Comparison of sensor to computer response time in different water conditions:

Sensors has been tested with tap water and river water and we’ve compared between the time it takes for the sensor to report a ***RISE*** in water level. We’ve made sure that the sensors are exposed to exact water levels in both river and tap water. The difference in time is as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Tap Water(s) (water level rising)** | **River Water(s) (water level rising)** | **Sensor Level(ft)** | **Water**  **Level(ft)** |
| 7.570s | 5.620s | 1ft | 1.5ft |
| 3.750s | 2.530s | 2ft | 2.5ft |
| 4.860s | 2.120s | 3ft | 3.5ft |
| 6.110s | 3.610s | 2ft | 2.5ft |
| 4.950s | 5.610s | 1ft | 1.5ft |
| 6.910s | 3.350s | 2ft | 2.5ft |
| 3.380s | 3.690s | 3ft | 3.5ft |
| 4.410s | 6.380s | 2ft | 2.5ft |
| 3.870s | 3.570s | 1ft | 1.5ft |
| 5.090s(AVG) | 4.053s(AVG) |

Graphical representation(response time vs experiment number):

Then the sensors has been tested with tap water and river water and we’ve compared between the time it takes for the sensor to report a ***FALL*** in water level. We’ve made sure that the sensors are exposed to exact water levels in both river and tap water. The difference in time is as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Tap Water(s) (water level dropping)** | **River water(s) (water level dropping)** | **Sensor Level(ft)** | **Water**  **Level(ft)** |
| 5.140 | 6.040 | 1ft | 1.5ft |
| 4.200 | 7.390 | 2ft | 2.5ft |
| 4.950 | 2.890 | 3ft | 3.5ft |
| 7.410 | 8.290 | 2ft | 2.5ft |
| 7.790 | 7.230 | 1ft | 1.5ft |
| 4.590 | 5.860 | 2ft | 2.5ft |
| 3.490 | 13.380 | 3ft | 3.5ft |
| 3.040 | 5.390 | 2ft | 2.5ft |
| 6.150 | 7.280 | 1ft | 1.5ft |
| 5.196(AVG) | 7.083(AVG) |

Graphical representation(response time vs experiment number):

Inference: Due to dirt and other impurities in river water, the sensor was able to detect, when it was submerged, faster than it did with clear water. However, for the same reason, when river water level receded, dirt sticks to the sensors. Hence the response time for the sensors in river water level drop is comparatively higher.

Stress Point:

Testing stress point using low levels of water for more accuracy of the error\*

Current water level: 3.1 inches

Expected: we will get reading when water touches sensor

Actual: we get reading when water covers sensor up to 0.4 inches, i.e. if the sensor is placed at 3.1 inches, we won’t get reading till water level increases till 3.1+0.4=3.5 inches

Error= 11.43% (error will reduce as water level increases)

DATA LOGS:

(Format: sensor\_id sensor\_data current\_runtime average\_runtime time date)

