



Pyramids Higher Institute (PHI) for Engineering and Technology



Department of Electronics and
Communication Engineering

قسم هندسة الالكترونيات والاتصالات

Graduation Projects 2026-2027 Brain Storm

عصف ذهني مشاريع التخرج ٢٠٢٦-٢٠٢٧

Prof. Gamal El-Sheikh



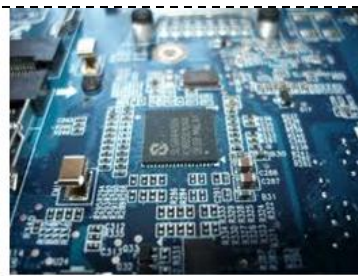
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Prof. G.A. El-Sheikh









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Student Assessment;

Course Code	Course Name	Exam					اسم المقرر	كود المقرر
			YW	Lab	Final	Total		
ELC-413	Graduation Project (1)		50	50	----	100	مشروع التخرج (١)	الك-١٣
ELC-423	Graduation Project (2)		50	50	100	200	مشروع التخرج (٢)	الك-٢٣

Viva

	Report	Presentation	Understanding	H.W.
إجمالي	التقرير	عرض	فهم	تشغيل
١٠٠	٢٠	٢٠	٢٠	٤٠

Engineering



An engineer is a person who
can do for a dollar!!!

what any fool can do
for hundreds of dollars!!!



HUMAN RESOURCE MANAGEMENT

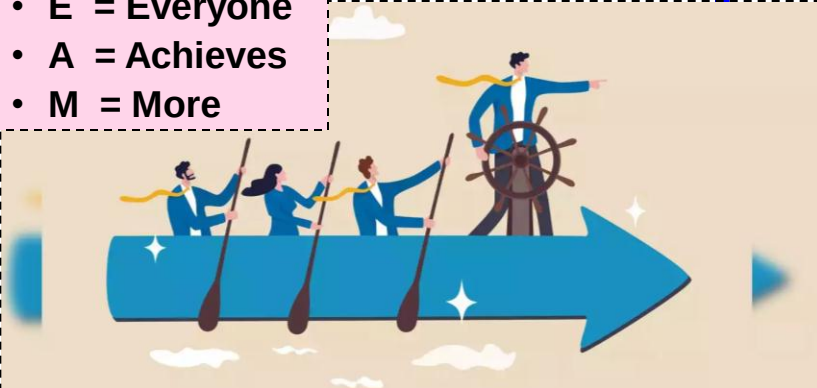


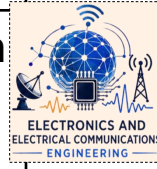
Personnel, People at work, Manpower, Staff, employees

Team Work Management: Principles and Leadership

TEAM;

- T = Together
- E = Everyone
- A = Achieves
- M = More





Boss		Leader	
Drives Employees	يقود الموظفين	Coaches Employees	يدرب الموظفين
Depends on Authority	يعتمد على السلطة	Depends on Goodwill	يعتمد على حسن النية
Inspires Fear	يزرع/يلهم الخوف	Generates Enthusiasm	يولد الحماس
Says (I)	يقول (أنا)	Says (We)	يقول (نحن)
Places Blame for the Breakdown	يلوم المسؤول عن الانهيار	Fixes the Breakdown	يصلح الانهيار
Knows how it is done	يعرف كيف يتم ذلك	Shows how it is done	يبين كيف يتم ذلك
Uses People	يستخدم الناس	Develops People	يطور الناس
Takes Credit	يأخذ الائتمان	Gives Credit	يعطي الائتمان
Commands	الأوامر	Asks	يسأل
Says (Go)	يقول (اذهب)	Says (Let's Go)	يقول (هيا بنا)

Leadership Traits الصفات القيادية

- Qualities such as intelligence, charm, decisiveness, enthusiasm, strength, bravery, integrity, and self-confidence.
- Are they genetic or learned?
- Skills Required of Effective Leaders:**
 - Technical
 - Conceptual
 - Human relations (interpersonal)
 - Networking (political)
- Effective Leadership:** Situational Leadership Theory; Effective leaders change their leadership style or behavior to fit changing situations.

- صفات مثل الذكاء، والسحر، والحسم، والحماس، والقوة، والشجاعة، والنزاهة، والثقة بالنفس.
- هل هي وراثية أم مكتسبة؟
- المهارات المطلوبة من القادة الفعالين:
 - إصطلاحي / فني
 - المفاهيمي
 - العلاقات الإنسانية (بين الأشخاص)
 - الشبكات (السياسية)

- As a leader you continually increase your ability to realize the best in yourself and to bring out the best in others.
- Qualities Attributed to Leaders; الصفات المنسوبة إلى القادة**
 - Leaders are intelligent, outgoing, have strong verbal skills, are aggressive, understanding, and industrious.
 - Effective leaders are perceived as consistent and unwavering in their decisions.
 - Effective leaders project the appearance of being a leader.

Team Work Overview

قال الإمام الشافعي رحمه الله: رأيي صواب **يحتمل الخطأ.... ورأيي غيري خطأ،** **يحتمل الصواب**



احرص على أن تبقى جسور التواصل ممدودة دائماً



As Engineer; Keep your knowledge healthy via;

- Exercises
- History (provides a framework for you to analyze the situation you are facing)
- Sciences, Engineering (how to employ your systems)
- Cultures (Know yourself and know others)
- Discussion with others; peers, experts

Always strive to improve yourself,
you will be amazed at what you don't know

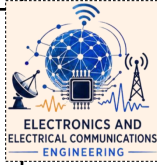
Be sure that
Hard Work is good for you to Solidify

Team Work Overview

None of us is as SMART as all of us

All of us is going to loose !!!!!

What Students Can Do Together Today,
They Can Do Alone Tomorrow



No nation could develop its attitude without reading or citing what have been done.

No nation could feel alive without developments via youth and expertise.

