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history

جامعة دمنهور
Damanhour University

كلية الحاسبات والمعلومات
Computers and Information

WELCOME

Smart Safety Helmet Presentation

DESIGNED BY FOURTH YEAR GRADUATION TEAM

Project Supervisor : DR / Walaa Mohamed

Assistant Supervisor : DR / Shimaa Sami

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WORKING TEAM

Mohamed Ahmed Abd Elghany

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Amr Sabri Abd Elmoneim Amr

Rahma Mohamed Ebrahim Salem

Habiba Essam Mohamed Abd Eldayem

Alaa Mohamed Abdelsatar Elattar

Fatma Hosafi Ibrahim Ageba

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Occupational Safety and Health Administration

It's a U.S. federal agency under the Department of Labor that was created in 1970 . Its main mission is to ensure safe and healthy working conditions for all American workers by setting and enforcing standards, providing training, outreach, education, and assistance.

2014
1

60,000 Accident round World

That is a rate of 3.3 accident per 100,000 full-time employed workers

2017
2

Budget

The Budget Of Occupational Safety and Health Administration in USA Reached More Than $550,000,000

2018
3

Falls

338 out of 1,008 total deaths in construction (33.5%)

2021
4

Injuries

2.6 million reported non-fatal workplace injuries in the private sector in 2021

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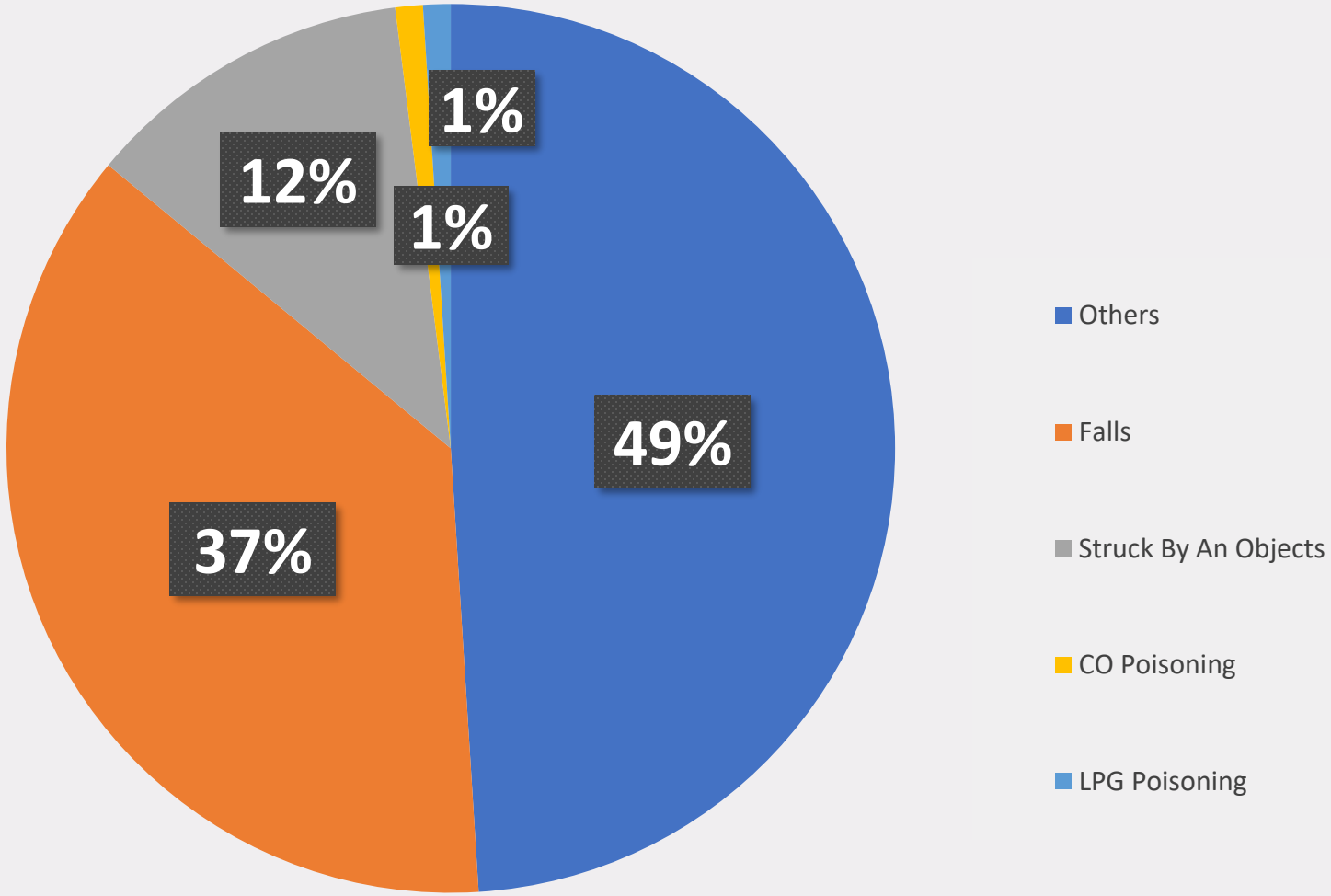
Statistics Of Common Work Sites Hazards

OSHA (2020)



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WHY WE CHOOSE THIS IDEA ?

