OPTIMIZING COAL LOADING FOR EFFICIENT RAIL TRANSPORT: ADDRESSING OVERLOADING AND UNDERLOADING CHALLENGES.

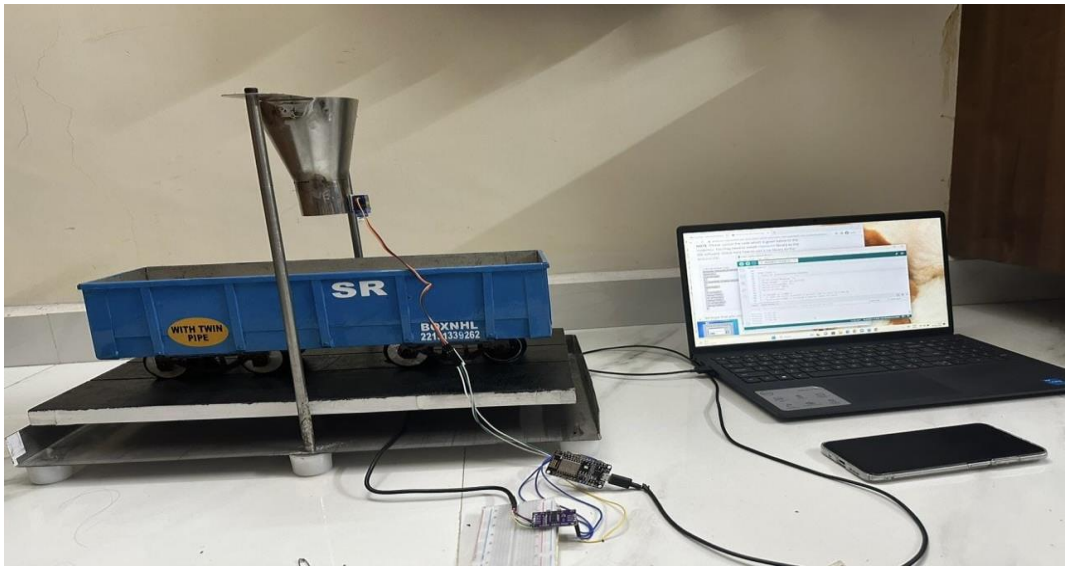
Problem Statement

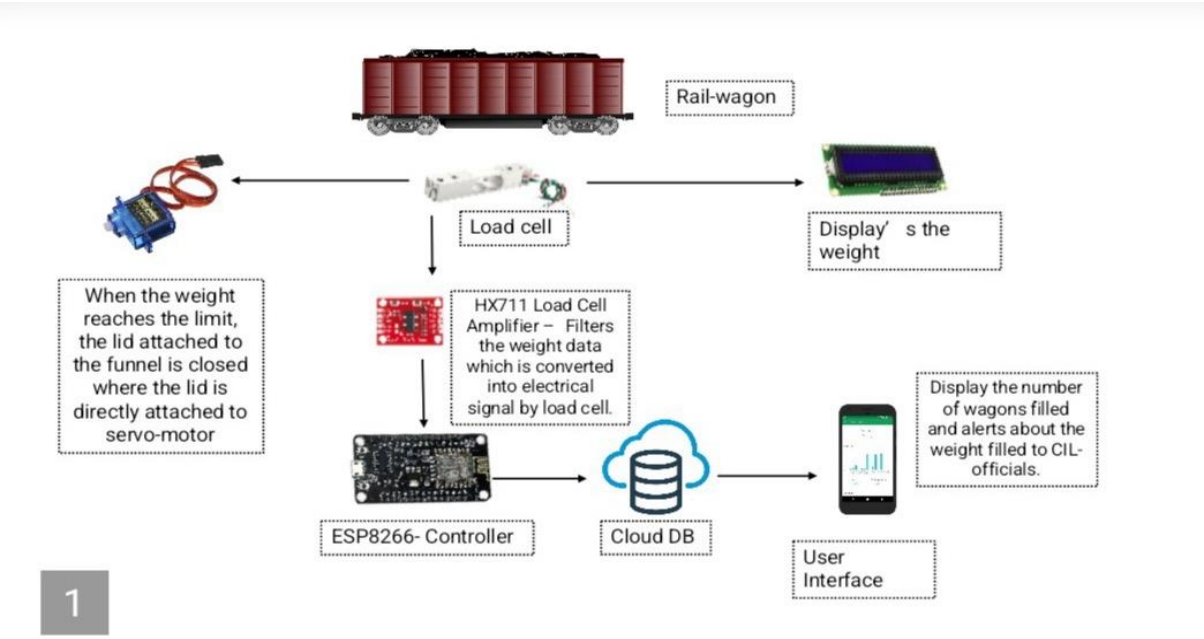
A System of IOT devices to prevent Underloading /Overloading of railway wagons

CIL has experienced significant financial losses due to difficulties in wagon loading, including fines for overloading and additional expenses from under loading, which exceeded the actual contract value of Rs. 593 Crores in 2021-2022.

Problem Solution

- Installing load cell, under the surface of the track to continuously measure the weight of the wagon
- Equipping wagon with IoT communication modules to transmit weight data in real-time to a centralized control system, ensuring immediate monitoring and signal is passed to servo motor once the maximum weight is reached
- Integrating an alerting mechanism within the central control system to detect under-loading or overloading. When such conditions are identified, immediate alerts are generated and transmitted to Coal India Limited.





Source Code

```
#include <HX711.h>
#include <Servo.h>
#define DOUT  D5
#define CLK   D6
HX711 scale(DOUT, CLK);
Servo myservo;
float calibration_factor = -219050;
void setup() {
  Serial.begin(9600);
  scale.set_scale();
  long zero_factor = scale.read_average();
  myservo.attach(0);
}
void loop() {
  scale.set_scale(calibration_factor);
```

```
  Serial.print("Reading: ");
  float weight = scale.get_units();
  Serial.print(weight, 3);
  Serial.print(" kg");
  Serial.println();
  if (weight >= 4.000) {
    myservo.write(180);
    delay(2000);
  } else {
    myservo.write(0);
  }
}
```