

Pump it Up: Data Mining the Water Table: Tanzanian Water wells

Presentation by:

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February 2023

Business Problem



- Tanzania, as a developing country, struggles with providing clean water to its population of over 57,000,000. There are many water points already established in the country, but some are in need of repair while others have failed altogether.
- The goal is to predict the condition of water wells in Tanzania and address the clean water crisis by identifying patterns in non-functional wells and providing recommendations for well repair or construction.

Solution

- To build a classifier that can predict the condition of a water well based on information such as the type of pump, when it was installed, and other relevant variables.
- The classifier will categorize the wells into functional, functional but needs repair, or non-functional status, providing a comprehensive understanding of the state of the wells in Tanzania.

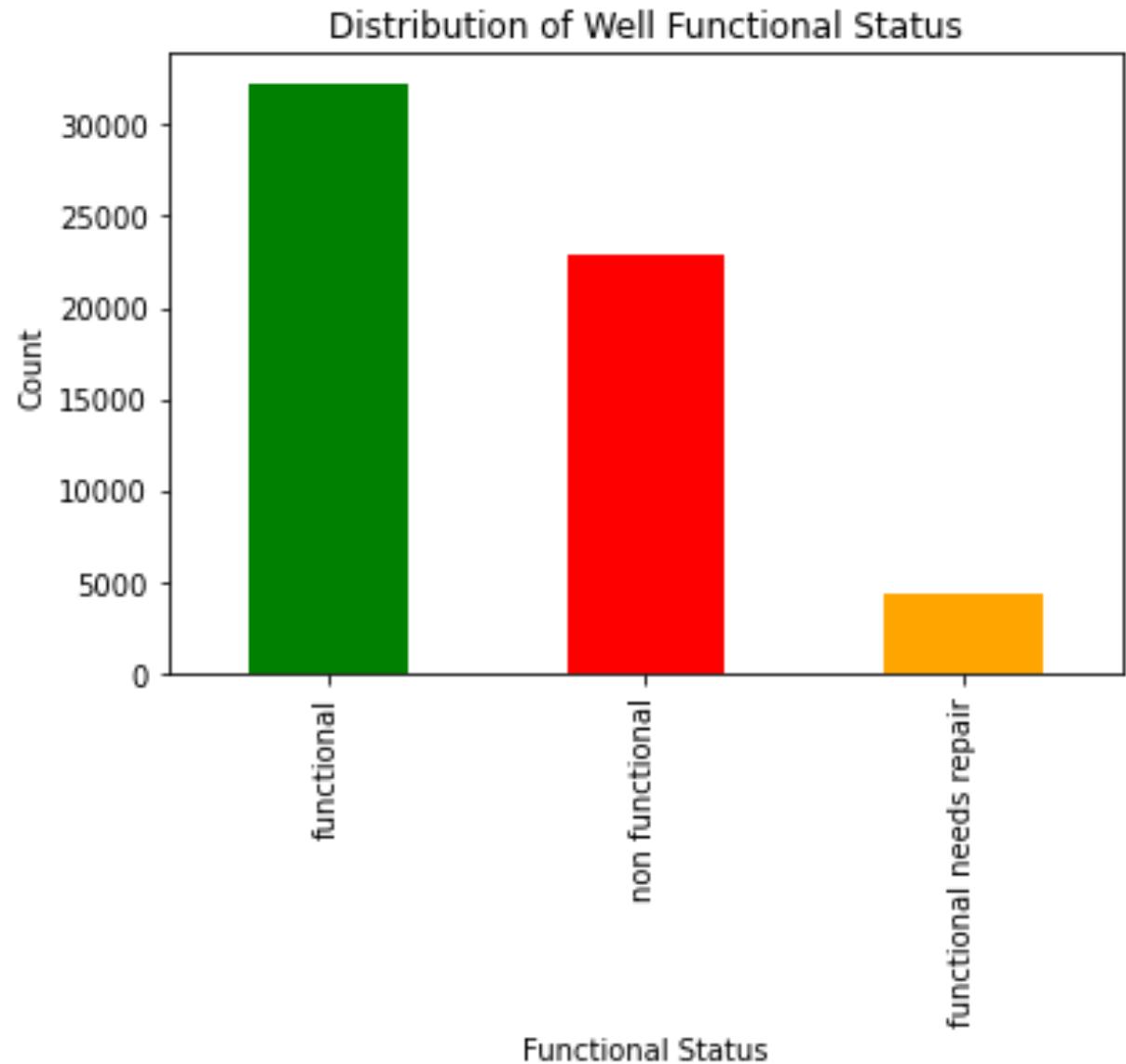


Data and Methods

- Data is from drivendata.org title of data is Pump it Up: Data Mining the Water Table
- Data was cleaned and pre-processed for analysis and prediction.
- Classifiers used were Decision tree and Random Forest.