1) To reduce the risk of injury while working on construction sites.

2) To save effort and time.

3) Increase control over workers and increase performance further.

4) Protect workers and avoid the risk of injury while performing their jobs

5) The possibility of following construction work through the phone application or website.

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OCT 2023

Getting ready

We started to develop our skills to reach the required point that we need to implement the project

DEC 2023

Documentations

We started building our project documentations such as presentation & ERD model & use case model

JAN 2024

Implementation

We started implementing the project as we planned

FEB 2024

Implementation

We finished implementing website and mobile app as we planned

WebSite

We designed a responsive website with smooth and simple interface to ease using for supervisors or monitor.

Mobile App

We designed a mobile application for supervisors and managers in case their labtops are not available to use they can use this app.

Sensors

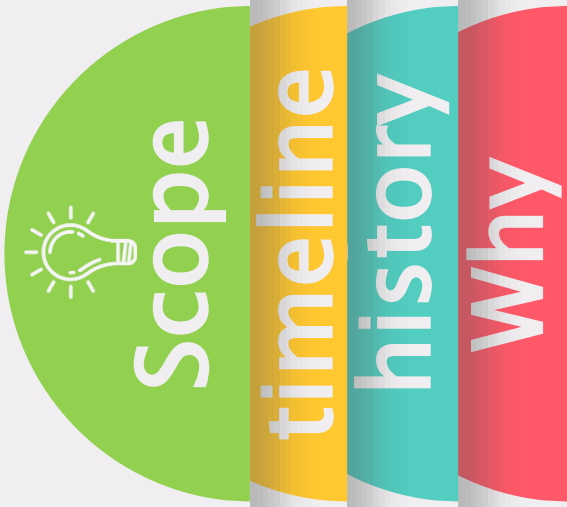
Starting programming sensors to make every sensor do its job and collecting data from these sensors .

Connection

Making connections between the sensors & microcontroller to collect data and send this data to the server

Testing

Here we needed to test the project and increasing the performance of sensors to get highest accuracy rate.



Introduction:

The project falls within the realm of wearable technology and IOT devices in the construction industry. It combines elements of sensor technology, real-time data analysis, and communication systems to enhance worker safety and efficiency on construction sites.

Project Timeline:

The project will be executed in several phases, with an estimated timeline as follows:
Phase 1: Requirement analysis and concept design (2 months)
Phase 2: Hardware and software development (4 months)
Phase 3: Integration and testing (1 months)
Phase 4: Documentation, training, and finalization (1 month)

Features and Functionality:

The smart safety helmet will include the following features and functionality:
- Impact detection: Sensors to detect impacts and collisions, triggering immediate alerts.
- Hazard monitoring: Sensors to monitor environmental factors such as temperature, humidity, and air quality.
- Fall detection: Accelerometers and gyroscopes to detect falls and initiate emergency protocols.

