fokus pada model untuk improve, udh ke highlight mau nngapain.

introduction => menjawab permasalahan yang ada

Literature review
misalnya pake deep learning dijelasin, SOTAnya. keseluruhan paper bukan satu2

paragraf 1 km bahas apa dari literature review
paragraf terakhir berupa SOTA
formulasikan research questionnya apa, apa yg jadi masalah biasanya 3 pertanyaan untuk disolve, 2 atau 3, 4/5 kebanyakan.

methodologi di chapter 3 paper kalian, pake chart (flow chart), ada data collection method, d imana km melakukan analisis, framework, dll

masukin perhitungan, algoritma yg mau ktia pake
Hipotesa, pengujiannya gimana, metrik pengukuran keberhasilan keakuratan
arsitektur,kodenya, IoT yg mirip sm yg kita buat.

pake canva untuk gambarin research kalian utk presentasi

Dalam bentuk video 10-15 menit**,** jelaskan sejelas mungkin, yg ini pake indonesia dulu
Deadline tgl 17 pengumpulan video di YT dan info mekanisme ujian seperti apa
bikin video lagi yg udh jadi keseluruhan pake inggris.

Recording zoom, ada muka kalian, dan sharescreen ppt kalian
dalam video (10-15 menit) :

1. Drama singkat (semua permasalahan)
2. Literature review, SOTA
3. Solusi, apa yg ingin kita buat
4. Metodologi
5. Prototype Dispenser otomatisnya
6. Cara kerjanya

Methodology

Penelitian ini menerapkan metode eksperimen langsung dengan pendekatan otomatisasi berbasis mikrokontroler ATmega328 (Arduino Uno DIP R3) yang mampu beroperasi secara nirkabel tanpa keterbatasan jarak fisik pengguna. Mikrokontroler ini berfungsi sebagai unit pusat yang memproses data dari sensor dan mengendalikan Solenoid Valve, yang berperan dalam membuka dan menutup aliran air. Sistem dirancang dengan mengintegrasikan sensor ultrasonik HC-SR04 untuk mendeteksi tinggi gelas atau botol yang digunakan, serta sensor aliran YF-S201 (flow sensor) untuk mengukur secara real-time volume air yang mengalir. Selain itu, Penelitian ini juga menggunakan Software Arduino IDE untuk merancang program yang dapat melakukan perhitungan dari data yang diberikan oleh kedua sensor, Sehingga ketika gelas sudah terisi penuh, Solenoid Valve akan tertutup secara otomatis dan memberikan notifikasi berupa alarm yang menandakan pengisian air minum sudah selesai. Pendekatan ini tidak hanya meningkatkan efisiensi pengisian air, tetapi juga meningkatkan akurasi dan kenyamanan dalam penggunaan sehari-hari.

Untuk menilai kinerja sistem, dilakukan beberapa pengujian dengan menggunakan berbagai ukuran gelas dan botol. Metrik pengukuran yang digunakan meliputi, akurasi estimasi volume berdasarkan ukuran gelas, akurasi volume dari flow sensor, waktu pengisian air dari awal hingga terisi penuh, kecepatan respon sensor ultrasonik saat mendeteksi keberadaan gelas, ketepatan waktu sistem dalam menutup solenoid valve setelah volume tercapai, dan konsistensi hasil pengisian pada beberapa kali pengujian berulang. Metrik ini digunakan untuk mengevaluasi performa, akurasi, dan efisiensi dispenser secara menyeluruh.

This research applies a direct experimental method with an automation approach based on the ATmega328 microcontroller (Arduino Uno DIP R3) that can operate wirelessly without physical distance limitations for the user. This microcontroller acts as a central unit that processes data from sensors and controls the Solenoid Valve, which plays a role in opening and closing the water flow.

Architecture that is used in this project includes:

- Arduino Uno R3 as the main microcontroller responsible for processing sensor inputs and controlling output components,
- HC-SR04 ultrasonic sensor for detecting the presence and measuring the height of the bottle to estimate its volume,
- YF-S201 flow sensor for calculating the amount of water dispensed in real-time, a 12V solenoid valve for regulating the flow of water based on system commands,
- IRF540N MOSFET as an electronic switch to control the solenoid valve efficiently, resistors (1kΩ and 10kΩ) for ensuring circuit stability and proper signal conditioning,
- Breadboard along with jumper wires for assembling and connecting all the components into a functional prototype circuit

The system is designed by integrating the HC-SR04 ultrasonic sensor to detect the height of the glass or bottle being used, as well as the YF-S201 flow sensor to measure in

real-time the volume of water flowing. Additionally, this research also uses the Arduino IDE Software to design a program that can perform calculations from the data provided by both sensors, so that when the glass is full, the Solenoid Valve will automatically close and provide a notification in the form of an alarm indicating that the drinking water filling is complete.This approach not only improves the efficiency of water filling, but also enhances accuracy and comfort in everyday use.