For SENSOR\_DATA

L -> LOW -> 001

M -> MEDIUM -> 011

H -> HIGH -> 111

N -> NO READING -> 000

X -> INVALID DATA

**1084868581 N 0.312ms 0.331ms(avg) 15:08:19 27/03/2014**

**1084868581 N 0.252ms 0.331ms(avg) 15:08:20 27/03/2014**

**1084868581 N 0.269ms 0.331ms(avg) 15:08:21 27/03/2014**

**1084868581 N 0.271ms 0.331ms(avg) 15:08:22 27/03/2014**

**1084868581 N 0.269ms 0.331ms(avg) 15:08:23 27/03/2014**

**1084868581 N 0.278ms 0.331ms(avg) 15:08:24 27/03/2014**

**1084868581 N 0.283ms 0.331ms(avg) 15:08:25 27/03/2014**

**1084868581 N 0.276ms 0.331ms(avg) 15:08:26 27/03/2014**

**1084868581 N 0.298ms 0.331ms(avg) 15:08:27 27/03/2014**

**1084868581 N 0.278ms 0.331ms(avg) 15:08:28 27/03/2014**

**1084868581 N 0.314ms 0.331ms(avg) 15:08:29 27/03/2014**

**1084868581 N 0.256ms 0.331ms(avg) 15:08:30 27/03/2014**

**1084868581 N 0.276ms 0.331ms(avg) 15:08:31 27/03/2014**

**1084868581 L 0.319ms 0.331ms(avg) 15:08:32 27/03/2014**

**1084868581 L 0.27ms 0.331ms(avg) 15:08:33 27/03/2014**

**1084868581 L 0.297ms 0.331ms(avg) 15:08:34 27/03/2014**

**1084868581 L 0.331ms 0.331ms(avg) 15:08:35 27/03/2014**

**1084868581 L 0.282ms 0.331ms(avg) 15:08:36 27/03/2014**

**1084868581 L 0.302ms 0.331ms(avg) 15:08:37 27/03/2014**

**1084868581 L 0.318ms 0.331ms(avg) 15:08:38 27/03/2014**

**1084868581 L 0.338ms 0.331ms(avg) 15:08:39 27/03/2014**

**1084868581 L 0.279ms 0.331ms(avg) 15:08:40 27/03/2014**

**1084868581 L 0.271ms 0.331ms(avg) 15:08:41 27/03/2014**

**1084868581 L 0.277ms 0.331ms(avg) 15:08:42 27/03/2014**

**1084868581 L 0.309ms 0.331ms(avg) 15:08:43 27/03/2014**

**1084868581 L 0.354ms 0.331ms(avg) 15:08:44 27/03/2014**

**1084868581 L 0.271ms 0.331ms(avg) 15:08:45 27/03/2014**

**1084868581 L 0.27ms 0.331ms(avg) 15:08:46 27/03/2014**

**1084868581 L 0.27ms 0.331ms(avg) 15:08:47 27/03/2014**

**1084868581 L 0.301ms 0.331ms(avg) 15:08:48 27/03/2014**

**1084868581 L 0.287ms 0.331ms(avg) 15:08:49 27/03/2014**

**1084868581 L 0.291ms 0.331ms(avg) 15:08:50 27/03/2014**

**1084868581 M 0.269ms 0.331ms(avg) 15:08:51 27/03/2014**

**1084868581 M 0.279ms 0.331ms(avg) 15:08:52 27/03/2014**

**1084868581 M 0.254ms 0.331ms(avg) 15:08:53 27/03/2014**

**1084868581 M 0.268ms 0.331ms(avg) 15:08:54 27/03/2014**

**1084868581 M 0.258ms 0.331ms(avg) 15:08:55 27/03/2014**

**1084868581 M 0.276ms 0.331ms(avg) 15:08:56 27/03/2014**

**1084868581 M 0.343ms 0.331ms(avg) 15:08:57 27/03/2014**

**1084868581 M 0.355ms 0.331ms(avg) 15:08:58 27/03/2014**

**1084868581 M 0.277ms 0.331ms(avg) 15:08:59 27/03/2014**

**1084868581 M 0.271ms 0.331ms(avg) 15:09:00 27/03/2014**

**1084868581 M 0.286ms 0.331ms(avg) 15:09:01 27/03/2014**

**1084868581 M 0.286ms 0.331ms(avg) 15:09:02 27/03/2014**

**1084868581 M 0.27ms 0.331ms(avg) 15:09:03 27/03/2014**

**1084868581 M 0.326ms 0.331ms(avg) 15:09:04 27/03/2014**

**1084868581 M 0.274ms 0.331ms(avg) 15:09:06 27/03/2014**

**1084868581 M 0.335ms 0.331ms(avg) 15:09:07 27/03/2014**

**1084868581 M 0.335ms 0.331ms(avg) 15:09:08 27/03/2014**

**1084868581 M 0.379ms 0.331ms(avg) 15:09:09 27/03/2014**

**1084868581 H 0.335ms 0.331ms(avg) 15:09:10 27/03/2014**

**1084868581 H 0.276ms 0.331ms(avg) 15:09:11 27/03/2014**

**1084868581 H 0.277ms 0.331ms(avg) 15:09:12 27/03/2014**

**1084868581 H 0.297ms 