Pump it Up: Data Mining for the Tanzanian Water Crisis

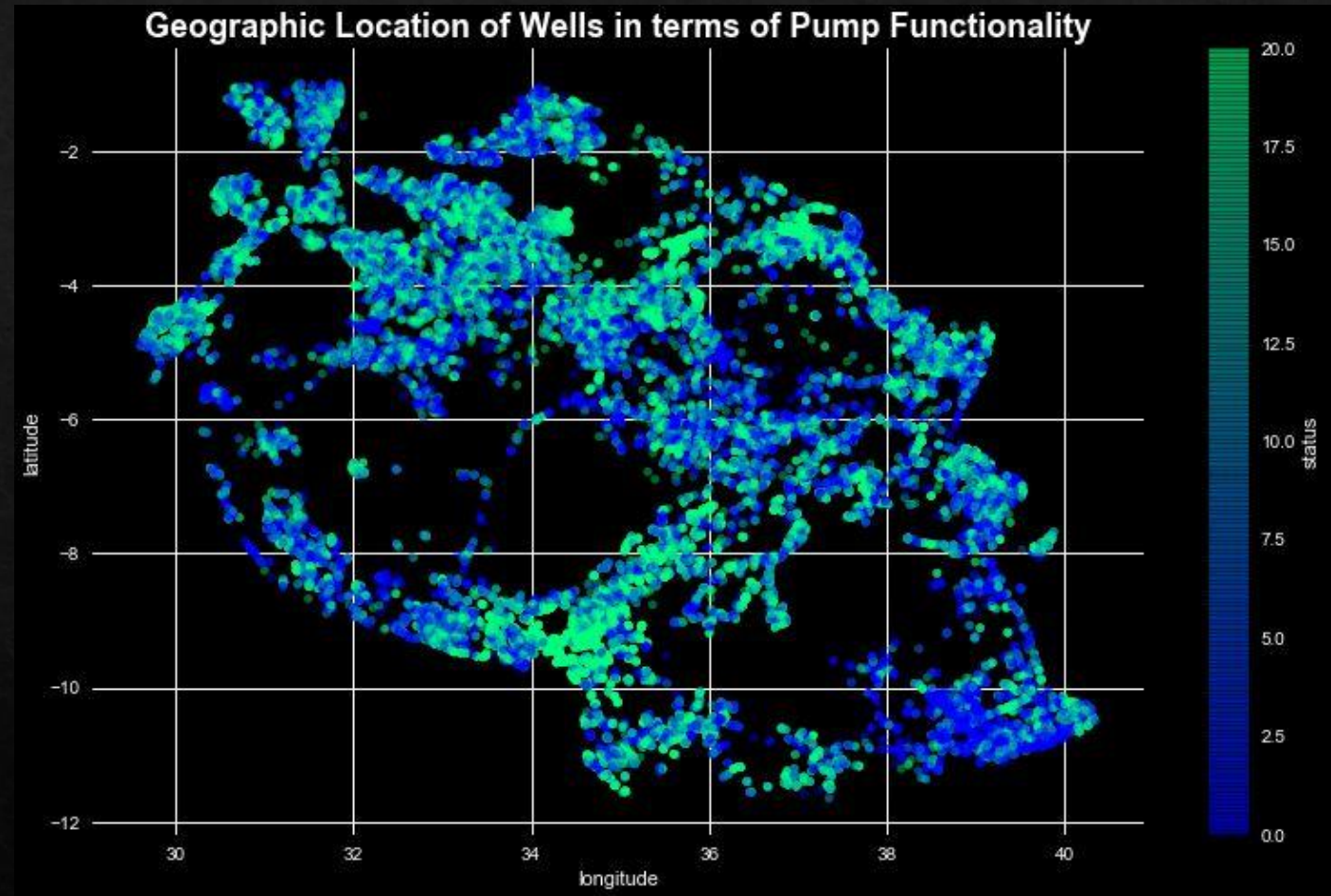Predicting Operating Condition of Water Pumps in Tanzania

Presented by John Kundycki

Tanzania's Water Crisis

❖ Tanzania has one of the fastest growing economies in Africa

❖ Approximately, only 50% of the population have access to clean water

❖ Many water basins that are being polluted

❖ Arid Environment – Lack of Water in many areas of the country

❖ Lack of access to clean water forces many people to rely on contaminated supplies – putting people's lives at risk

Source: https://drop4drop.org/tanzanias-water-crisis/

Water Wells

- ◈ To battle the water crisis, water pumps have been installed all across the country