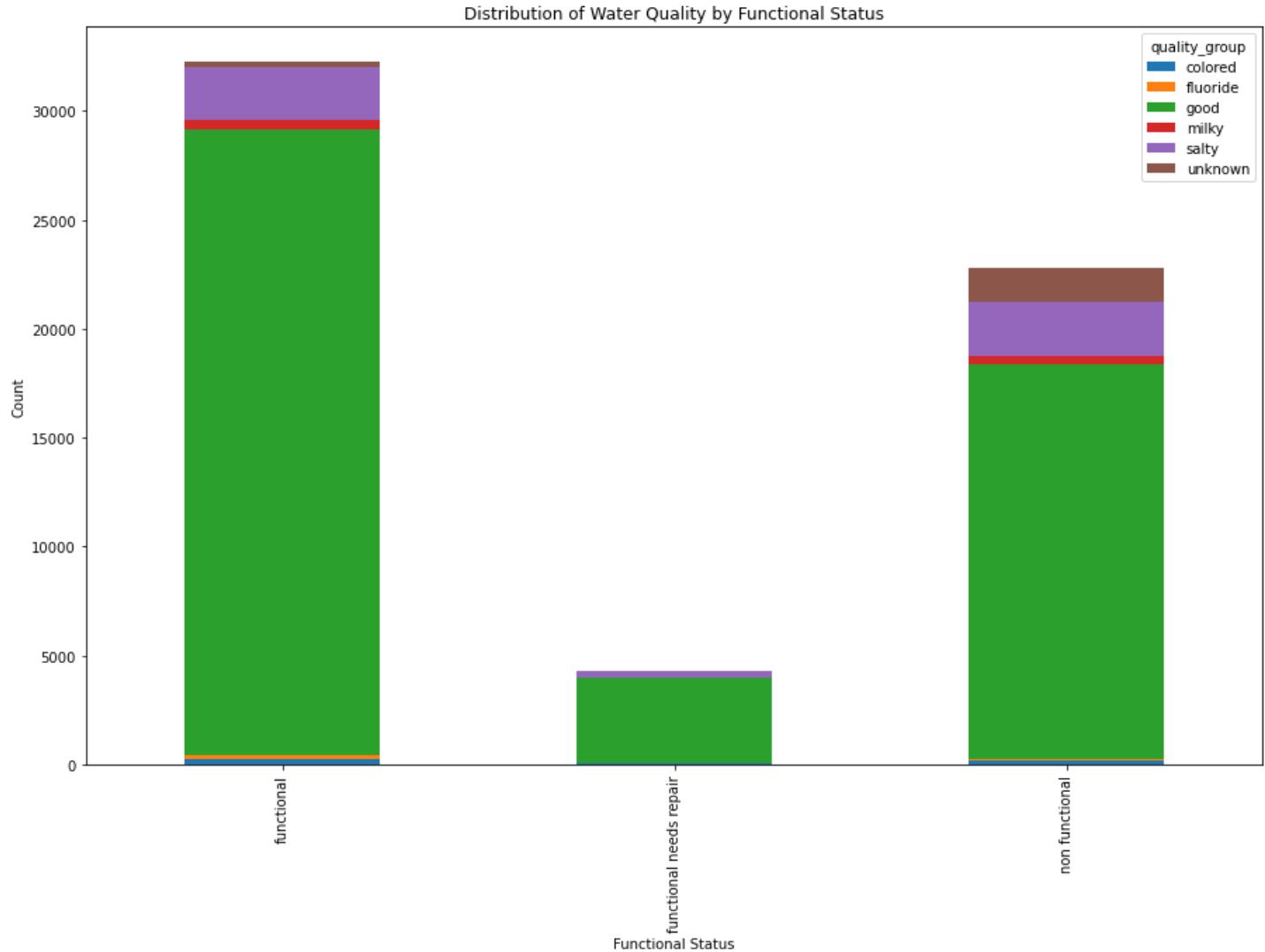
Results

- The bar graph shows the distribution of functional, functional but needs repair, and non-functional wells in Tanzania. Over 30,000 wells are functioning, while above 20,000 are not. A subset of approximately 5000 wells have the potential to be restored to full functionality with repairs.



