.
  - Giving recommendations based on the factors identified for the next constructions and repairs.
  - The data provided was sufficient for modeling with 40 different features to use.

Modeling and Evaluation

Our modeling process involved the following steps:

1. Data cleaning and preparation
2. A simple decision tree as our baseline model
3. A Random Forest model for our second model
4. Grid Search to tune the Random Forest model
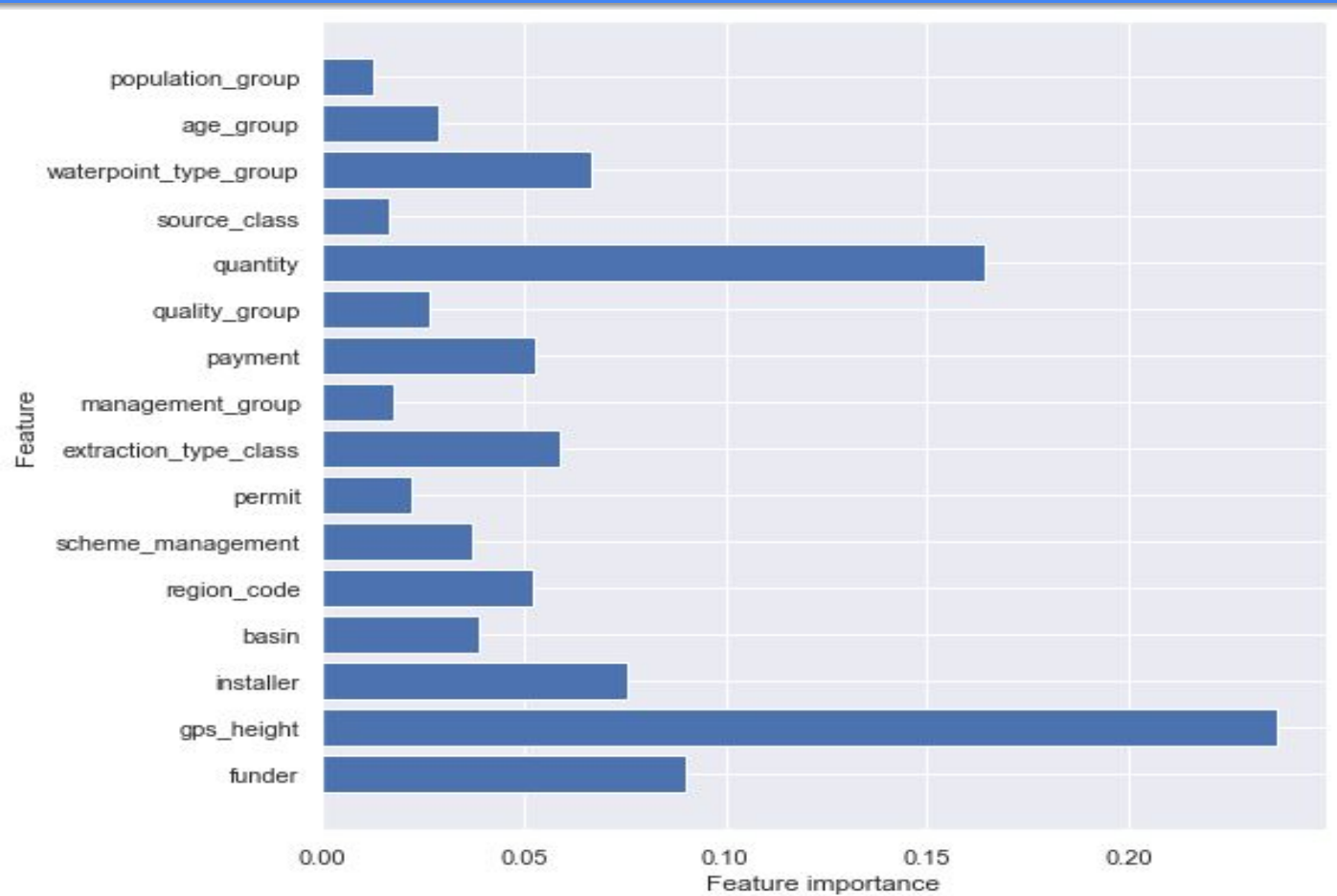5. XGBoost model with default parameters.