Remember your Responsibility!!!!

G.A. El-Sheikh

Objective

Read + Write

<i>Team Work</i>	العمل الجماعي
Coming together is the beginning	لقاء الجماعة هو البداية
Keeping together is a progress	استمرار الجماعة تقدم
Working together is a success	العمل جماعة نجاح

Good Objectives are **SMART**

- محدد
- يمكن قياسه
- يمكن تحقيقه
- واقعي
- له وقت محدد

They specify **HOW** to meet goal:

Specific: so that you know what final product should look like

Measurable: try to find ways to quantify the objective

Agreed \ **A**ttainable: to performance standards are mutually agreed on

Realistic: this is where **triple** constraint flexibility comes in

Time Constrained (**Trackable**): has a specific deadline

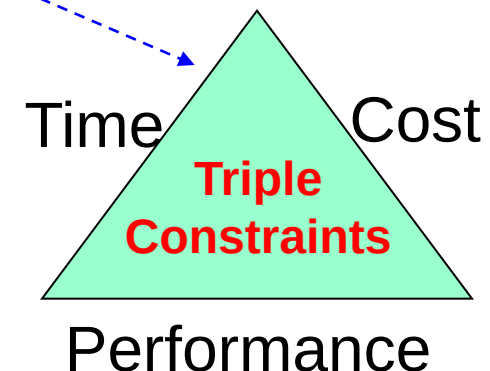
محدد: الهدف واضح ومحدد جيداً.

قابل للقياس: يمكن تتبع التقدم نحو الهدف.

قابل للتحقيق: الهدف واقعي وقابل للتحقيق.

وثيق الصلة: الهدف ذو معنى ويتماشى مع الأهداف الأوسع.

محدد زمنياً: الهدف له إطار زمني محدد للإنجاز.



Good Objectives are **SMART**

This framework helps people and organizations set effective goals;

- **Specific:** The goal is clear and well-defined.
- **Measurable:** Progress towards the goal can be tracked.
- **Achievable:** The goal is realistic and attainable.
- **Relevant:** The goal is meaningful and aligns with broader objectives.
- **Time-bound:** The goal has a defined timeframe for completion.

Last Project:

Design and Realization of SBPM via Integrating IoT and AI towards Enhanced Medical Applications

Present



•BP

Designed CSBPM:

- BP
- HR
- PR
- Oxygen
- ECG
- PPG
- BP Estimate (using AI and ML)

Designed



Benefits

- **Owning the Know-How** for a digital Blood Pressure Monitor (BPM) → **Manufacturing, Maintenance, Upgrading**
- **Extended capabilities** using AI and ML with real time operations and accurate processing
- **Extended applications** via IoT and **Telemedicine** linking patients, consultants and medical centres\hospitals
- **Portable and friendly User Interface (UI)** Device
- Multi-sensors integrated in one unit
- Wireless data transfer (Wi-Fi)
- **Low-cost** compared to medical devices purchasing
- Supports **expansion** (temperature sensor, cloud support, etc.)

Future Work

- **Full Integration with AI and refined ML algorithms** for accurate oscillation detection and precise processing.
- **Enhanced Cuffless Monitoring algorithms** with PPG or wearable sensors.
- **Cloud-Based Health Platforms:** Expand IoT connectivity to be fully integrated within telemedicine systems.
- **Energy Efficiency:** Optimize power consumption through low-power electronics and energy harvesting techniques to extend device operating lifespan.
- **Robust Multi-Parameter Monitoring:** (e.g. Temp., BP, HR, PR, PPG, PTT, Spo2, Telemedicine & IoMT Integration, etc) and enhanced algorithms.
- **Expand Clinical Trials:** Conduct large-scale validation studies to meet international standards and ensure regulatory approval for widespread adoption.



CERTIFICATE OF PARTICIPATION



This is to certify that

*Mina Sabry, Gamal El-Sheikh, Asmaa Rady, Alhassan Hesham, Mohamed
Ahmed, Mohamed Sherif, Nesma Gamal El-Sheikh*

Participated with a paper titled:

"Design and Realization of Smart Blood Pressure Monitor with IoT"

at the 10th International Undergraduate Research Conference (IUGRC-10)
held on 12-14 July 2026 at MTC, Cairo, Egypt