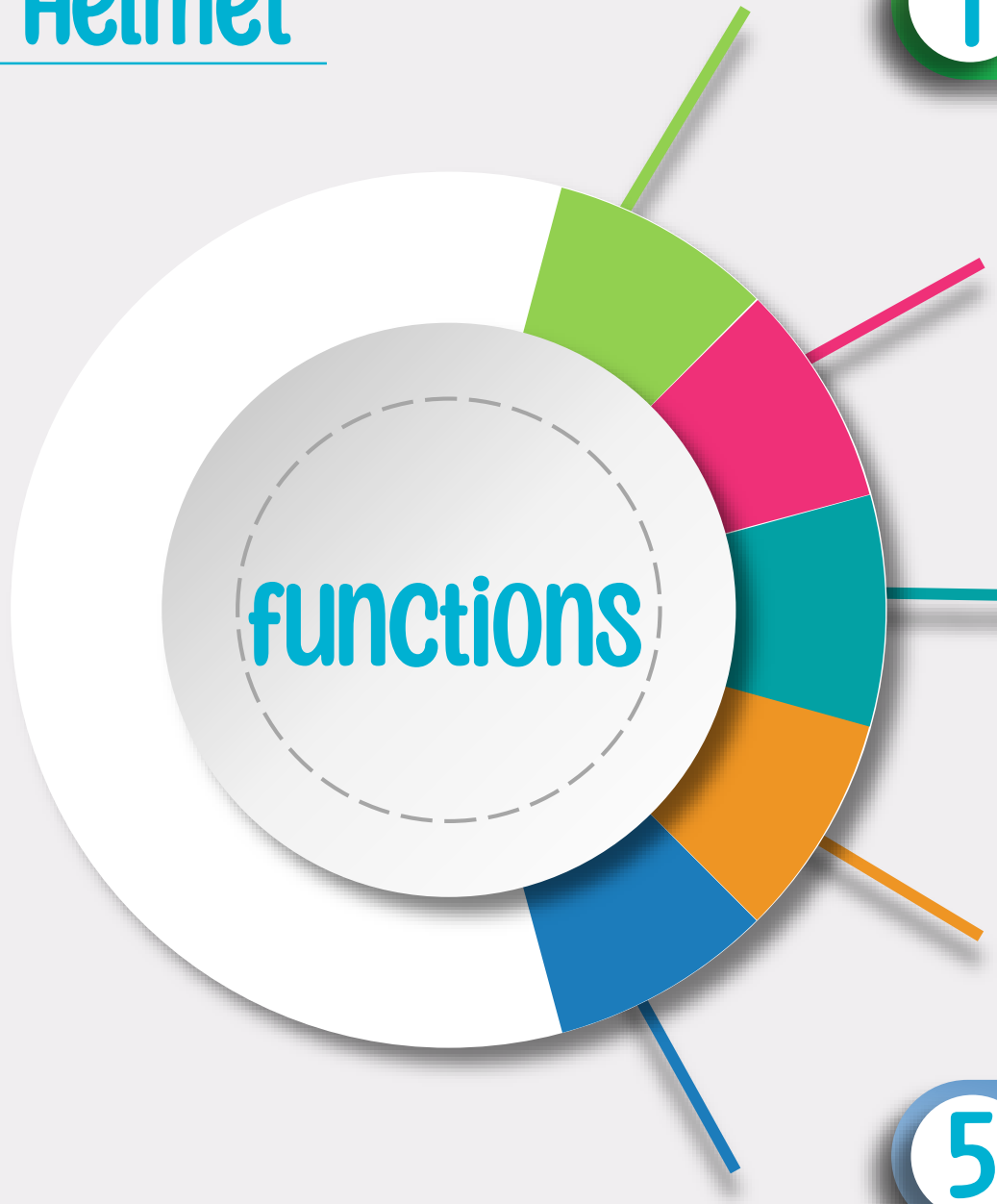
Features and Functionality:

- GPS tracking: Integration of GPS technology to locate and track helmet wearers in real-time.
- Alert and notification system: Visual, auditory, and haptic alerts to warn the wearer and relevant personnel of potential dangers.
- Data logging and analysis: Capture and store data for future analysis and reporting.
- User interface: An intuitive interface for configuring settings, accessing data, and managing the helmet's functionalities.

Deliverables:

The project will deliver the following outcomes:
- Fully functional smart safety helmet prototype with all the specified features.
- User documentation and guidelines for operating and maintaining the helmet.
- Software applications for data analysis, configuration, and management.
- Testing and validation reports to ensure its reliability and compliance with safety standards.
- Training materials for end-users to understand the features and benefits of the smart safety helmet.

Smart Helmet

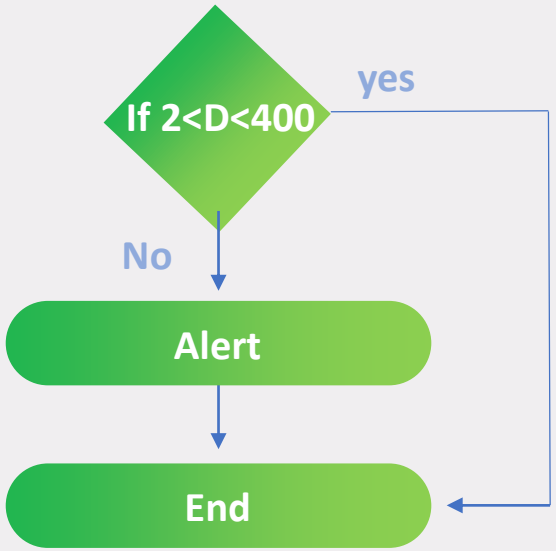


1. Object Detection
2. Gas Monitoring
3. Temperature & Humidity Monitoring
4. GPS Tracking
5. Fall Detection

OBject Detection

How Does It Work:

-Transmitter Sends an original signal in the range from 2 – 400 cm. if there is an object in that range , the signal will be reflected and the sensor receives it through the Receiver .
- In that moment , This range will be the distance between the object and the sensor.(the helmet)



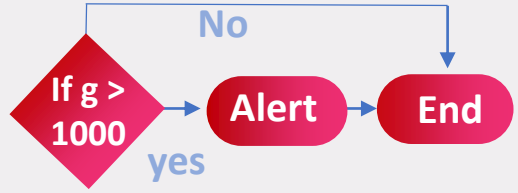
Gas Monitoring

Liquefied Petroleum Gas (LPG)

* As per to OSHA the normal average of LPG is 1000 ppm .

