IOT PROJECT REPORT (FINAL EVALUATION)
NO TOUCH AUTOMATIC HAND SANITIZER

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INITIAL OBJECTIVE:

- TO CREATE A CONTACTLESS HAND SANITIZER DISPENSER THAT CAN BE USED INSTEAD OF ANY PRESS-TO-RELEASE HAND SANITIZER DISPENSER AVAILABLE IN THE MARKET.
- THE DISPENSER AUTOMATICALLY DETECTS OUR HAND BY USING THE ULTRASONIC SENSOR. THE ULTRASONIC SENSOR IS USED FOR DETECTING OUR HAND AND IF IT FINDS ANY SIGNAL, THE SERVO MOTOR STARTS AUTOMATIC SPRAYING OF THE SANITIZER.
- SANITIZER LEVEL INSIDE THE DISPENSER IS MEASURED USING WATER LEVEL SENSOR. THE WATER LEVEL SENSOR IS USED TO CHECK IF THE DISPENSER IS ABOUT TO RUN OFF THE SANITIZER.
- WE HAVE LEDs GLOWING AS THE OUTPUT, INDICATING THE LEVEL OF LIQUID INSIDE THE CONTAINER. ALSO, THE BUZZER GOES ON IF THE SANITIZER IS ABOUT TO RUN OFF i.e THE SANITIZER LEVEL IS BELOW A CERTAIN LEVEL.

DESCRIPTION OF YOUR IMPLEMENTATION WITH THE CODE:

- IR BLASTER DETECTS THE PRESENCE OF HAND WITHIN THE PROXIMITY OF 5 cm.
- TIP 32C TRANSISTOR RUNS COORDINATION BETWEEN THE IR BLASTER AND THE WATER MOTOR. THE TRANSISTOR MAKES VCC OF WATER MOTOR HIGH/LOW BASED ON THE DETECTION OF HAND BY IR BLASTER.
- THE SANITIZER LEVEL INSIDE THE CONTAINER IS BEING MEASURED BY AN ULTRASONIC SENSOR.
- LED TURNS ON IF HAND IS DETECTED AND THE SANITIZER FLOWS OUT OF THE PIPE WITH THE HELP OF A WATER MOTOR.

ONEM2M IMPLEMENTATION

- THE DATA THAT WE ARE STORING IS AS FOLLOWS:
  1. EPOCH TIME WHEN THE DISTANCE OF HAND IS <6 CM FROM THE ULTRASONIC SENSOR (HAND IS DETECTED):
     APPLICATION ENTITY: ULTRASONICSENSOR_
     CONTAINER: HANDDETECTION_
  2. SANITIZER LEVEL DATA
     APPLICATION ENTITY: WATERLEVELDATA_
     CONTAINER: WATERLEVEL_
  3. EPOCH TIME CORRESPONDING TO SANITIZER LEVEL DATA IS PUSHED INTO ONEM2M
     APPLICATION ENTITY: WATERLEVELDATA_
     CONTAINER: EPOCH_

DATA ANALYTICS

WE ARE PLOTTING THESE THREE GRAPHS ON OUR WEB SERVER (USING PYTHON AND FLASK):

- SANITIZER LEVEL VARIATION WITH TIME
  LOGIC: WE FETCH ALL THE DATA FROM ONEM2M AND PLOT IT WITH EPOCH TIME ON OUR WEB SERVER.
- NUMBER OF TIMES THE SANITIZER IS USED PER HOUR PLOTTED AGAINST 24 HOURS OF THE DAY
  LOGIC: WE FETCH ALL THE DATA FROM ONEM2M AND BY LOOKING AT THE EPOCH TIME WE CHECK AT WHICH HOUR OF THE DAY HAND WAS DETECTED BY THE ULTRASONIC SENSOR AND THEN WE UPDATE THE FREQUENCY.
- WE ARE ALSO ANALYSING THE TIME TAKEN BY THE SANITIZER TO GET EXHAUSTED:
  LOGIC: WE ARE CALCULATING THE TIME THAT THE LEVEL OF THE SANITIZER IN THE CONTAINER TAKES TO DROP FROM 6 cm to 2 cm. WE ARE ALSO MAINTAINING A VARIABLE IN WHICH WE UPDATE THE LAST TIME THE WATER LEVEL WAS >= 6 cm, AND IF AT ANY INSTANT IT DROPS TO A LEVEL <=2cm, WE SUBTRACT THE TWO EPOCH TIMES TO SEE THE TIME TAKEN BY IT TO BECOME EMPTY.

CHALLENGES AND RESOLUTION:

1. RELAY MODULE:

   WE WERE STRUGGLING TO TURN ON THE WATER MOTOR USING THE RELAY MODULE BUT THERE WAS SOME ISSUE WITH THE VOLTAGE SUPPLIED. FINALLY, WE USED AN IR BLASTER INSTEAD OF THE RELAY MODULE AND THE ISSUE WAS RESOLVED.

2. OUR DATA UPLOADED ON ONEM2M WASN'T LOADING:

   WE REALISED THE ISSUE WAS WITH THE IP ADDRESS.

3. OUR DATA ON ONEM2M WAS GETTING EXHAUSTED:

   THE DEFAULT LIMIT ON ONEM2M SERVER IS 120 ENTRIES, WE CHANGED THE LIMIT ON THE ENTRIES ON THE ONEM2M SERVER TO 1,20,000 ENTRIES AS THE DATA WAS GETTING EXHAUSTED TOO SOON.

OBJECTIVES ADDRESSED:

- THE DISPENSER AUTOMATICALLY DETECTS OUR HAND BY USING THE IR BLASTER. WE USED AN IR BLASTER INSTEAD OF AN ULTRASONIC SENSOR FOR DETECTING OUR HAND.
- THE WATER MOTOR STARTS AUTOMATICALLY SPRAYING THE SANITIZER INSTEAD OF A SERVO MOTOR.
- THE BUZZER WAS SUPPOSED TO GO ON ONCE THE SANITIZER LEVEL FALLS BELOW A CERTAIN LEVEL BUT INSTEAD OF USING A BUZZER AND AN LED BOTH WE ENDED UP USING ONLY AN LED TO INDICATE THE DOWNFALL IN THE LEVEL OF THE SANITIZER IN THE DISPENSER.