- ◈ Water Pumps bring clean water to the people of Tanzania

- ◈ Many of these pumps need replacement or repair

Geographic Location of Wells in terms of Pump Functionality

Legend:
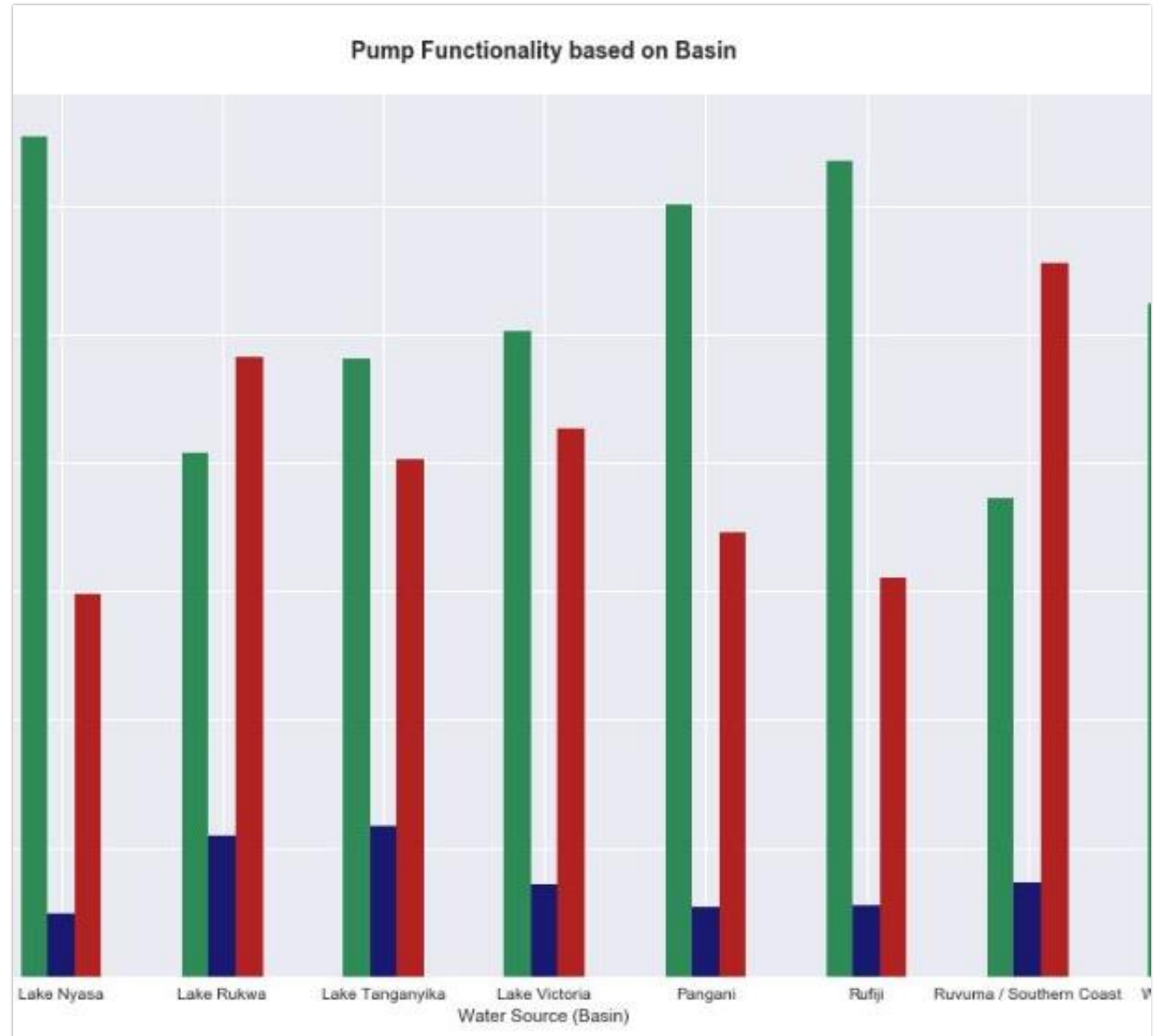Dark Blue: Non-functional pumps
Turquoise: Pumps that need repair
Teal: Functional pumps

Predictive Modeling to Combat Water Crisis

◆ Being able to predict which pumps need replacement or repair would provide many people with more access to clean water

◆ Repairing a pump instead of replacing a pump would save on costs

◆ Predicting operating status of pump might give more insight on which pumps or water sources work best and which do not work, providing future generations more access to clean water
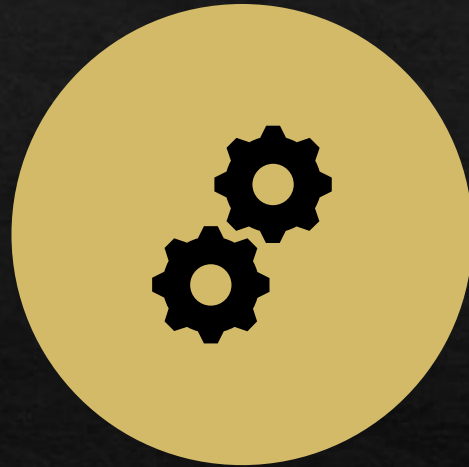
Why do pumps at Lake Nyasa work better than pumps at Lake Rukwa?

Pump Functionality based on Basin

Water Source (Basin): Lake Nyasa, Lake Rukwa, Lake Tanganyika, Lake Victoria, Pangani, Rufiji, Ruvuma / Southern Coast

Predictive Modeling

◈ Model has been built that can predict which pumps are non-function and which need repair with ~ 82.5% accuracy (Random Forest Classifier)

◈ Use this model to predict which pumps need repair and which need replacement

◈ Send crews out to inspect the pumps detected by the model and assess what needs to be done

Future Work

CONTINUE TO IMPROVE THE MODELS WITH HYPERPARAMETER TUNING

FURTHER EXPLORE THE DIFFERENCES AS TO WHAT DETERMINES THE SUCCESS OR FAILURE OF A PUMP

Questions?

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