Project description - Group 8

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For the final project, we want to develop a smart bike light that will improve safety for cyclists and for everyone on the road. In addition to having a normal on/off switch, this bike light will automatically turn on once the bicycle starts moving when it's dark and also turn off if it senses that the bike hasn't moved in 30 seconds. It will also incorporate an alert system to notify the user when the battery is running low.

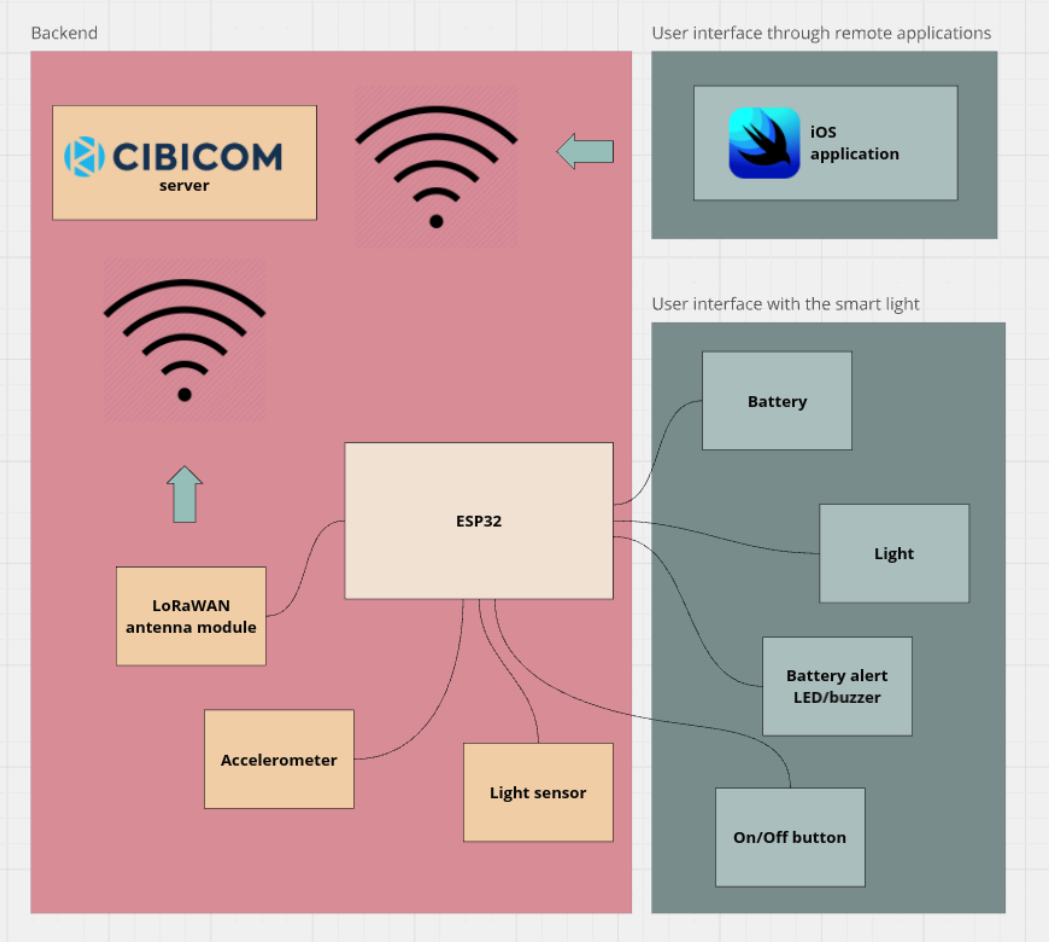
Furthermore, the user will be able to obtain real-time data remotely, such as the bike's location and the light's battery status. The user will also be able to switch between three different modes: active mode, park mode, and storage mode. This will be possible with the use of LoRaWAN and techniques to reduce battery usage.

Lastly, we will also develop and 3D-print a case for the bike light and test it under real-world conditions. If we have time, we would like to integrate other functionalities into our light, such as automatically increasing the light when the bike decelerates or designing a PCB.

Brief description of components needed

Component	Function description
ESP32	Main controller for the system
Light/LEDs	LEDs for the bike light
Accelerometer	To detect if the bike is moving or stopped
Light sensor / LDR	To automatically turn on the light if it's dark
LoraWAN antenna	To communicate through LoraWAN
Buzzer/LED	For warning when the battery is low
Battery	To power the system

Solution diagram



Team responsibilities

Name	Responsibility
Corinne Fogarty Draper (s241750)	ESP32 programming, Light sensor
Mariana Sousa Pinho Santos (s233360)	LoRaWAN, GeoLocation
Nipun Fernando (s215518)	ESP32 programming, Soldering, Accelerometer
Paul Martin Künnapuu (s243363)	CAD design, 3D printing
Sia Jæger Linde (s221601)	Buzzer/LED, Project planning
Vandad Kolahi Azar (s205073)	Electronics, App, Charging/battery