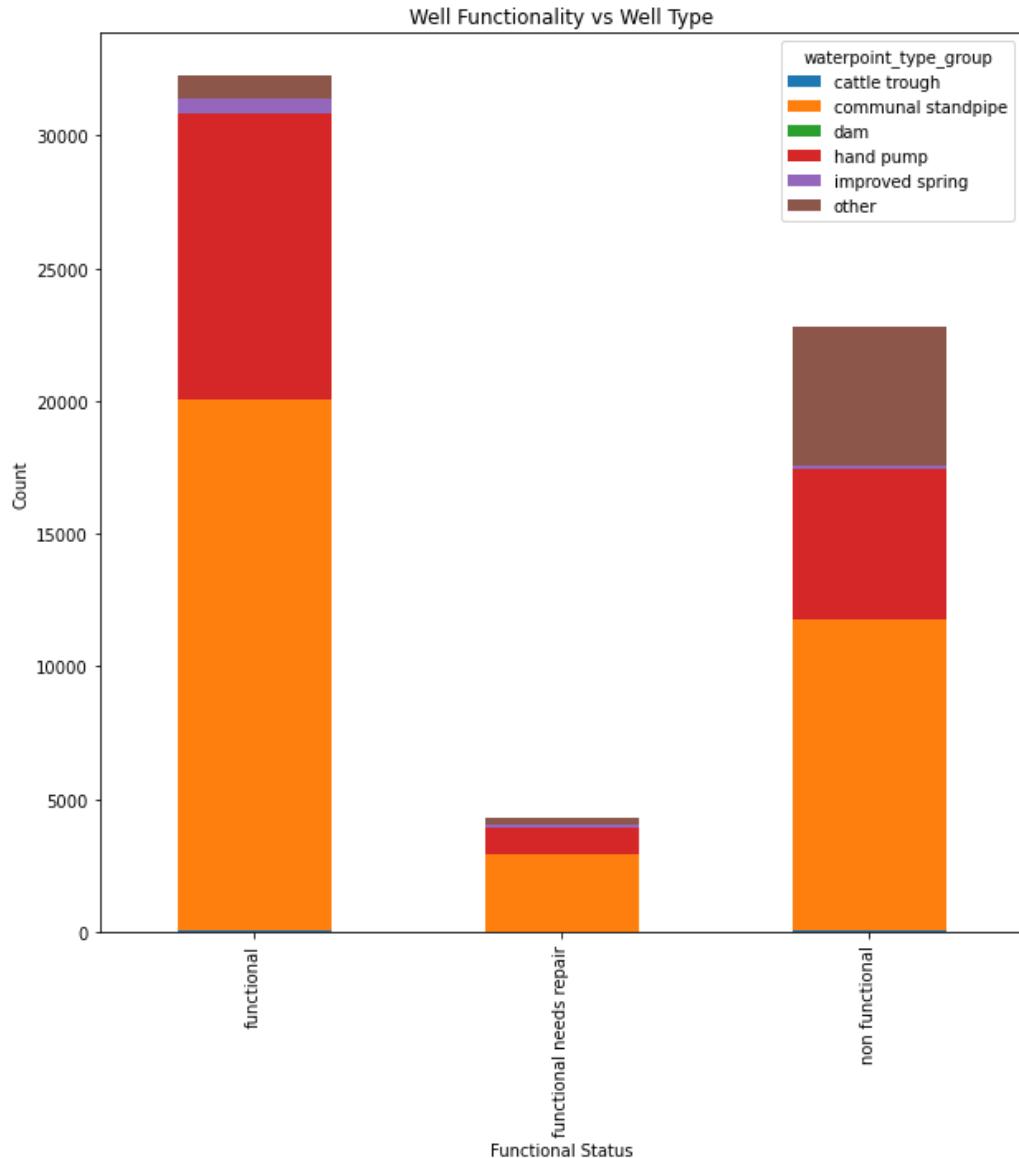
Results

- The "Well Functionality vs Water Quality" bar chart displays the relationship between the functional status of a well and the quality of water it provides. The chart showcases the distribution of water quality (such as salty or contaminated) for each functional status category (functional, functional but needs repair, and non-functional). This visualization helps us understand how water quality affects the functionality of a well.



