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Course Code : SG_KSODV_H08 (group C) -

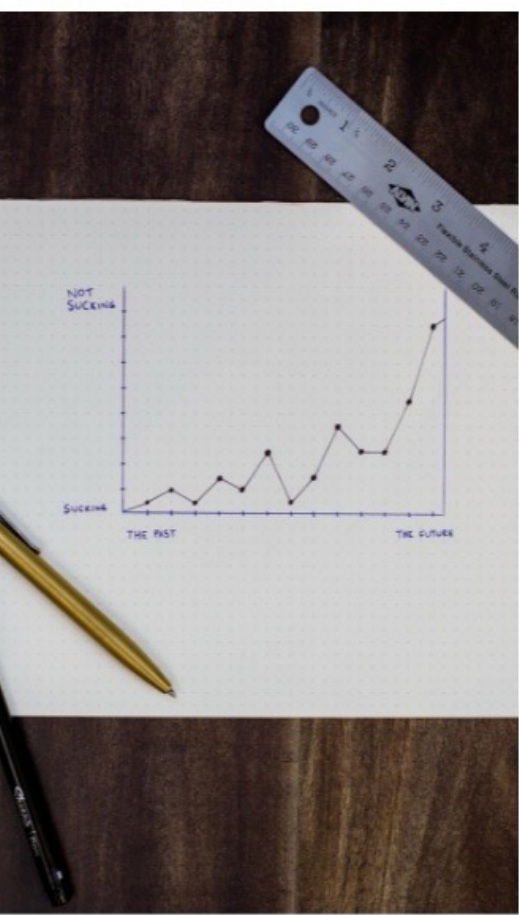
Atlantic Technological University, Sligo

Project Overview

Implementation

Smart Hydration Companion

AN INNOVATIVE DEVICE FOR MONITORING AND OPTIMIZING PERSONAL HYDRATION LEVELS THROUGH SMART SENSORS AND PERSONALIZED REMINDERS.



Accurate Hydration Tracking

Utilises weight sensors to precisely monitor water



Smart Reminders

Provides personalized hydration reminders based on individual needs and



Customisable Goals

Allows users to set daily hydration targets tailored to their preferences.



Real-time Data Display

Features an LCD screen to showcase hydration data



Sustainable Approach

Promotes environmentally friendly practices by encouraging reusable water



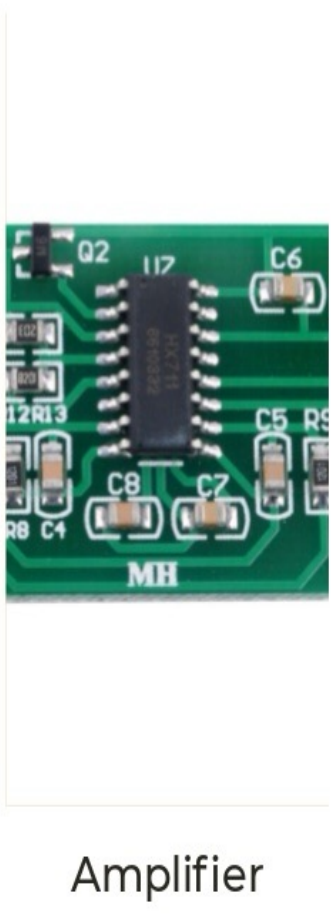
Arduino Board

An Arduino Uno board acts as the central controller for the device.



Weight Sensor

A high-precision load cell weight sensor measures water intake accurately.



Amplifier

An amplifier module enhances the weight sensor signal for accurate readings.



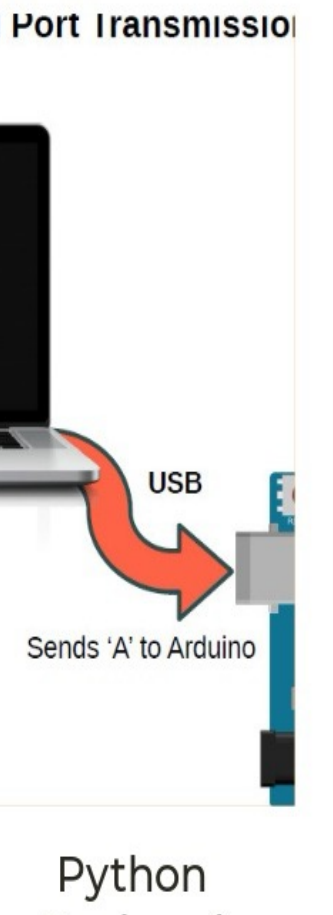
LCD Display

A RGB backlit LCD displays real-time hydration data and reminders.