Out of all the models, the tuned Random Forest Model had the highest accuracy of 79%

This means that from data provided 79 out of 100 values were predicted correctly which is an acceptable and realistic score.

Results
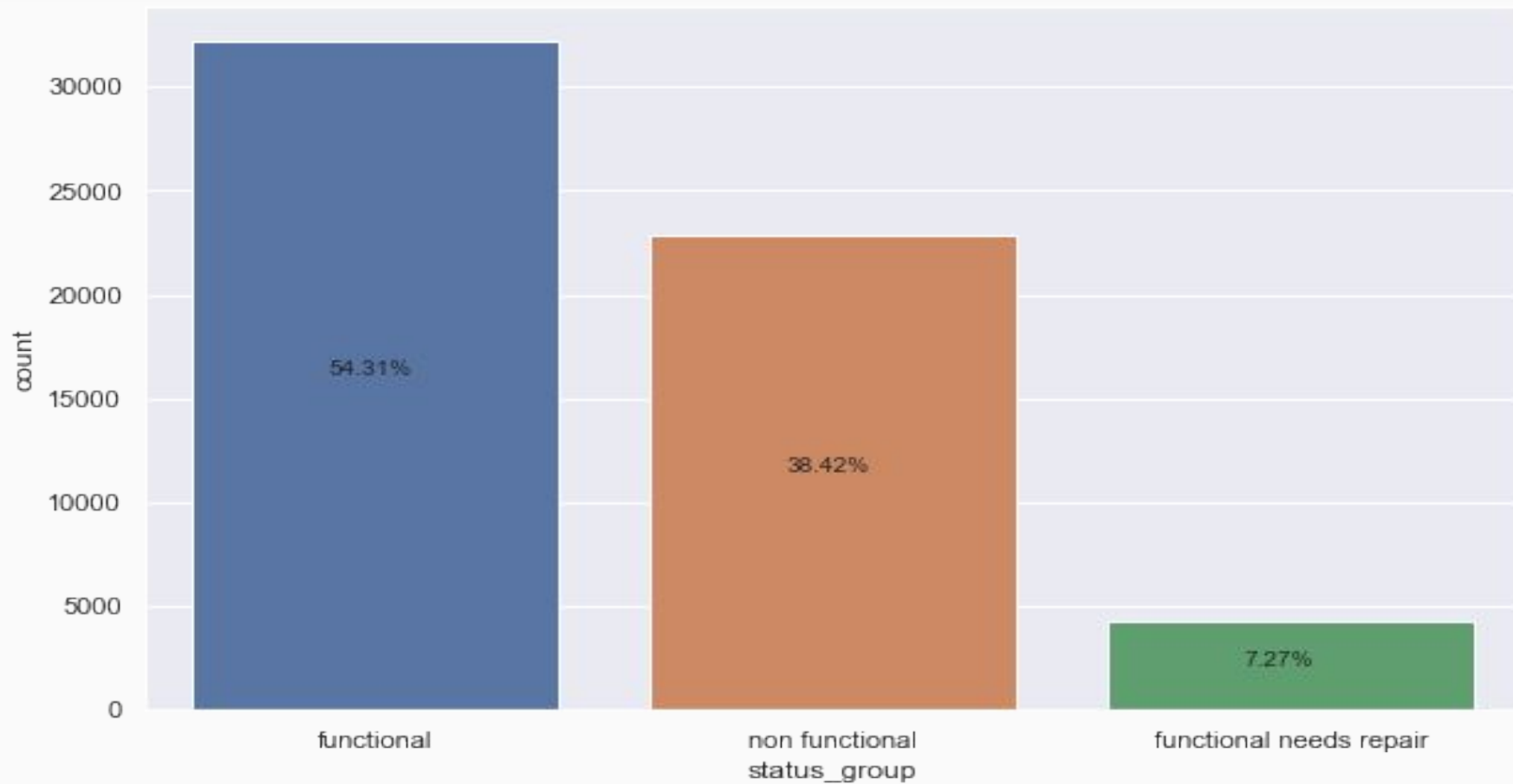
# Factors influencing the waterpoint condition