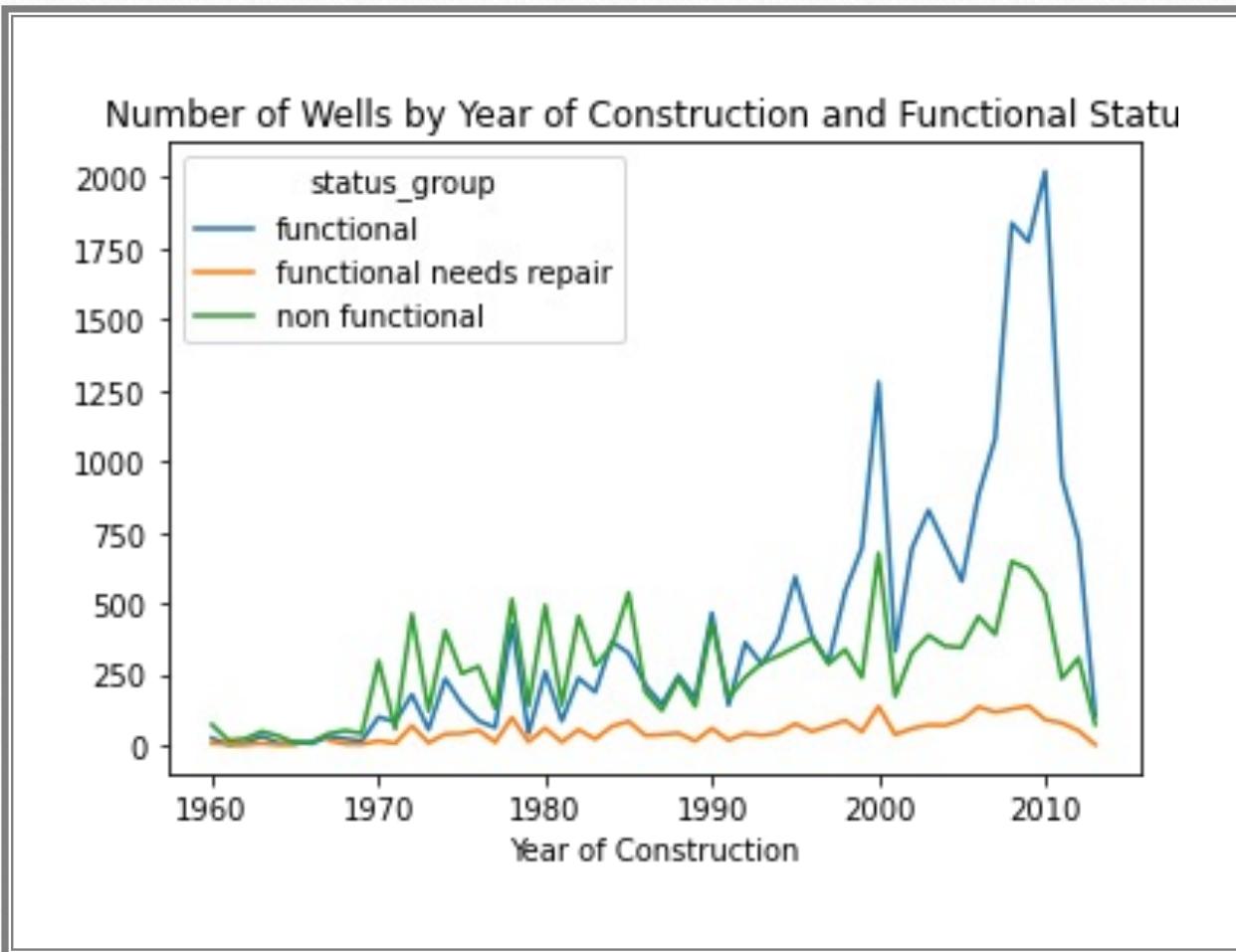
Results

- The bar chart illustrates the relationship between well functionality and well type, specifically how the various types of wells (e.g. borehole, hand pump) are distributed among the functional, functional but needs repair, and non-functional categories. The graph provides insights into the types of wells that are most prone to malfunction and those that are performing optimally. This information can be used to guide future well construction efforts and ensure the optimal functioning of wells.