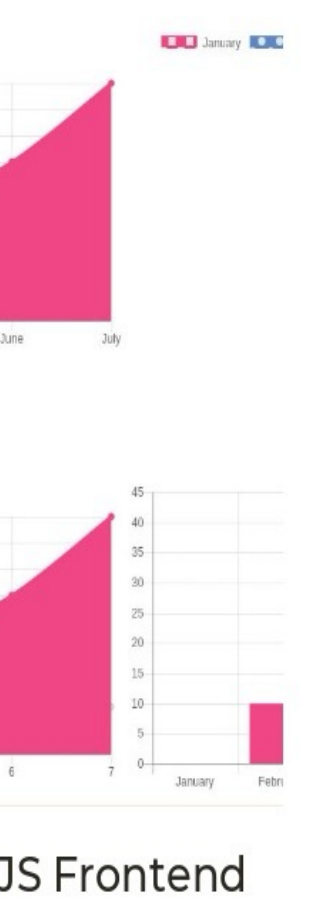
Speaker

A compact speaker provides audible alerts and hydration reminders.



Python Backend

A Python script running on a computer receives data from the Arduino.



JS Frontend

An interactive JavaScript website renders hydration charts and stats.

Surprising Dehydration Statistics in 2024

- 135 million deaths globally due to dehydration annually
Dehydration leads to many preventable deaths annually.
- 2 billion lack clean water access, heightening risks
Unsafe water sources in many areas raise risks of dehydration and health issues.
- Only 22% drink enough water daily despite knowing risks
Despite awareness, the majority fails to maintain proper hydration levels, putting their health at risk.
- Up to 65% may be chronically dehydrated
Chronic dehydration is a widespread issue, affecting a significant portion of the population.
- 5-10% of elderly mortality linked to dehydration
Dehydration threatens many elderly, causing numerous deaths.
- 37% confuse thirst for hunger, leading to overeating
Misinterpreting thirst signals as hunger can worsen eating and worsen dehydration.
- 50% of children with gastroenteritis are dehydrated
Gastroenteritis in kids often causes dehydration needing hydration care.
- Proper hydration could prevent 1 in 5 illnesses
Maintaining adequate hydration levels can play a crucial role in preventing a significant portion of illnesses.
- Over 500 dehydration-related deaths in the UK annually
Dehydration in the UK leads to preventable deaths.
- Diarrhea, linked to dehydration, is a leading child mortality cause
Diarrheal diseases, often exacerbated by dehydration, are a major cause of death among children under five globally.
- 2% body weight loss increases heat illness risk during activities
Even mild dehydration, causing just 2% body weight loss, can significantly increase the risk of heat-related illnesses during physical activities.
- Over 25% of marathon runners experience dehydration-related hyponatremia
Marathon runners and endurance athletes are prone to dehydration conditions, including hyponatremia.
- Nearly 70% of working people don't drink enough water
Dehydration at work is common. Many workers don't drink enough.
- Over 9,000 heat-related deaths in the U.S. since 1979, with dehydration a major factor
Dehydration has contributed to many heat-related deaths over decades.
- 1 in 10 international traveler sickness consultations due to dehydration
Travelers often face dehydration, a leading cause of illness.
- Dehydration contributes to 3% of elderly deaths in the U.S.
In the United States, dehydration plays a role in a significant portion of deaths among the elderly population.
- Over 4 million people die yearly from dehydration-related diseases
Dehydration illnesses lead to many preventable deaths worldwide each year.
- Up to 3 liters of water per hour lost during intense exercise
Intense physical activities trigger high water loss up to 3 liters per hour raising dehydration risks.

“Water is the driving force of all nature.”

- LEONARDO DA VINCI



Testing

Testing Phase	Purpose	Approach
Component Tests	Verify individual component functionality	Simulation tools like Wokwi to test weight sensor, LCD, speaker
System Integration Tests	Identify compatibility issues, software bugs, system accuracy	Integrated testing of all components working together
Real World User Trials	Evaluate user experience, accuracy, habit formation	Target users test the system in daily life, provide feedback

*Data from project requirements and testing plan

Security

Data Encryption

Ensure data integrity and privacy by implementing robust encryption standards for data storage and transmission related to hydration tracking.

Local Data Storage

Enhance user data privacy by storing hydration data locally, accessible only through the secure website, providing an additional layer of protection against unauthorized access.

Future Improvements

Miniaturized Integration

Develop a compact design that integrates directly into a smart water bottle for enhanced portability, seamless hydration tracking during consumption, and an encouraging user experience.

Environment-Aware Reminders

Add temperature sensors to smart water bottles. Adjust hydration reminders based on environment temperatures. Tailor advice to surroundings.

Comprehensive Health Management

Enhance the mobile application to offer an integrated view of health and hydration data from sensors and trackers, personalized hydration recommendations based on activity, diet, and environment, along with a user-friendly interface with customizable goals, progress tracking, and motivational rewards for overall wellness.

Solution Aim

The Smart Hydration Companion offers an intuitive and interactive system to empower users to establish sustainable hydration habits. The solution aims to make maintaining proper hydration levels a natural part of daily routines through seamless integration of automated tracking, personalized reminders, and real-time insights.

