BASIC PROJECT: AUTOMATED SANITARY SYSTEM

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PREAMBLE

In Nigeria, quite a number of people don't take precautions against the coronavirus disease (COVID-19) such as proper hygiene, use of face masks in public places, observing social distancing etc. The number of cases confirmed and reported by Nigeria Centre for Disease Control (NCDC) shows that the rate at which the virus spreads increases daily.

One of the best ways of getting rid of the virus is by washing the hands with soap and water. We've noticed that places such as markets, mechanic workshops, banks etc. lack efficient public sanitary facilities. People have to depend on hand sanitizers which should be used when there's no access soap and water. To address this issue, we've designed a device that makes washing of hands in public places a simple and non-touch process.

TECHNOLOGY AND IMPLEMENTATION

The device is a **Dual-pump Automated Hand Washing System.** Its major components include:

- A Microcontroller
- Two Mini Self-priming pumps

- An Infrared Sensor
- Dispensing tubes
- Sink
- Discharge pipe
- Two Inlet pipes

The microcontroller uses a firmware etched into its memory to take readings from the Infrared sensor and drive the pumps to dispense soap and water at scheduled time intervals. The Infrared sensor detects the proximity of the user's hands, if the hands are close enough, a signal is sent to the microcontroller to activate the pumps. One pump is responsible for dispensing soap while the other dispenses water, both soap and water will be released to the user's hands via the dispensing tubes. The waste water (or mixture) goes to the sink where it'll pass through a discharge pipe that is directed to a drain or a bucket. The Inlet pipes connect the device's pumps to soap and water containers through hoses, this makes the pumps draw the fluids from these containers through the hoses.

3D MODEL OF THE AUTOMATED HAND WASHER

FEASIBILITY

The hand washing system possesses a lot of advantages over existing sanitary systems. Some features that make it a viable product for preventing the spread of the coronavirus include:

- **Easy to use:** Anybody can use this device as its mode of operation requires the consumer to do one thing. The user only has to place his/her hands close to the sensor. Once that is done for the first time, soap is dispensed for a programmed duration of 5 seconds. The microcontroller then starts a 20 second timer after which water is dispensed. The user will keep rinsing his/her hands until they place their hands close to the sensor again to stop the dispensing of water.
- **Non-touch**: With the use of an Infrared sensor, the device is utilized without any form of contact.
- **Small and Portable**: It can be placed on a surface e.g. a stool, tabletop. It can be carried from place to place due to its small size.
- **Low Power**: It consumes little power.

ECONOMIC IMPLICATIONS

The device is constructed from low cost and efficient components. With the simplicity of its design, the cost of manufacturing a circuit board and an enclosure are greatly minimized thereby making the product affordable.

EFFECT AND RELEVANCE TO COVID-19

The hand washing system is a preventive measure against the virus as it promotes good hygiene in places where there are no sanitary facilities. It also eliminates the touching of things like taps, sachet water etc. in an attempt to get

hands clean. The device makes soap and water readily available and with its compactness, it can be deployed anywhere.