Results

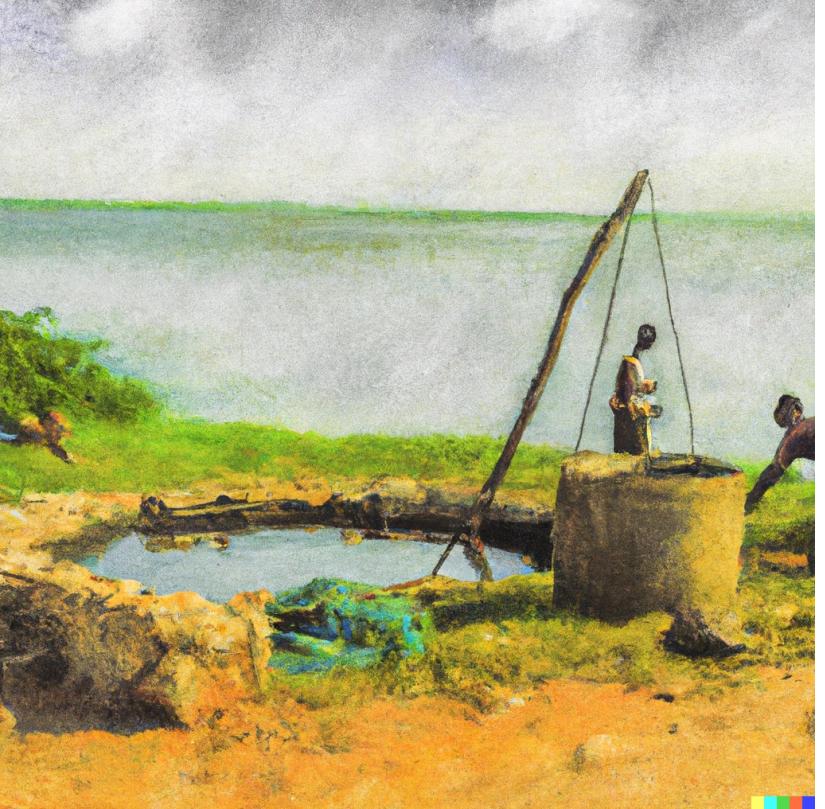
- The line chart depicts the change in the number of functional, functional but needs repair, and non-functional wells over time, with regards to the year of construction.
- The results show that the more recent wells tend to be more functional than older wells, suggesting that advancements in well construction and maintenance practices have improved the overall functionality of wells.
- This information can be used to prioritize maintenance efforts on older wells and encourage the use of updated technologies in future well construction projects.



Conclusion

- The classifier built in this project has demonstrated promising results with an f1 score of 80%.
- The results of the various visualizations provide valuable insights into the status of water wells in Tanzania and highlight areas where improvements can be made.
- The distribution of functional, functional but needs repair, and non-functional wells shows that there is a significant gap in providing clean water to the population, but with the majority of wells functioning optimally.
- The relationship between well functionality and well type, as well as well functionality and year of construction, provides a better understanding of the types of wells that are most prone to malfunction and the effect of advancements in well construction and maintenance practices.





Recommendation

- Based on the findings, it is recommended that the government of Tanzania and NGOs focused on addressing the clean water crisis prioritize well repair efforts for the subset of wells that are functional but need repair, as well as prioritize the use of updated technologies and maintenance practices in future well construction projects.
- Additionally, regular monitoring and assessment of the water wells should be implemented to ensure their continued functionality and address any issues that may arise.

“Thousands have lived without Love, not one
without water” — W.H.AUDEN

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Github : [Nurul-ain2022](#)



A landscape photograph showing a green hillside with a white horizontal bar across it. The bar is positioned approximately one-third of the way from the top of the image. There are two small brown rectangular markers on the left and right edges of the frame.

Thank you!