MILITARY TECHNICAL COLLEGE



MISSION TECHNICAL CENTER FOR
RESEARCH AND DEVELOPMENT
& INNOVATION

AL-KHALEFA AL-MAAMON STREET KOBRY AL-KHABA, CAIRO - EGYPT

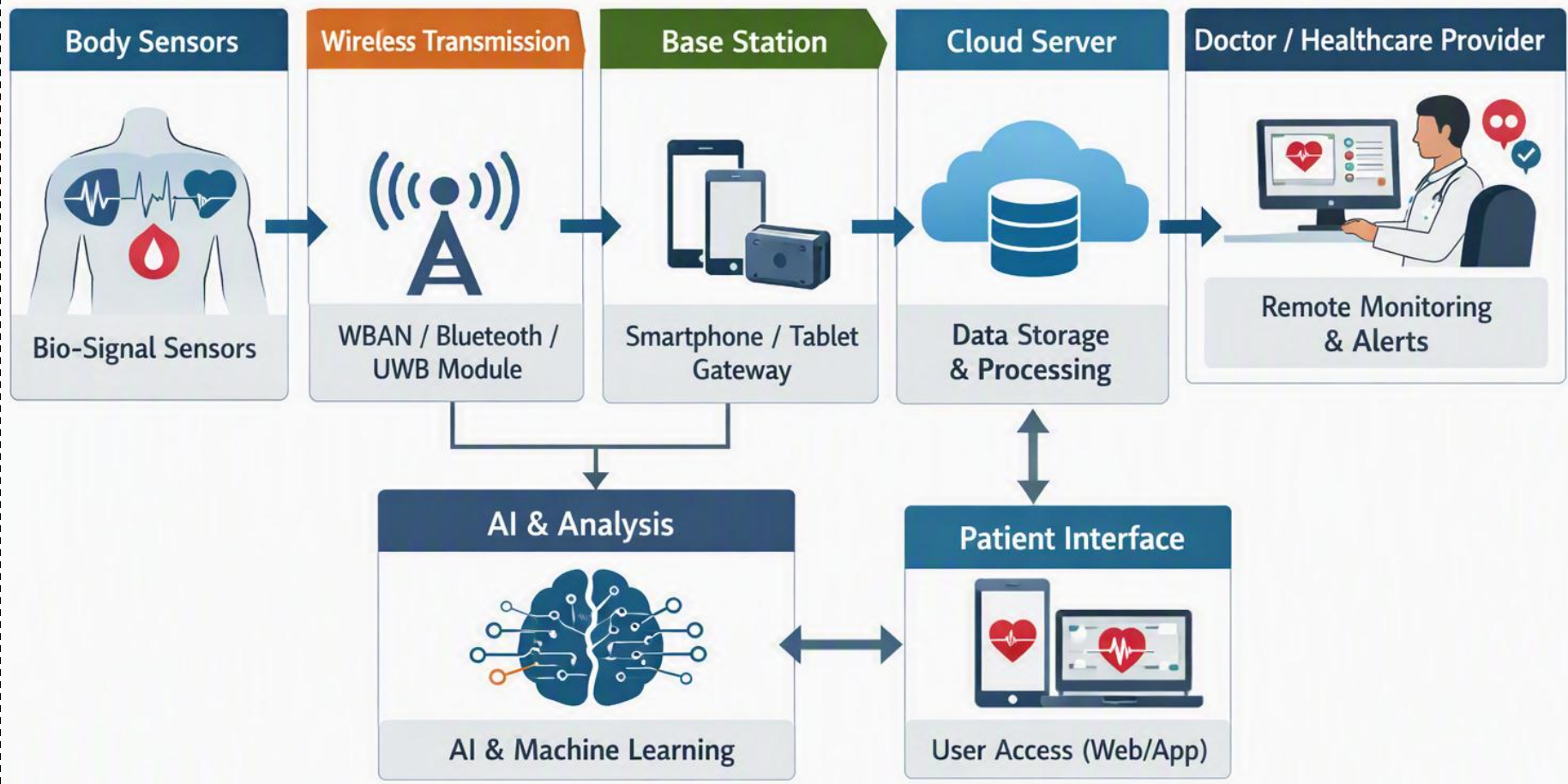
**Maj. Gen. Prof.
Al-Hussein Mostafa Sharaf
Commandant of Military Technical College**

Project Idea (01):

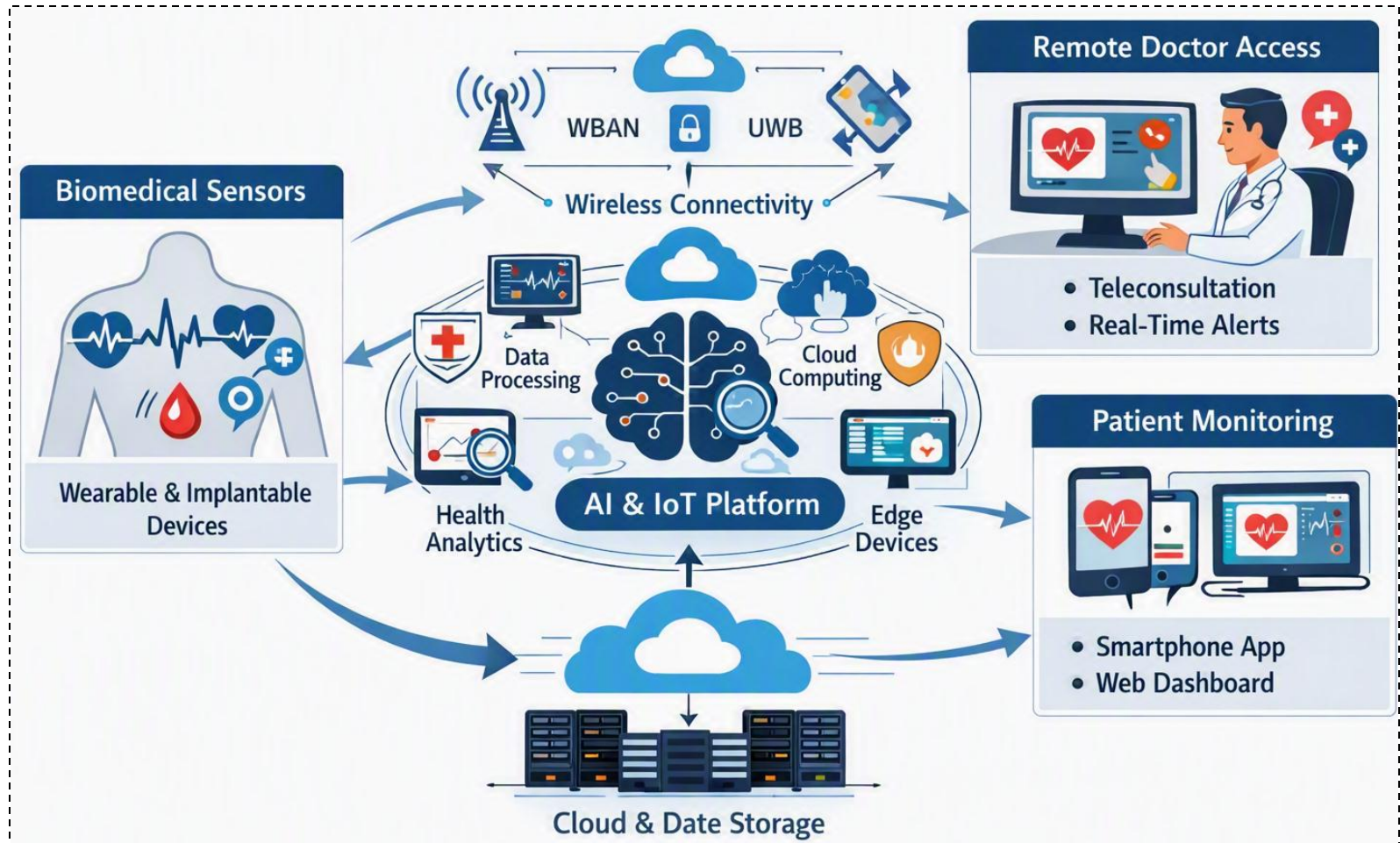
Design and Realization of Telemedicine using In-Body Biomedical Systems



