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Solving Complex Engineering Problems Incorporating SDGs

Activities with Targeted SDGs

The following table summarizes various engineering projects address complex real-world challenges while incorporating sustainability and societal well-being. Each project demonstrates the application of technical knowledge aligned with relevant Sustainable Development Goals (SDGs).

Solving Complex Engineering Problems Incorporating Sustainability Goals

S. No.	Project Title	SDG Mapped	Remarks
1	Obstacle Detection System for Blind Persons	3, 4, 9, 10, 11, 12	Enhances independent mobility and safety for visually impaired individuals using low-cost sensor technology.
2	Automatic Night Light	4, 7, 9, 11, 12	Reduces energy consumption by automatically controlling lighting based on ambient light conditions.
3	Smart Gas Leakage Detector	3, 4, 8, 9, 11, 12	Provides early warning to prevent fires, explosions, and health hazards in domestic and industrial environments.
4	Voice Controlled Home Automation	3, 4, 7, 9, 10	Enables hands-free appliance control, improving accessibility and optimizing energy usage.
5	Temperature Detection Unit	3, 4, 7, 9, 12	Monitors thermal conditions to improve safety, enhance energy efficiency, and reduce food and resource wastage.
6	Human Following Robot	3, 4, 8, 9, 10, 12	Supports elderly assistance, healthcare logistics, and safer automation in industrial environments.
7	Radar System Using Arduino	3, 4, 7, 8, 9, 11	Implements low-cost object detection for vehicle safety and industrial collision avoidance.

S. No.	Project Title	SDG Mapped	Remarks
8	Fire Fighting Robot using Arduino	3, 4, 8, 9, 11, 12	Enables autonomous fire detection and suppression to protect lives and infrastructure.
9	Remote Controlled Car by Arduino UNO	4, 8, 9, 12	Serves as a base platform for delivery and surveillance robots using resource-efficient power systems.
10	Bluetooth Controlled RC Car	4, 8, 9, 12	Acts as a customizable IoT platform supporting automation and technological innovation.
11	Log Temperature Data to Google Sheets using ESP32 and DHT11 Sensor	2, 3, 4, 9, 12	Applied in smart agriculture and healthcare for crop optimization and cold-chain monitoring.

These projects collectively demonstrate how engineering solutions can address complex societal challenges while promoting sustainability, accessibility, safety, and innovation. By integrating affordable technologies with practical applications, they contribute to responsible engineering practices and support long-term sustainable development

List of Complex Engineering Problems

The following projects demonstrate practical approaches to solving complex engineering problems using embedded systems, sensors, and automation technologies. They address real-world challenges related to safety, accessibility, energy efficiency, and smart monitoring. Each project is supported by a report, presentation, and video, showcasing the design, implementation, and validation of the proposed solutions.

S. No.	Project Title	Report	Presentation	Video Link
1	Obstacle Detection System for Blind Persons	https://drive.google.com/open?id=1H4l2m79ZUYAeL7RVBGoHrVYCWzRauo1E	https://drive.google.com/open?id=1j9td5Kk7FL7vh3BpLLDC5hdbZwFcVeyJ	https://drive.google.com/open?id=1DQcctaIrpdTuqunl5-Q8_O3FH451S5kF
2	Automatic Night Light	https://drive.google.com/open?id=1u07-0rkfcwA8Nd8Qwm3chiA1_wOF2w1d	https://drive.google.com/open?id=1wFRfBM-3zMqeZKcFjz2Bpx8fhQQ_kbCK	https://drive.google.com/open?id=1bBQH5g0lINDCvM7HqFLxX3rPgiNLiC5l

S. No.	Project Title	Report	Presentation	Video Link
3	Smart Gas Leakage Detector	https://drive.google.com/open?id=1ODMtI4iOOQcktyQgHvWj472ui_r7g67S	https://drive.google.com/open?id=10GzV-DvUmYIH_IHqjn0fdaXsCCazjPGT	https://drive.google.com/open?id=16ZYllZer9QzSE7SCoBek3X3Nqat7teTS
4	Voice Controlled Home Automation	https://drive.google.com/open?id=1VZYyv9fgsRPznDYqOu4Xjg6FAFPYQrif	https://drive.google.com/open?id=1v5k_25vJhOtWCuH_fCh9kOcSVZ7xAXNn	https://drive.google.com/open?id=1g5aTlwS1M2S-23f141e6Xs-7dFRt-98S
5	Temperature Detection Unit	https://drive.google.com/open?id=1ozp_aA5EaioNwN_3BEgZLuMFHJ3ZaYP	https://drive.google.com/open?id=16VgxhZoPSLMays2uxI5ylx_KkhLrMec-	https://drive.google.com/open?id=1vw_gPM2Tcg8m_wVkIfA86TGt4zQokwrZ
6	Human Following Robot	https://drive.google.com/open?id=18Q6mB8Wqz-qYrjGhPP1u13YKxGLGJ2GH	https://drive.google.com/open?id=1YiPl5LTqZ4vE6Uge_L4XJNAm_Ftn0SA3	https://drive.google.com/open?id=1Eqnh5fbVZQ955CWovNK607itPHIFHH60
7	Radar System Using Arduino	https://drive.google.com/open?id=1KWhBNpv2TJhUAlr4P29yVmoNCJbaTYGh	https://drive.google.com/open?id=1DA9qA0iiRyYLbUu2cw-2cqVL24YU8ymC	https://drive.google.com/open?id=1ZiaxDRd2NZqBOySR8yFJrWTDjKLiS2JF
8	Fire Fighting Robot using Arduino	https://drive.google.com/open?id=1Ide7gBO60vdu6W99xmbaVQz22bE50hjd	https://drive.google.com/open?id=1s53quEU4a_FMqxzWNXzPfhDnRQvftAJh	https://drive.google.com/open?id=13b2vO3cjd5bCkkKYn5y84JWha-k4WHIk
9	Remote Controlled Car by Arduino UNO	https://drive.google.com/open?id=1-_g1sS75JnrQ_9Wcnn0smGdXhZ383H4L	https://drive.google.com/open?id=1r_QiN4Rf0W3JiAjJVs4OU-VxE1P9kr31	https://drive.google.com/open?id=1tj9DkYJPv49D6EUD_EPK3O2eJe_gryxA
10	Bluetooth Controlled RC Car	https://drive.google.com/open?id=13_sPzRh_BTpvLIqDwiq4SYGPQSTCo_QN	https://drive.google.com/open?id=1s_pi0CA4BjnOsG1M89	https://drive.google.com/open?id=1TvrFGZykzcDdD-moN83lEuXoIutm

S. No.	Project Title	Report	Presentation	Video Link
			mH89cnpNDbVt-A	RPTC
11	Log Temperature Data to Google Sheets using ESP32 and DHT11 Sensor	https://drive.google.com/open?id=1qhY3x54i61PMBpgYqoMtR_zjO6_fVE6e	https://drive.google.com/open?id=1gF0SyrEBqHQwRUBEqdO0Ysi3S6wt5i6g	https://drive.google.com/open?id=1vKqxvGa10u130etPFLijfAv2tsPvUVUE

These projects collectively highlight the application of engineering knowledge to develop innovative and sustainable solutions. They emphasize technical skill development, real-world problem solving, and responsible design practices, contributing to improved safety, efficiency, and societal well-being.

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