To assess the system's performance, several tests were conducted using various sizes of glasses and bottles. The measurement metrics used include the accuracy of volume estimation based on the size of the glass, the accuracy of the flow sensor volume, the response speed of the ultrasonic sensor when detecting the presence of the glass, the timing accuracy of the system in closing the solenoid valve after the volume is reached, and the consistency of the filling results over several repeated tests. These metrics are used to evaluate the performance, accuracy, and efficiency of the dispenser as a whole.

The system implements a flow sensor pulse-counting algorithm to measure water volume in real time. Each pulse generated by the YF-S201 sensor represents a fixed amount of water flow. The total volume is calculated using the formula:

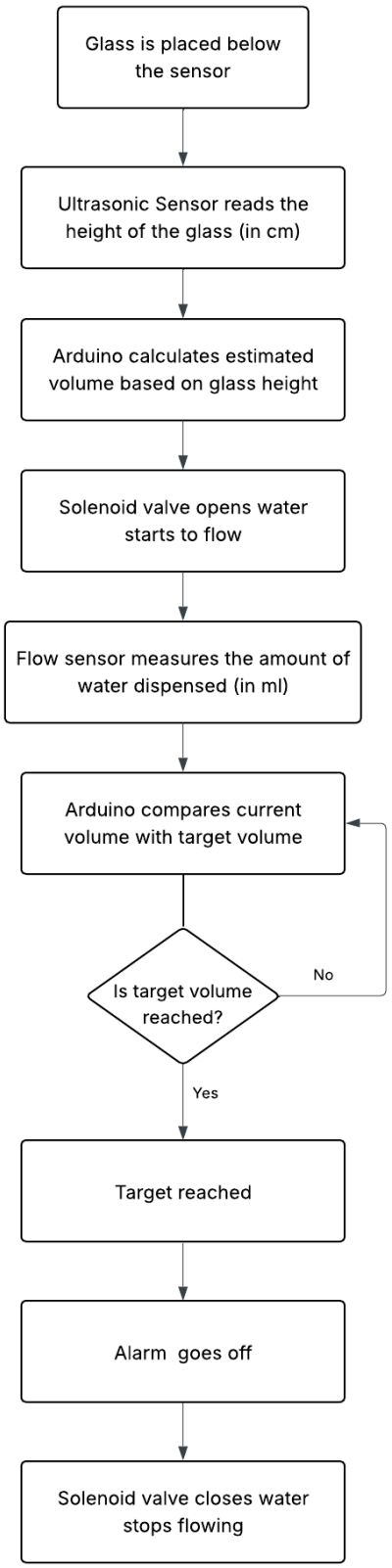
Volume (L) = Pulse Count / Calibration Factor

