IBM CALL FOR CODE 2021 CHALLENGE

**OVERVIEW**

ABSTRACT

Being a 21ST Centaury, the world is rapidly growing into adoption of technology in every aspect of life all the way from social, economic to political. IBM being one of the biggest technology company, its focused on addressing and giving solutions to the global problems in making a difference in communities around the world, through applications of intelligence, reason and science.

Climate change being a global crisis and has a potential to impact every living organism on the planet. The adverse effects are already being felt by human beings and animals across the globe. Divergent and exhaustive scientific researches has confirmed the likelihood of this there to continue, therefore we have to change in how we live in order to adapt to the new norm.

With the IBM 2021 Global Challenge divided into three sub themes

1. Clean water and sanitation
2. Zero hunger
3. Responsible production and green energy

We seek to work on project to address and provide a solution on Clean Water and Sanitation by ensuring people can access a cheaper, efficient and accurate way to evaluate whether a sample of water is contaminated or not.

CLEAN WATER AND SANITATION

PROJECT

(CLEAN WATER AND SANITATION)

NAME

* Hydro Safe
* We intend to name the project HydroSafe. The name is generated from two words:

1. Hydro-meaning water
2. Safe-meaning free from harm/contaminant

* When the two words are combine it forms Hydro Safe meaning water free from contamination.
* The idea on the name is generated with respect to the theme Clean water and Sanitation

OBJECTIVE

This project is targeted in establishing an Application that will be able to:

1. Detect and determine harmful bacteria/contaminants in a water sample.
2. To what percentage or extent the water sample is contaminated by the bacteria/contaminants.
3. Provide ways of separating each type of bacteria/contaminants found in water tested to make it safe for drinking and
4. There must be uniformity in the result for water tested despite the source e.g. dams, rivers and etc.

INTRODUCTION

Water is a polar inorganic, transparent, tasteless, odorless and nearly colorless chemical substances. It contains molecules of one hydrogen and two oxygen atoms hence the chemical formula H²O. Water is vital for all know forms of life even though it provides no calories or organic nutrients. It can exist in three states solid, liquid and gaseous. Water is vital both as a solvent in which many parts of the body solutes dissolve and as an essential part of many metabolic processes within the body.

Water fit for human consumption is called drinking water or portable water. Contaminated water maybe made portable by filtration or distillation or many other range of methods. Our project mainly deals with grey water which is unsafe or contaminated water, but can be treated to make it safe for drinking.

Grey water composes 50-80%residential wastes generated by households’ sanitation equipment. Poor water quality and bad sanitation are deadly, according to WHO some 5 million deaths a year are caused by water related diseases, and estimate of 1.4million deaths of children could be prevented if we had safe water which is the main aim of our project.

90% of waste water goes into local streams and rivers untreated this not only affects the streams but also the degrade ground water resources and that's where we come in to help stop the consumption on unsafe water.

Sanitation refers to public health conditions related to clean drinking water and adequate treatment and disposal of human excretes and sewage

Our Call for Code project maybe among the many existing sanitation technology methods.

APPARATUS

1. Mobile phone
2. Water sample
3. Clean glass/container
4. Laptop/Desktop

METHODOLOGY

Our project is based and targeting to in cooperate the first steps in the application of machine learning to analyze the different images to establish the water quality. In order to offer improved accuracy and offer a more complete analysis that moves beyond what is visible with the naked eyes, we are expanding our machine learning model to analyze microscopic images of water to determine the contaminants present. The mobile app is aimed at taking the images of water and then pass the image into a microscope which then use computer vision to identify the particles, determine the levels and return the results to the user on how the sample of water can be treated e.g. if the contaminants are stone particles it can be separated by filtration.

DATA COLLECTION AND ANALYSIS

We intend to get samples of water from different sources e.g. rivers, tap water, lakes, sea, collected rain water, ocean and from areas such as arid, semi-arid, desert and equatorial areas. After which we will take an image of each sample using the mobile phone. Means of data collection is through physical sampling. We also intend to analyze the various methods of water treatment methods and establish the suitable for each contaminant found.

CONCLUSION

In conclusion, our end goal is to generate an efficient, accurate and cheap mobile application for those who needs to determine the safety of their water sources and on how to treat the water that combines macroscopic and microscopic analysis through the phone camera and also allowing images collected via microscope to be uploaded for more advance classification.

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