More than 180,000 GAS LEAKS.

About 3020 Fires & Explosions.

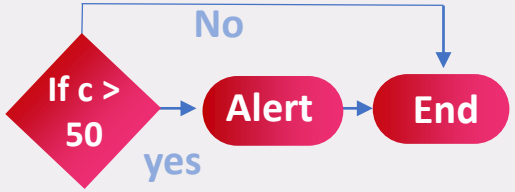


Carbon Monoxide (CO)

* As per to OSHA the normal average of CO is 50 ppm .

About 50,000 GAS LEAKS.

430 Fatalities.



Temperature & Humidity Monitoring

* As per to OSHA , Humidity in workplace can be controlled between 20% and 60% .

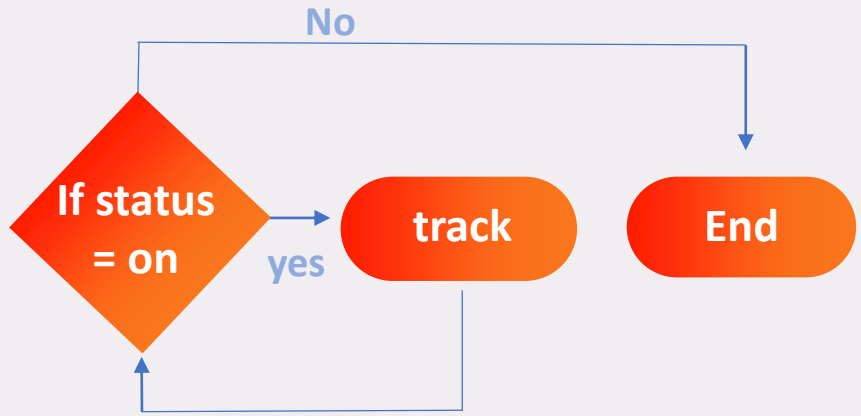
How Does It Work:

If the humidity is out of the mentioned range , helmet will send an alert to the system so supervisor will make arrangements to avoid any injuries .

GPS Tracking

How Does It Work:

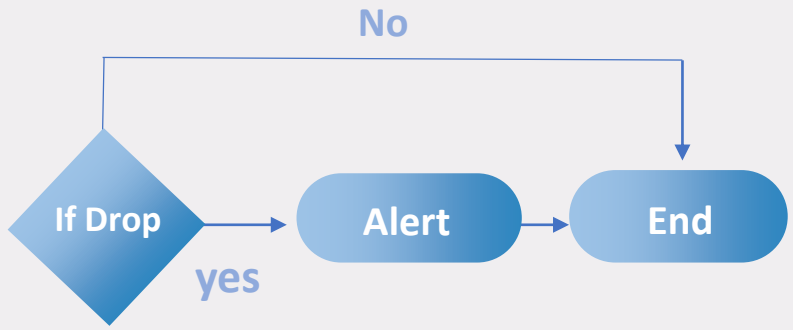
helmet has tracking sensor so supervisor can see workers location on google maps throw the website or mobile app to know where they are if he needed any of them .