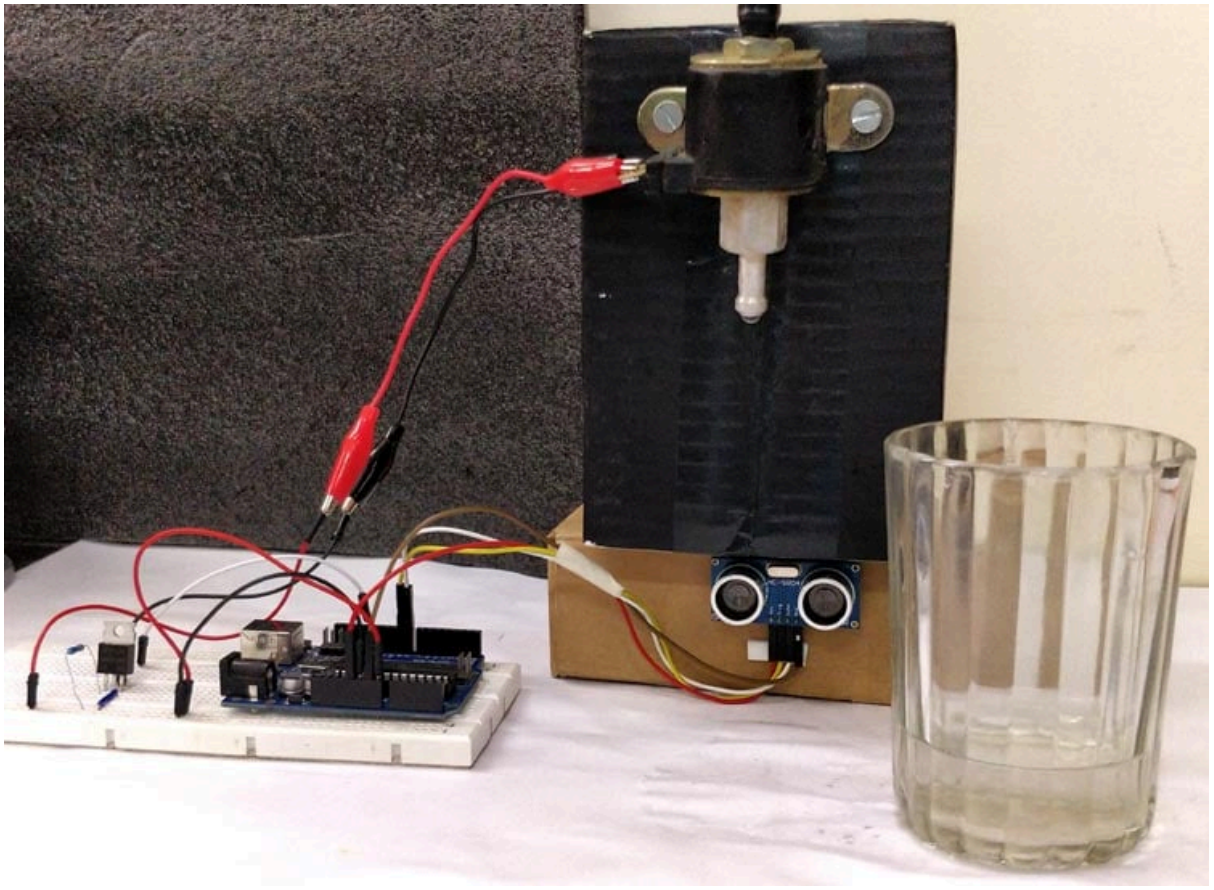
Where the calibration factor is determined through experimental calibration (e.g. 450 pulses per liter). Once the measured volume reaches the predefined target, a threshold based control algorithm is triggered, which automatically closes the solenoid valve to stop the water flow. This integration ensures accurate volume dispensing and prevents overfilling.

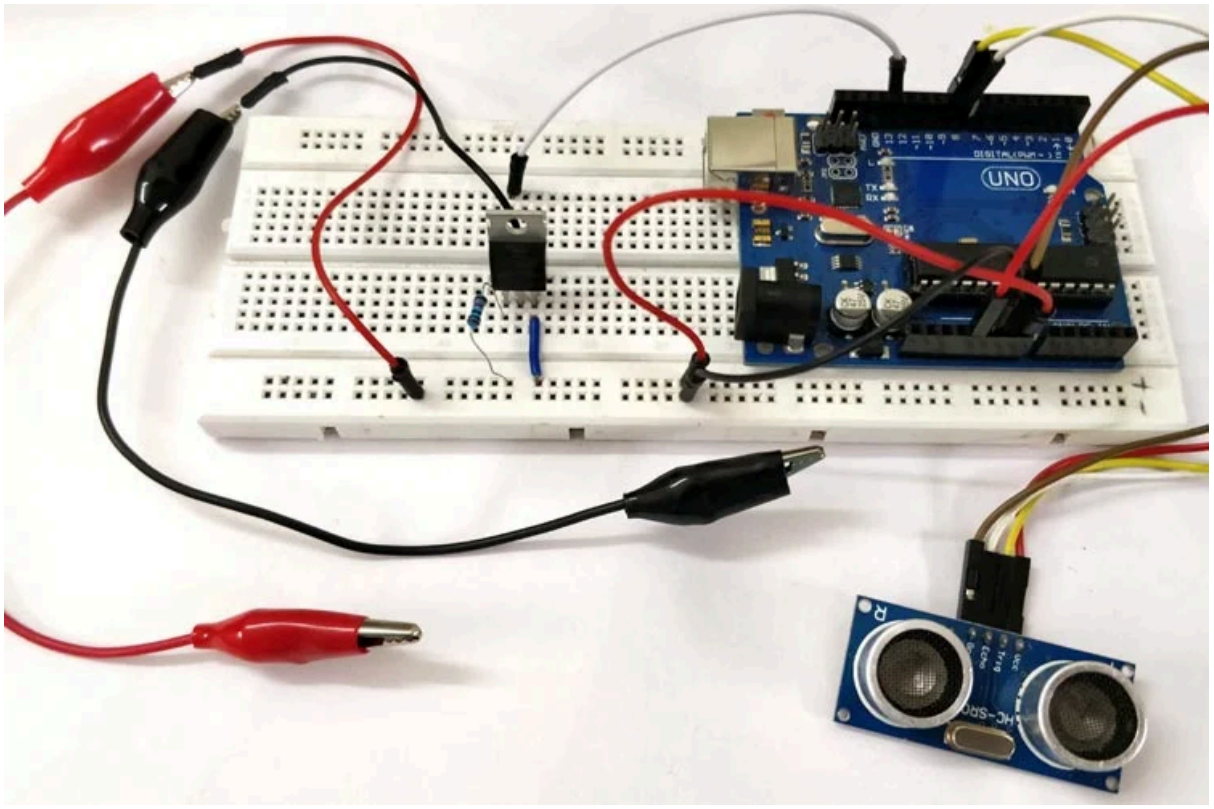
The system, also used an algorithmic approach is used that combines geometric calculations and sensor readings, with formula :