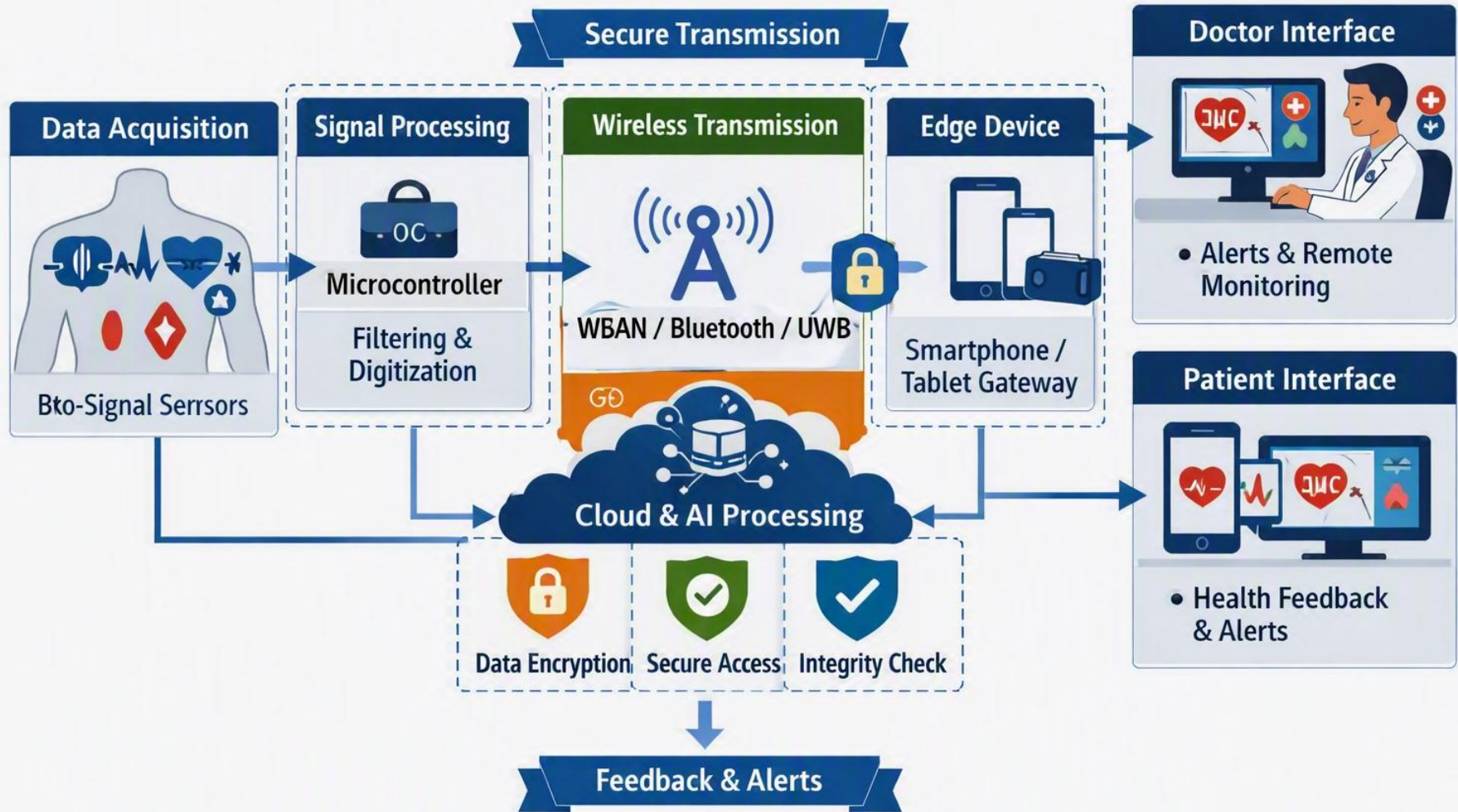
- Telemedicine with In-Body Biomedical Systems has emerged as a transformative paradigm in modern healthcare, enabling continuous monitoring and remote diagnosis through implantable and ingestible biomedical devices.
- This project presents the design and realization of a secure, low-power communication framework for transmitting physiological signals such as blood pressure, heart rate, ECG, PPG, and SpO₂.
- The system integrates body-centric wireless telemetry with cloud-based Internet of Medical Things (IoMT) platforms, ensuring real-time analytics and AI-driven risk stratification.
- Emphasis is placed on optimizing energy efficiency, minimizing latency, and maintaining compliance with biomedical safety standards.
- The proposed architecture demonstrates potential for scalable deployment in chronic disease management, emergency triage, and personalized healthcare, thereby advancing the role of electronics and communications engineering in telemedicine innovation.