Fall Detection

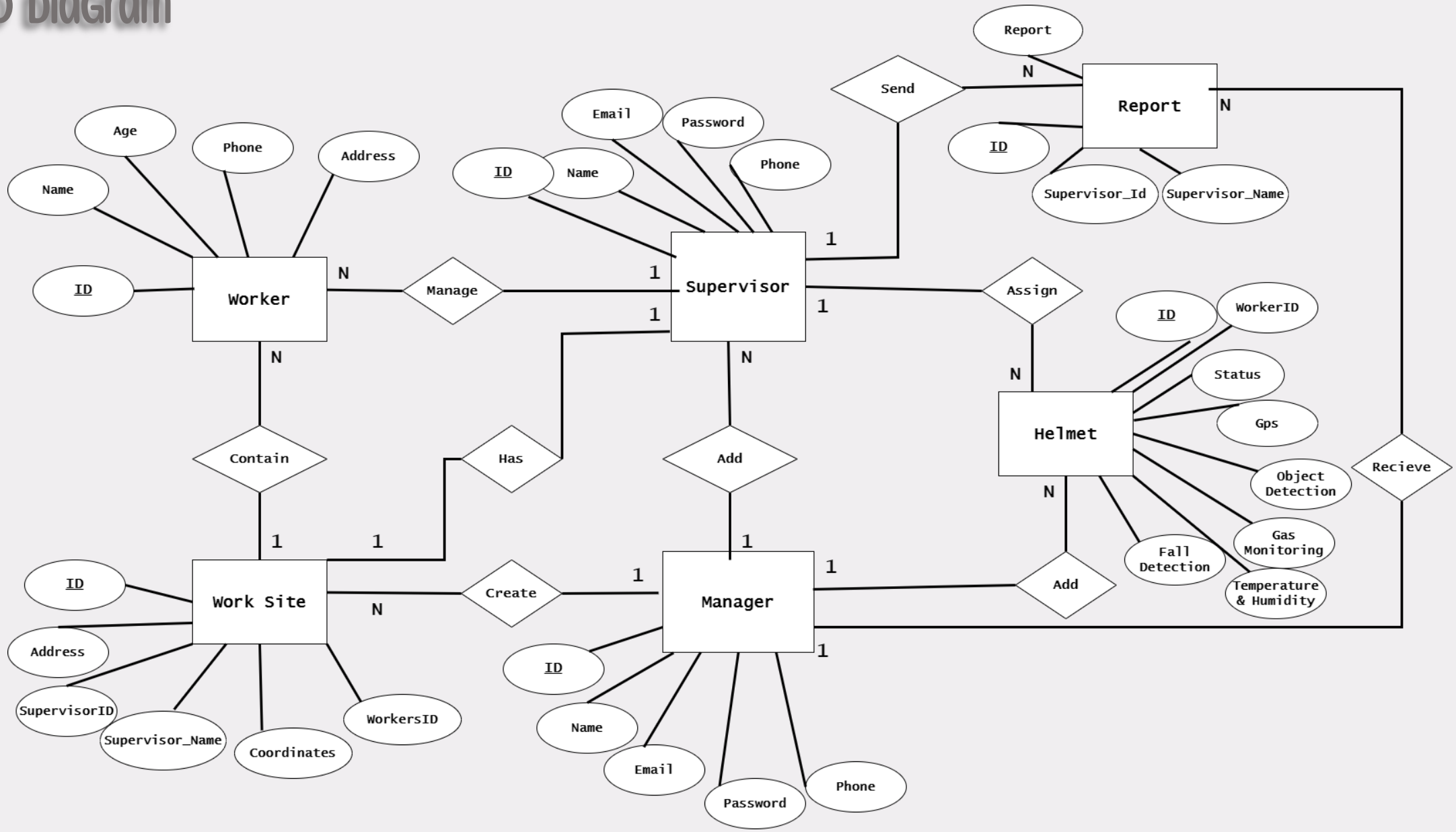
How Does It Work:

helmet has drop detection sensor that detect any fall and send alert to system so supervisor will be contacted if one of workers fall