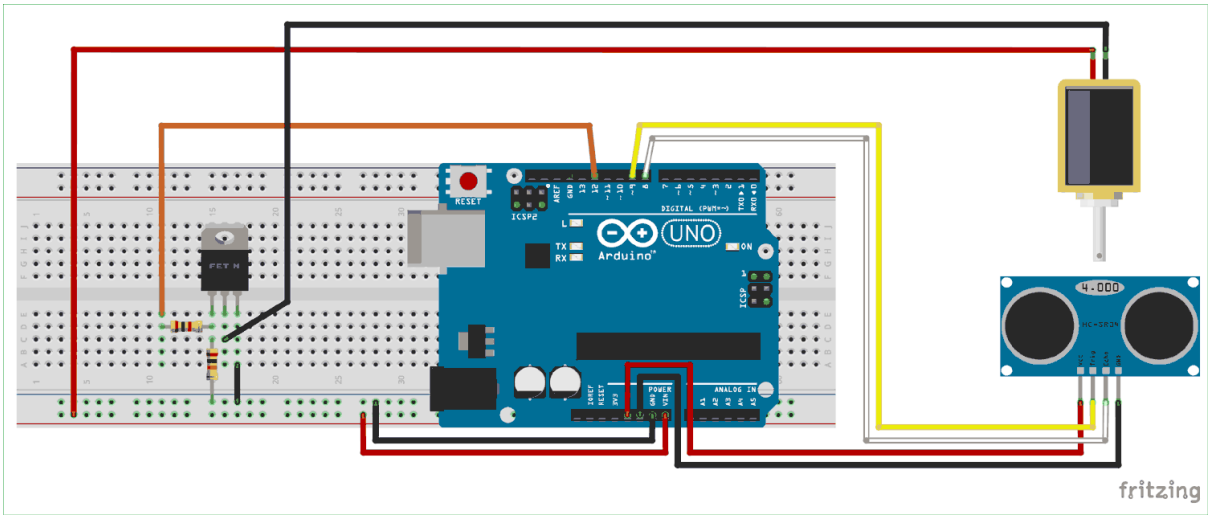
Water height(h) = distance between the sensor - water surface from total height of the bottle.

Furthermore, the volume of water is estimated using the formula for the volume of a cylinder, which is $V=\pi\times(D/2)^2\times h$, where D is the diameter of the bottle and h is the measured height of the water. This approach allows the system to automatically and accurately estimate the volume of water based on sensory data.


Glass is placed below the sensor
Ultrasonic Sensor reads the height of the glass (in cm)
Arduino calculates estimated volume based on glass height
Solenoid valve opens water starts to flow
Flow sensor measures the amount of water dispensed (in ml)
Arduino compares current volume with target volume
Is target volume reached?
No
Yes
Target reached
Alarm goes off
Solenoid valve closes water stops flowing




UNO


RESET
ICSP2
DIGITAL (PWM~)
UNO
Arduino
TX
RX
ON
ICSP
POWER
ANALOG IN
FET N
4.000
fritzing