Results

From the first diagram we can see that majority of the water points are functional forming 54.3% of all the water points.
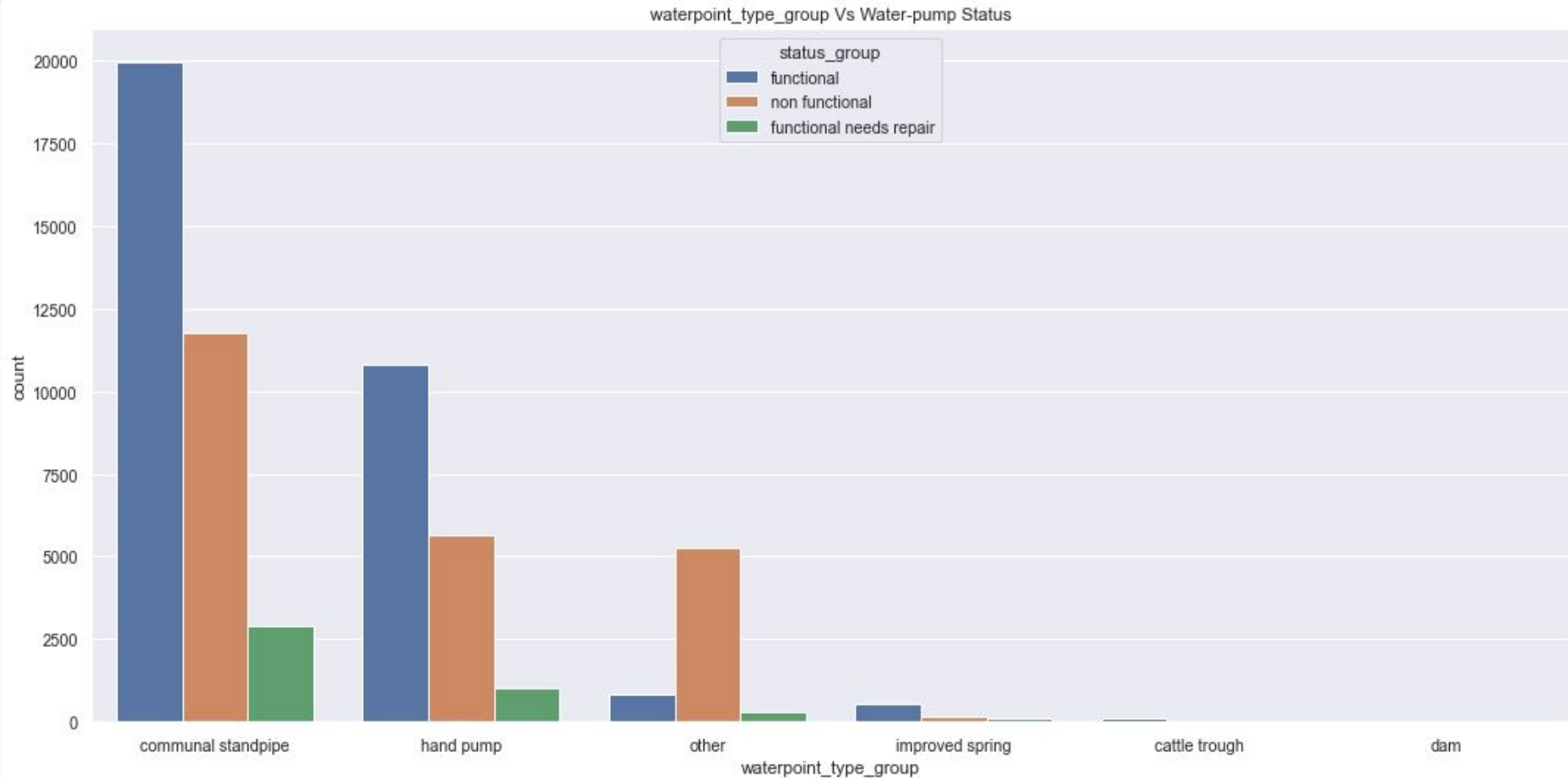
From the second diagram we can see that the top 5 factors are:

1. gps_height: altitude of the well
2. quantity of water: sufficient, insufficient, dry, seasonal
3. Funder: who funded the well
4. Installer: organization that installed the well
5. Waterpoint_type_group: The kind of waterpoint

quantity Vs Water-pump Status
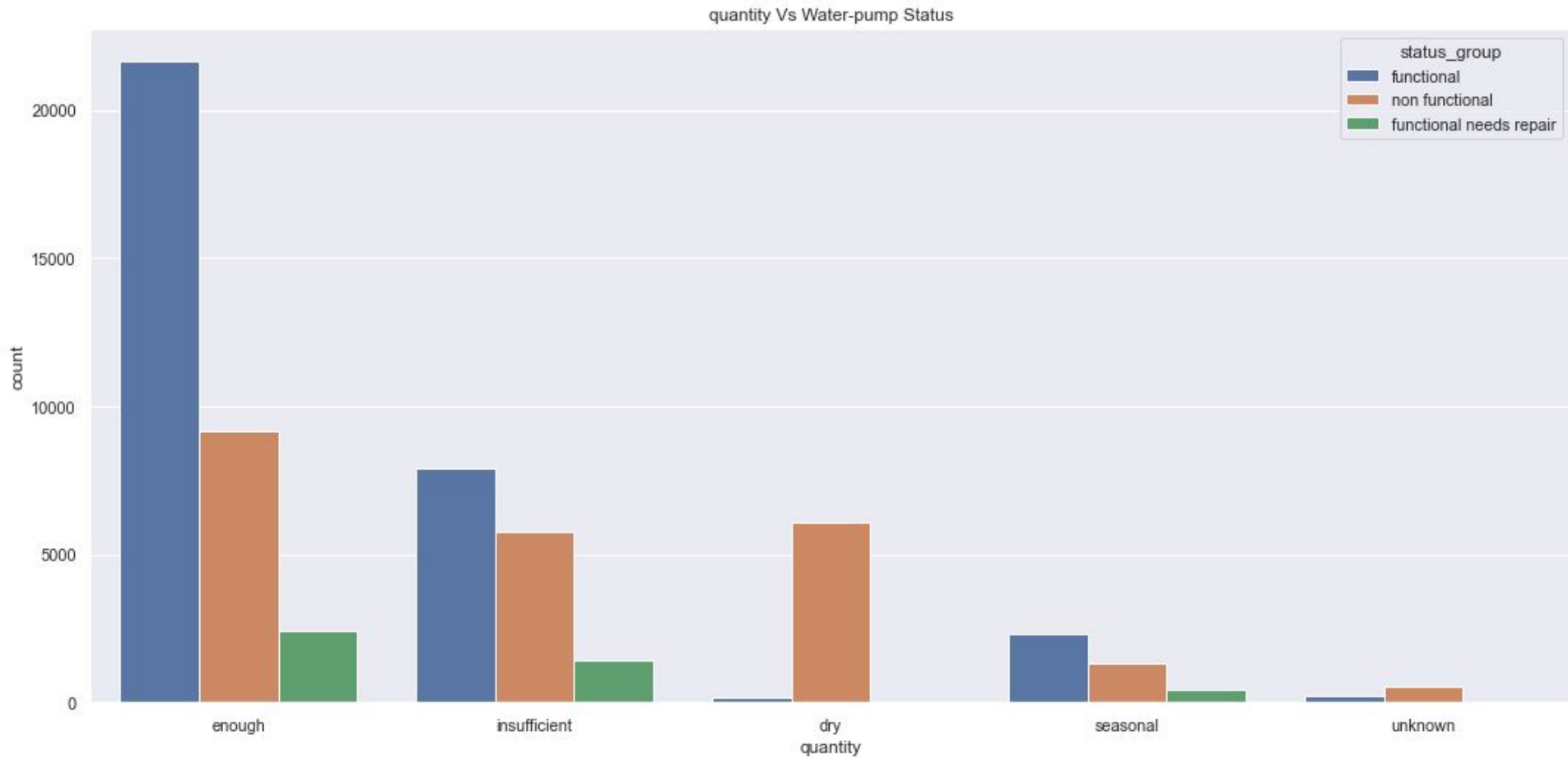
waterpoint_type_group Vs Water-pump Status

Recommendations

- For places where the water is sufficient it has been observed that about 10,000 are not functional. The ministry can start by fixing the non-functional points where the water is already sufficient.
- The ministry can use the model to know where to start in terms of sourcing funds from the top funders.
- The ministry can refer to the installers involved in installing the functional pipes and have them handle the new constructions and repair the existing ones.
- The government can invest in more communal standpipes and hand pumps for the type of water points they need to construct since they have the most functional waterpoints.

Thank you for your time.