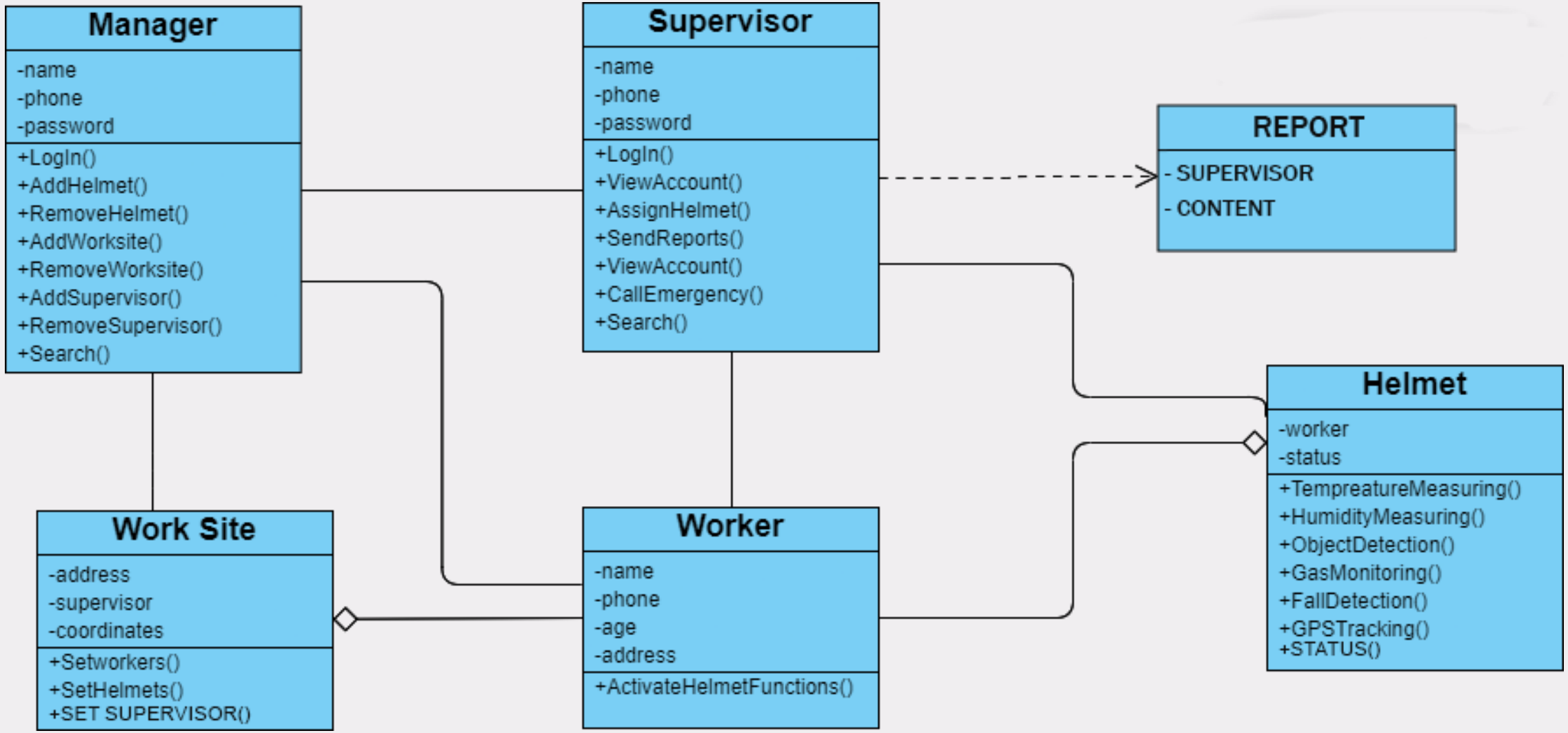
Structural Diagrams

. ERD Diagram



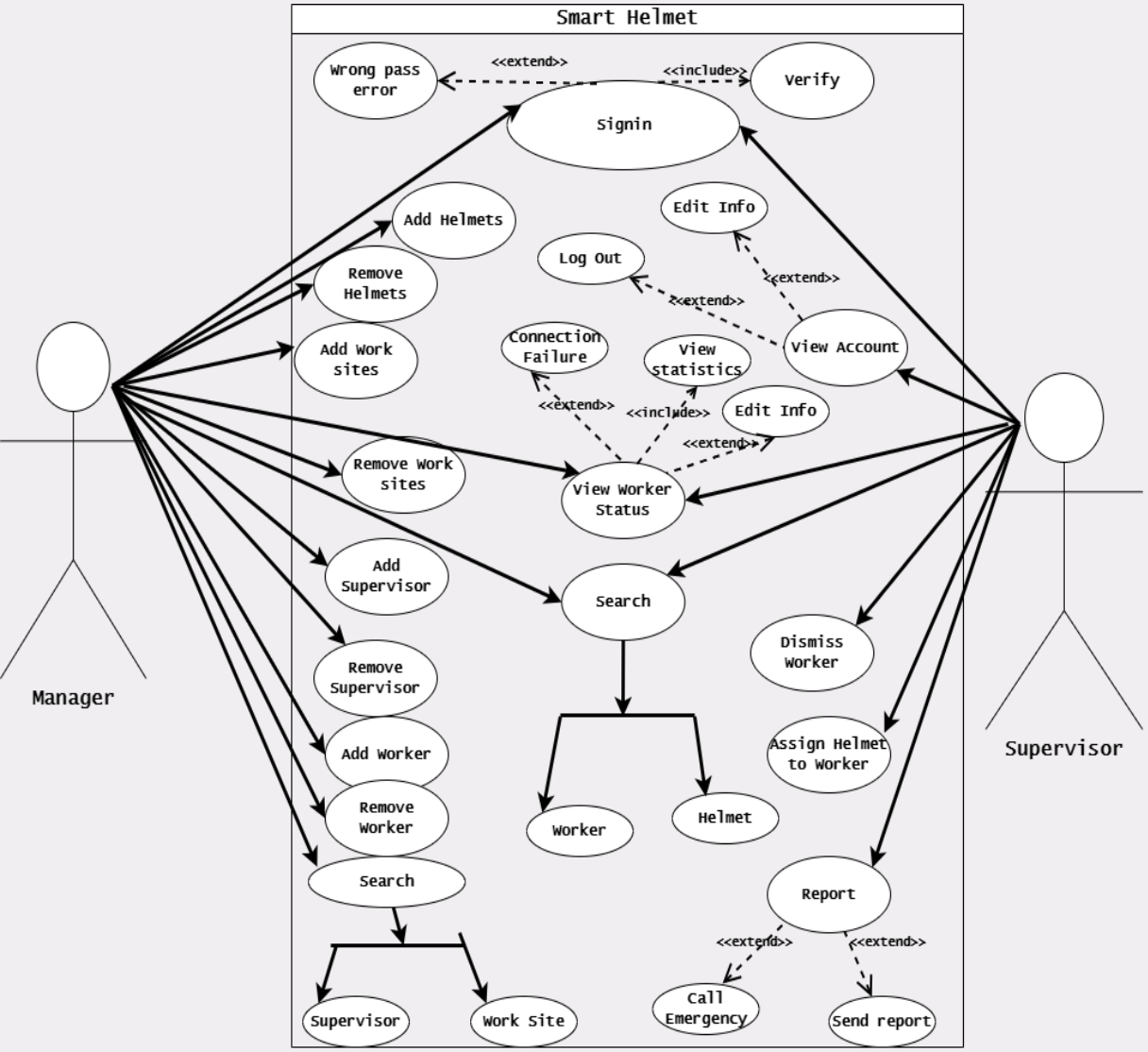
Structural Diagrams

. Class Diagram

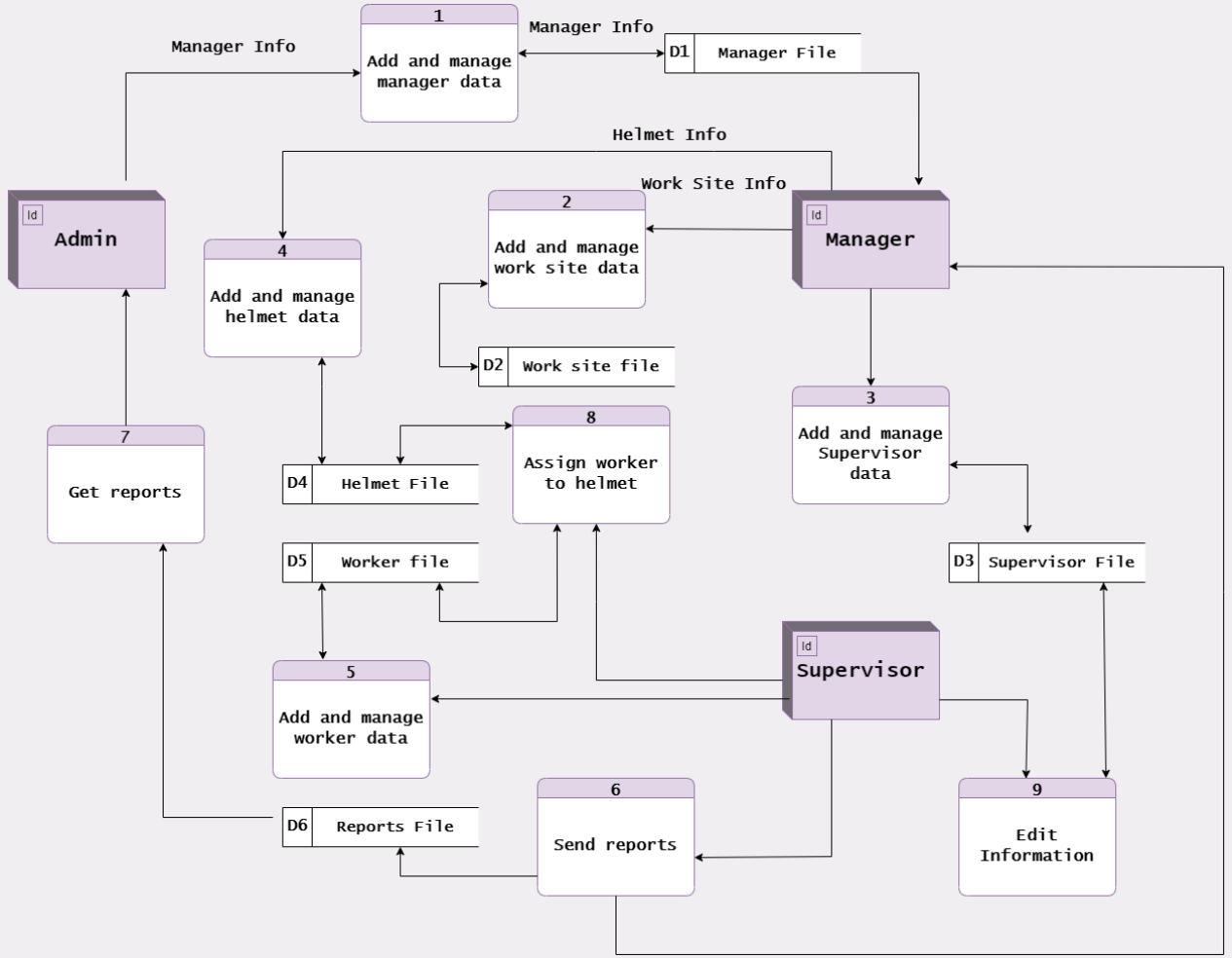


Behavioural Diagrams

. Use Case Diagram



. DFD Diagram



WHY US

- The ideas on the market do not have many of the features found in our helmet