0.331ms(avg) 15:09:13 27/03/2014**

**1084868581 H 0.275ms 0.331ms(avg) 15:09:14 27/03/2014**

**1084868581 H 0.27ms 0.331ms(avg) 15:09:15 27/03/2014**

**1084868581 H 0.258ms 0.331ms(avg) 15:09:16 27/03/2014**

**1084868581 H 0.258ms 0.331ms(avg) 15:09:17 27/03/2014**

**1084868581 H 0.289ms 0.331ms(avg) 15:09:18 27/03/2014**

**1084868581 H 1.383ms 0.692ms(avg) 15:09:27 27/03/2014**

**1084868581 H 0.333ms 0.572ms(avg) 15:09:28 27/03/2014**

**1084868581 H 0.337ms 0.513ms(avg) 15:09:29 27/03/2014**

**1084868581 H 0.499ms 0.51ms(avg) 15:09:30 27/03/2014**

**1084868581 H 0.363ms 0.486ms(avg) 15:09:31 27/03/2014**

**1084868581 H 0.325ms 0.463ms(avg) 15:09:32 27/03/2014**

**1084868581 H 0.345ms 0.448ms(avg) 15:09:33 27/03/2014**

**1084868581 H 0.338ms 0.436ms(avg) 15:09:34 27/03/2014**

**1084868581 H 0.349ms 0.427ms(avg) 15:09:35 27/03/2014**

**1084868581 H 0.331ms 0.418ms(avg) 15:09:36 27/03/2014**

**1084868581 M 0.373ms 0.414ms(avg) 15:09:37 27/03/2014**

**1084868581 M 0.439ms 0.416ms(avg) 15:09:38 27/03/2014**

**1084868581 M 0.345ms 0.411ms(avg) 15:09:39 27/03/2014**

**1084868581 M 0.323ms 0.405ms(avg) 15:09:40 27/03/2014**

**1084868581 M 0.325ms 0.4ms(avg) 15:09:41 27/03/2014**

**1084868581 M 0.325ms 0.396ms(avg) 15:09:42 27/03/2014**

**1084868581 M 0.337ms 0.393ms(avg) 15:09:43 27/03/2014**

**1084868581 M 0.33ms 0.39ms(avg) 15:09:44 27/03/2014**

**1084868581 M 0.427ms 0.392ms(avg) 15:09:45 27/03/2014**

**1084868581 M 0.341ms 0.39ms(avg) 15:09:47 27/03/2014**

**1084868581 M 0.297ms 0.386ms(avg) 15:09:48 27/03/2014**

**1084868581 M 0.281ms 0.381ms(avg) 15:09:49 27/03/2014**

**1084868581 M 0.288ms 0.377ms(avg) 15:09:50 27/03/2014**

**1084868581 M 0.311ms 0.374ms(avg) 15:09:51 27/03/2014**

**1084868581 M 0.329ms 0.372ms(avg) 15:09:52 27/03/2014**

**1084868581 M 0.443ms 0.375ms(avg) 15:09:53 27/03/2014**

**1084868581 L 0.273ms 0.371ms(avg) 15:09:54 27/03/2014**

**1084868581 L 0.275ms 0.368ms(avg) 15:09:55 27/03/2014**

**1084868581 L 0.325ms 0.367ms(avg) 15:09:56 27/03/2014**

**1084868581 L 0.263ms 0.364ms(avg) 15:09:57 27/03/2014**

**1084868581 L 0.278ms 0.361ms(avg) 15:09:58 27/03/2014**

**1084868581 L 0.261ms 0.358ms(avg) 15:09:59 27/03/2014**

**1084868581 L 0.28ms 0.356ms(avg) 15:10:00 27/03/2014**

**1084868581 L 0.274ms 0.354ms(avg) 15:10:01 27/03/2014**

**1084868581 L 0.279ms 0.352ms(avg) 15:10:02 27/03/2014**

**1084868581 L 0.319ms 0.351ms(avg) 15:10:03 27/03/2014**

**1084868581 L 0.26ms 0.349ms(avg) 15:10:04 27/03/2014**

**1084868581 L 0.278ms 0.347ms(avg) 15:10:05 27/03/2014**

**1084868581 L 0.31ms 0.346ms(avg) 15:10:06 27/03/2014**

**1084868581 L 0.278ms 0.344ms(avg) 15:10:07 27/03/2014**

**1084868581 L 0.275ms 0.342ms(avg) 15:10:08 27/03/2014**

**1084868581 L 0.29ms 0.341ms(avg) 15:10:09 27/03/2014**

**1084868581 N 0.278ms 0.34ms(avg) 15:10:10 27/03/2014**

**1084868581 N 0.281ms 0.339ms(avg) 15:10:11 27/03/2014**

**1084868581 N 0.314ms 0.338ms(avg) 15:10:12 27/03/2014**

**1084868581 N 0.283ms 0.337ms(avg) 15:10:13 27/03/2014**

**1084868581 N 0.3ms 0.336ms(avg) 15:10:14 27/03/2014**

**1084868581 N 0.262ms 0.334ms(avg) 15:10:15 27/03/2014**

**1084868581 N 0.315ms 0.334ms(avg) 15:10:16 27/03/2014**

**1084868581 N 0.277ms 0.333ms(avg) 15:10:17 27/03/2014**