Water Flow Analyzing System

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Problem Statement

With the increased effects of Global Warming on our environment, the need for judicial use of our resources has never been more urgent. Water is one among many such resources. There are many cases of careless water wastage in households, commercial complexes and many other places. Moreover, though people are aware of such incidents they are not mindful to the amount of waste these practises lead to.

Objective

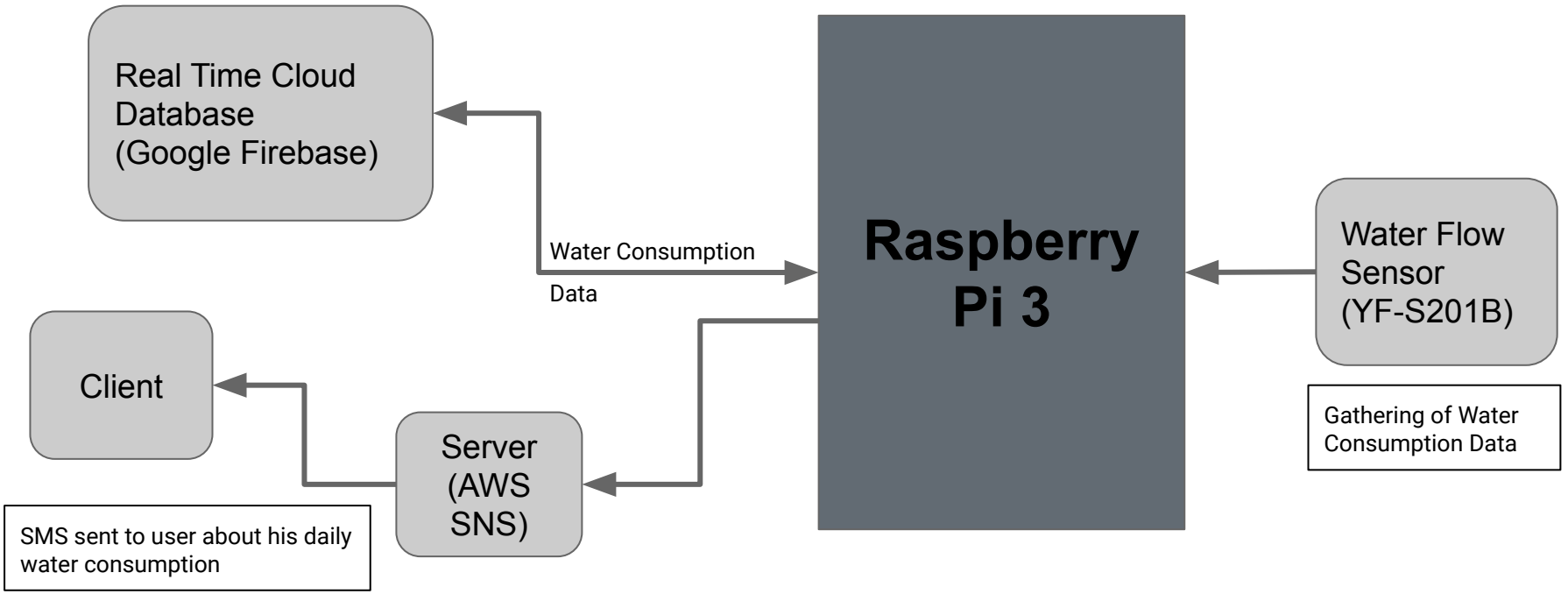
- Install an Intelligent Water Flow Analyzer which can monitor the daily water usage by a household
- Create a database of water consumption in households from various areas of a city and decide on a usage limit per household (average consumption)
- Send an email or SMS notification to the household owner when his domestic consumption exceeds the pre decided value
- Maybe a reward-penalty system can be established for all the compliant households based on their water consumption
- Create a system where households can push requests for particular days when they know they’ll be requiring more water

Components Required

- Water Flow Sensor
- Raspberry Pi
- Jumper Wires
- Water

Overview

We feel that if people are just notified of the amount of water they are consuming on a daily bases and how they compare to the recommended usage they will be more conscious of their water consumption.
The recommended usage will be calculated by studying numerous households spread across various areas in a city over a period of time and taking an average of the data. The Intelligent Water Flow Analyzer will then check if any particular household goes over the usage limit by a pre decided value or not, then an email or SMS notification will be sent to the household owner if they do go over. The usage limit will be flexible which can be changed according to some special occasions or holidays like diwali, holi, marriage etc.



Flow Diagram

Problems Faced

1. MongoDB couldn’t be used as a Database. Why?
    a. First, the pymongo driver in python for connecting to MongoDB didn’t support a version for MongoDB less than 2.6
    b. Our code was in python and the raspbian OS in our Raspberry Pi 3 only supported MongoDB version 2.4
    c. Cloud services offered by MongoDB which is MongoDB atlas too couldn’t be accessed from the raspbian OS
2. The SMS service which we decided to use was twilio, but couldn’t be used as they didn’t provided SMS service in our region
3. Unavailability of a real life database for water consumption in households

Overcoming the Problems

1. Used Google Firebase to create a real time cloud database instead of MongoDB
2. After twilio we came across Amazon Simple Notification Service, which is a notification service provided as part of Amazon Web Services, which resolved our SMS issue
3. While checking the proper working of our device we used the same readings to create a database, which although does not relate to real life household water consumption but saved us from creating a fake database with arbitrary values

Goals Achieved

- Successfully implemented a working model of what we had in mind
- Created an online real time database albeit not real life, which gets updated automatically after the program runs
- Successful delivery of text messages to user, making him conscious about his daily water usage
- Variable usage limit implemented which changes according to the water usage