-Most of the existing ideas are directed at cyclists to protect them from road dangers

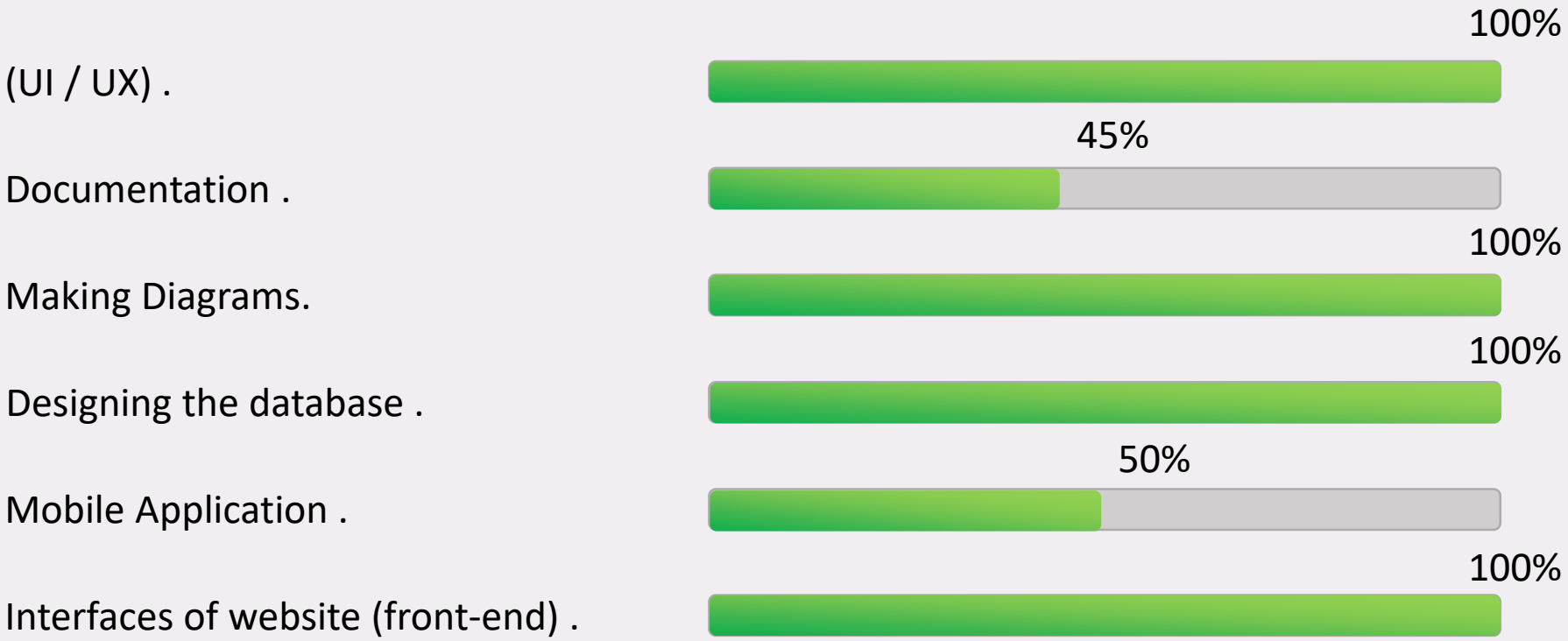
- There are some existing ideas that focus on the helmet as a basic entity in the idea, while we consider the helmet to be one of the entities present in the project.

-The system in our project includes an electronic website and a phone application to ensure multiple use by supervisors or managers

- We have an alert and notification system and reports management system in Our software to ensure heighest performance and accuracy in the danger situations

- We have an alert and notification system and reports management system in Our software to ensure heighest performance and accuracy in the danger situations

our progress




Thank
you