In-Body Telemedicine Systems



AI, IoT and Biomedical Telemedicine

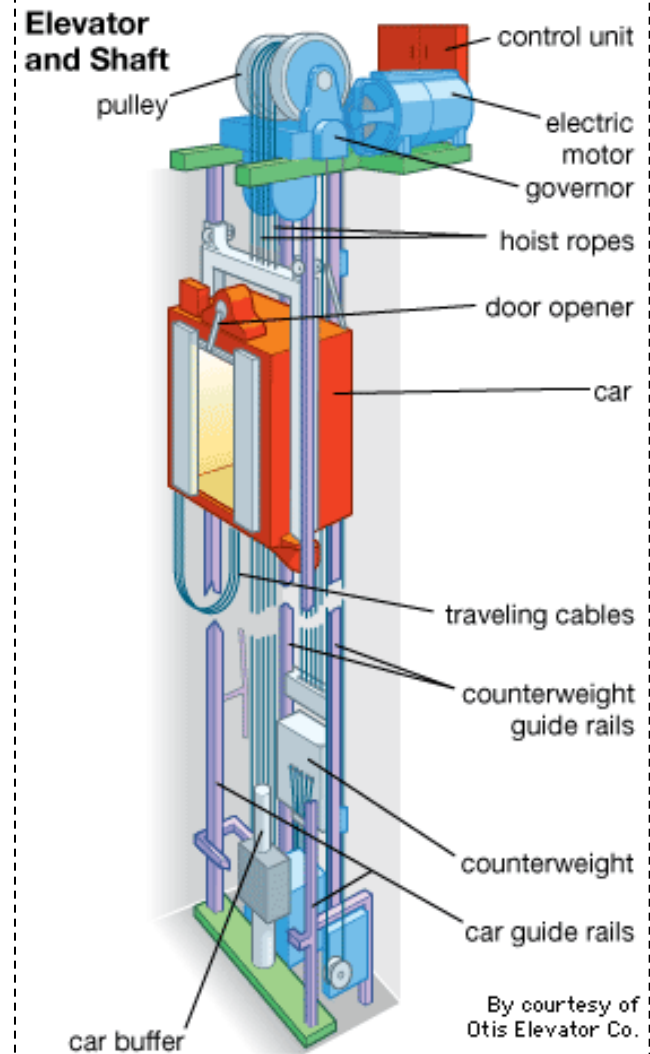


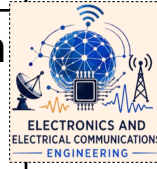
Telemedicine Data Flow with Security and Privacy Layers

Project Idea (02):

Design and Implementation of Smart Controlled Elevator

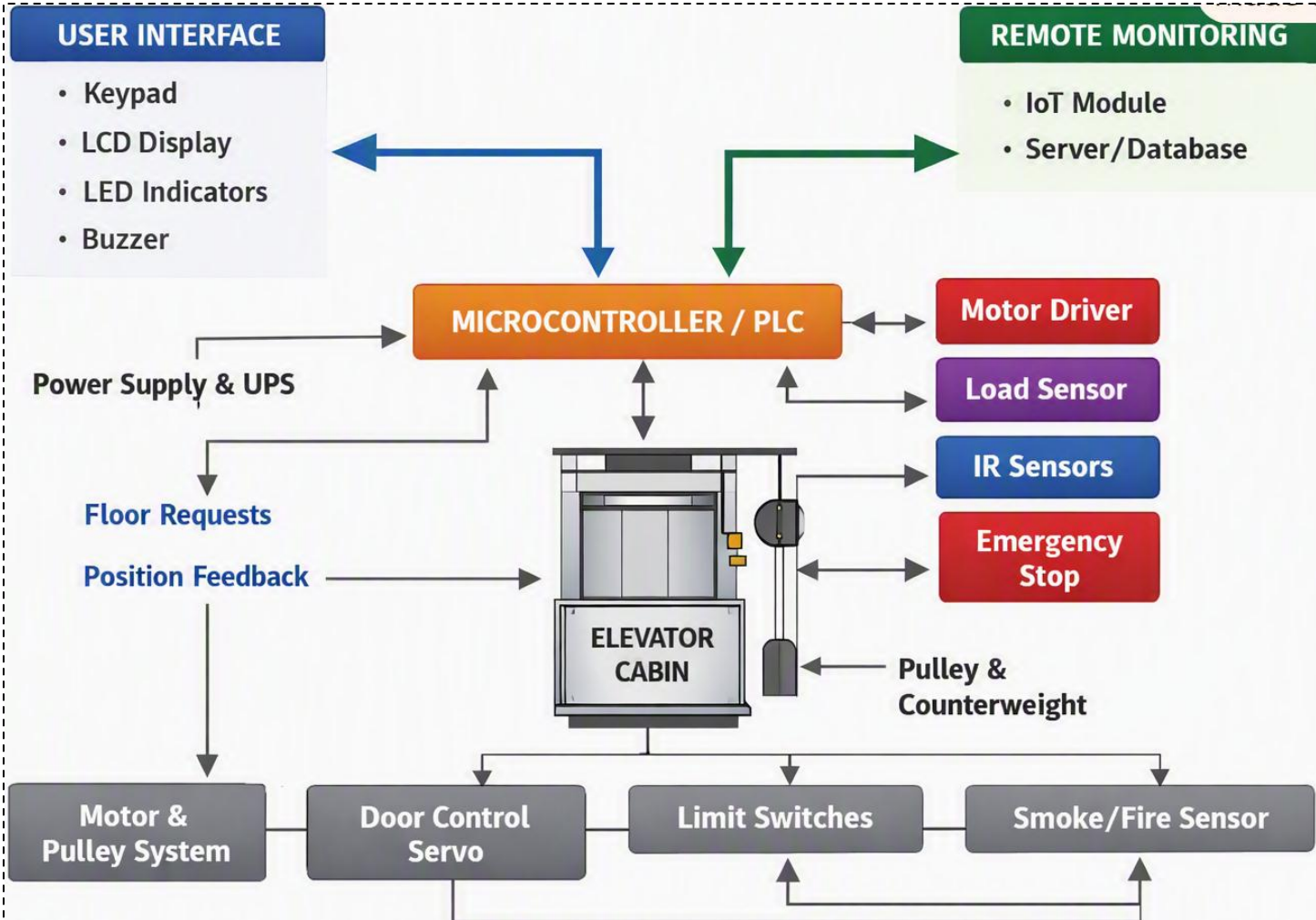
- Elevators are indispensable in modern infrastructure, serving as the backbone of vertical transportation in residential, commercial, and industrial buildings.
- Traditional elevator systems rely on fixed scheduling and mechanical relays, which often result in inefficiencies, energy waste, and limited adaptability.
- The proposed project, Design and Implementation of a Smart Controlled Elevator, aims to integrate microcontroller-based control, IoT monitoring, and intelligent scheduling algorithms to create a scalable, safe, and efficient elevator prototype.





This diagram highlights:

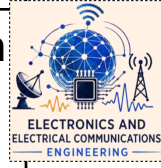
- User Interface (keypad, LCD, LEDs, buzzer) for floor requests.
- Microcontroller/PLC as the central control hub.
- Sensors (IR, load, limit switches, smoke/fire) feeding safety and position data.
- Actuators (motor, pulley, servo for doors) executing movement.
- IoT Monitoring (ESP8266, server/database) enabling remote control and logging.
- Power Supply & UPS ensuring stable operation



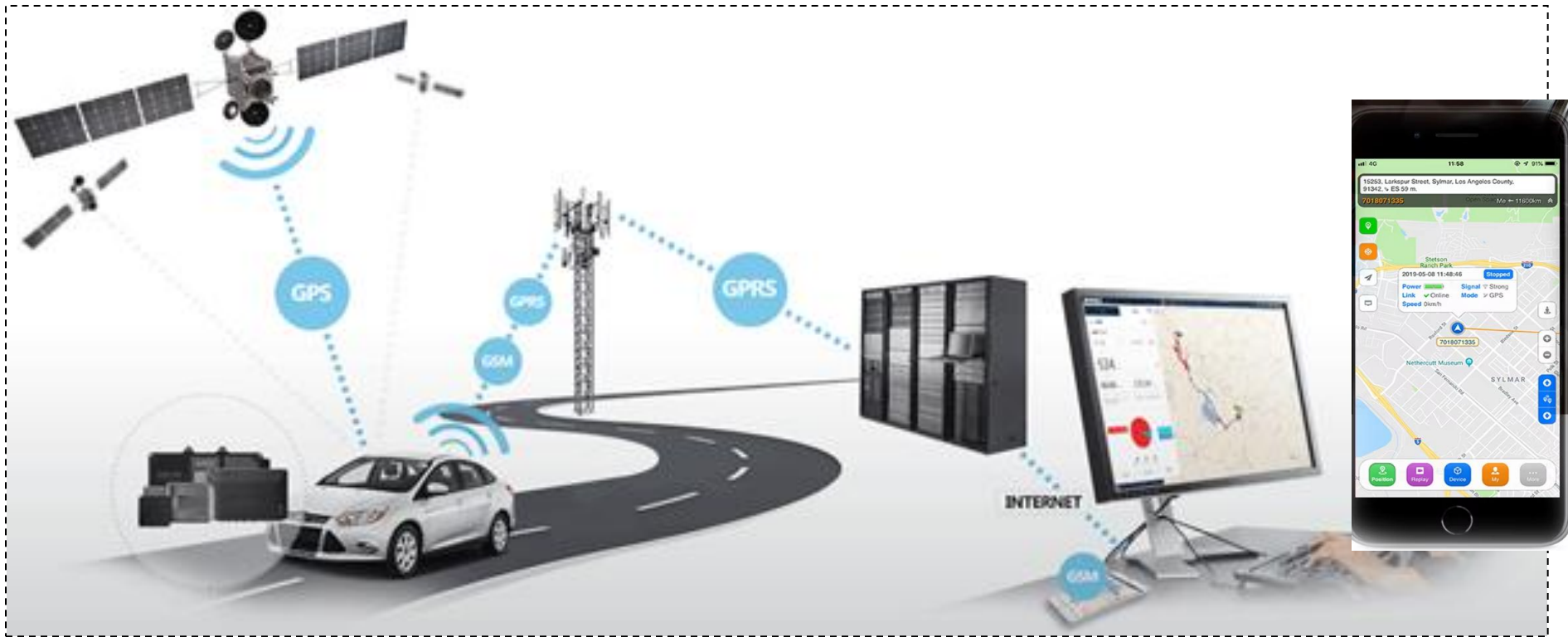
- This Figure depicts the functional block diagram for the *Smart Controlled Elevator*, it clearly maps out the system architecture, showing how the user interface, microcontroller/PLC, sensors, actuators, and IoT monitoring all connect to the elevator cabin and mechanical system.
- This diagram highlights:
 - User Interface (keypad, LCD, LEDs, buzzer) for floor requests.
 - Microcontroller/PLC as the central control hub.
 - Sensors (IR, load, encoder, limit switches, smoke/fire) feeding safety and position data.
 - Actuators (motor, pulley, servo for doors) executing movement.
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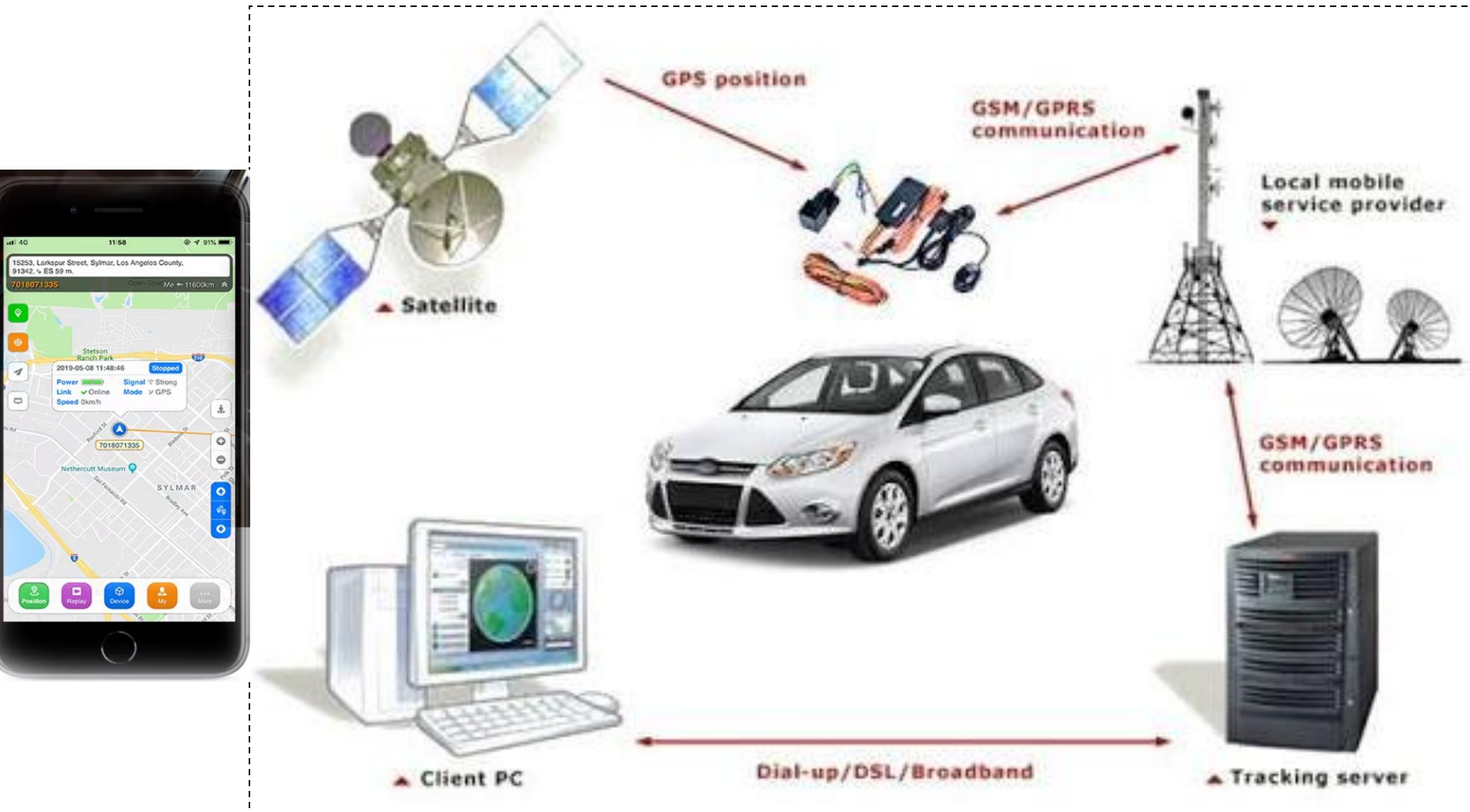
Project Idea (03):

Design and Implementation of a Smart GPS-GSM Vehicle Tracking System



- The rapid growth of urban transportation and the rising incidence of vehicle theft have motivated the necessity for dependable vehicle tracking systems.
- By integrating GPS technology for precise location detection with GSM for efficient communication, this project seeks to develop a smart car tracking system that enables real-time monitoring and bolsters security.
- Designed to cater to both personal and commercial applications, this innovative solution not only enhances fleet management capabilities but also offers a cost-effective means of safeguarding vehicles against theft, ultimately addressing the evolving demands of modern transportation.

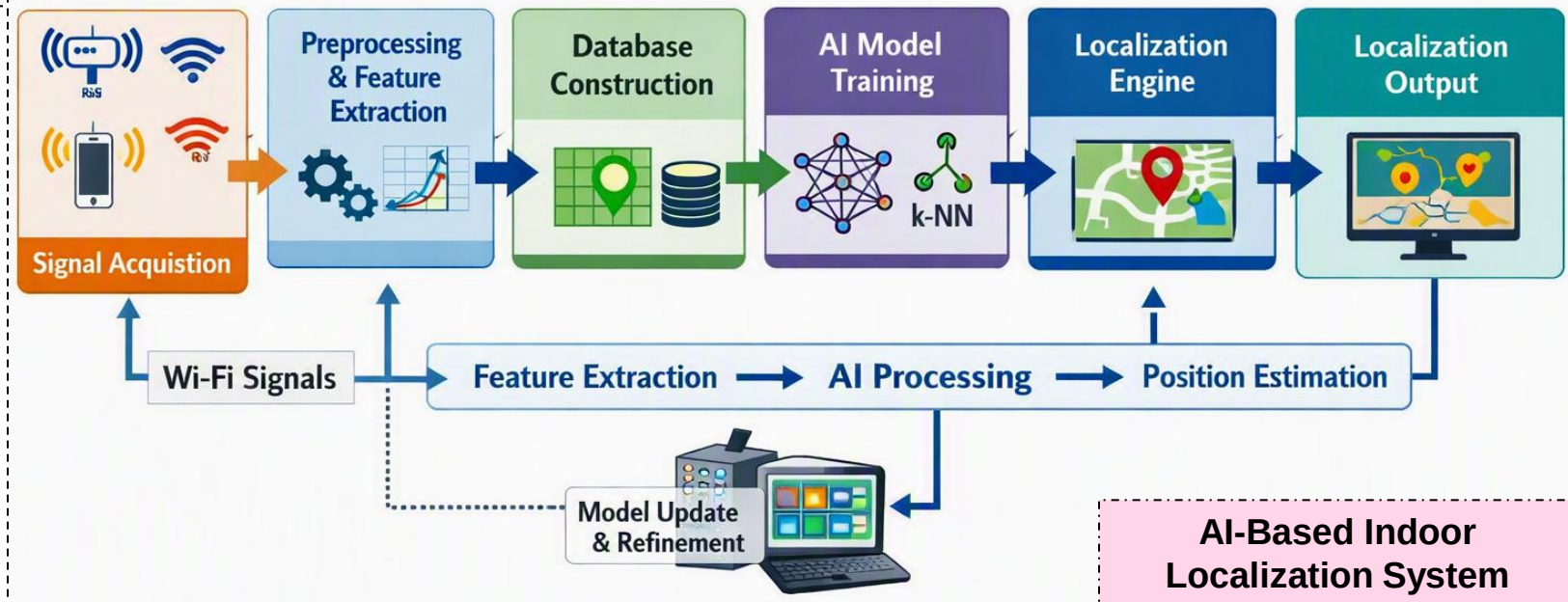


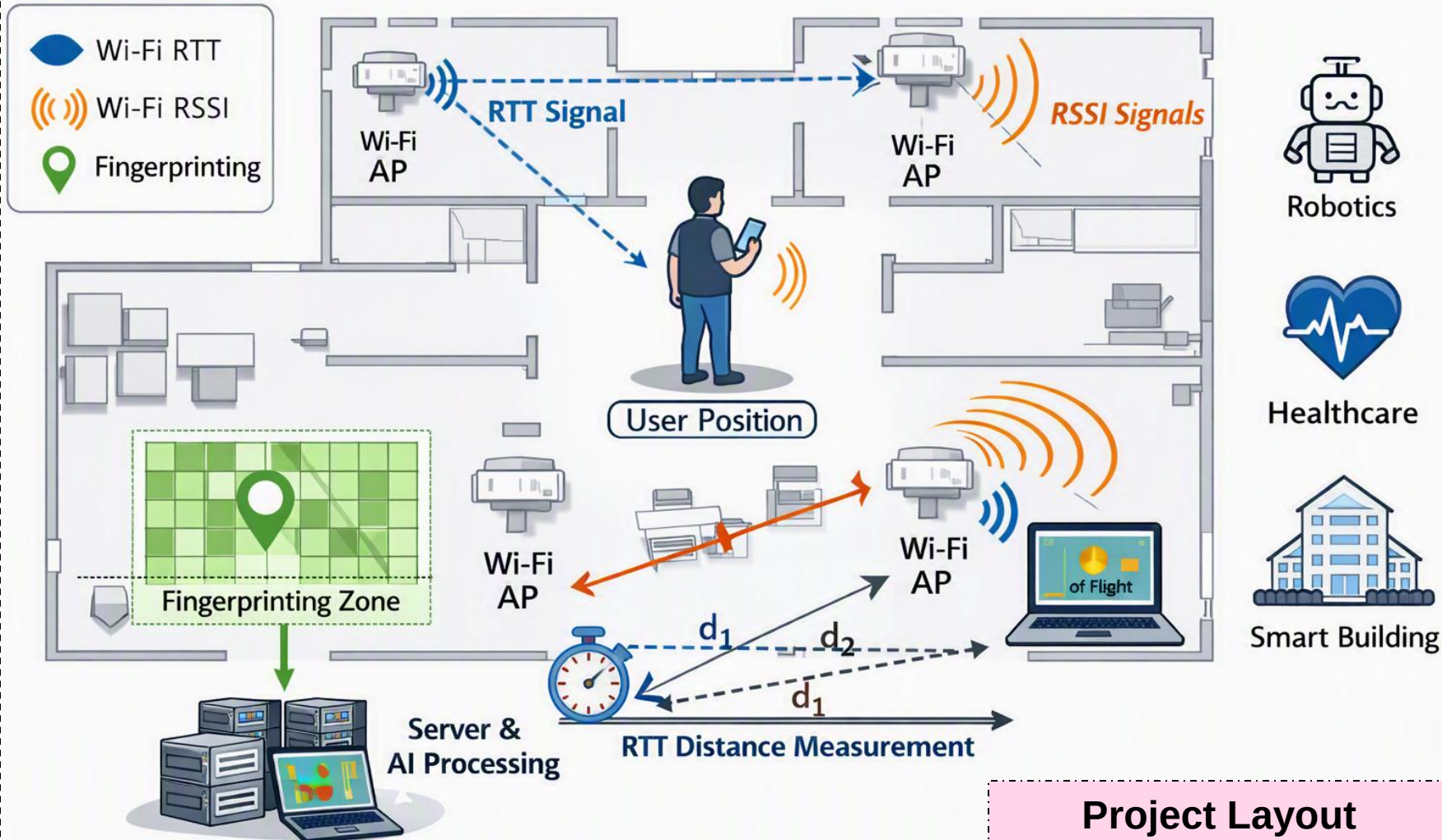


Project Idea (04):

AI-Based Indoor Localization using Wi-Fi RTT, RSSI and Fingerprinting

- Indoor localization has become a critical research area due to the limitations of GPS in enclosed environments.
- Leveraging Wi-Fi technologies such as Round Trip Time (RTT), Received Signal Strength Indicator (RSSI), and Fingerprinting, this project aims to design an AI-based system capable of accurately determining user positions indoors.
- Applications include smart buildings, healthcare monitoring, robotics navigation, and IoT-based services.





Applications of AI-Based Indoor Localization:

- **Healthcare Monitoring:** AI-driven indoor localization enables precise patient tracking and emergency response within hospitals.
- **Smart Buildings:** It optimizes energy use and enhances occupant comfort by monitoring movement and space utilization.
- **Robotics and Automation:** Robots rely on accurate indoor positioning to navigate complex environments safely and efficiently.
- **Retail and Commercial Spaces:** Retailers use localization to analyze customer behavior and deliver personalized shopping experiences.
- **Education and Campus Management:** Universities apply indoor localization to manage student flow, security, and resource allocation across campuses.
- **Industrial and IoT Applications:** Factories and IoT systems leverage localization for asset tracking, workflow optimization, and safety monitoring.

