LIGHTED TO ENLIGHTEN 45 YEARS

MUFFAKHAM JAH
COLLEGE OF ENGINEERING & TECHNOLOGY
(THE SULTAN UL ULOOM EDUCATION SOCIETY)
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ACES

HACK REVOLUTION

MJCET

INSTITUTION'S INNOVATION COUNCIL
(Ministry of Education Initiative)

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Team Details

1. Selected Track - Waste Management and Rural Developmenet
2. Project Name - SolarWaste: Mobile Plastic-to-Fuel Converter
3. Team Name - Syntax Squad
4. Team Lead - Shaik Sameer hussain
5. Institute Name - CMR Technical Campus

Describe Your Idea or Project

•Mobile solar-powered pyrolysis unit to convert plastic waste into fuel (diesel, gasoline, char).

•Operates in remote areas, reducing plastic pollution and producing valuable resources.

•Fully solar-powered, minimizing environmental impact and operational costs.

•Locals bring plastic waste to the unit, which is processed for use or sale.

Describe the Technology Stack Required:

•**Solar Panels:** Capture sunlight and convert it into electricity to power the unit.

•**Energy Storage**: Batteries store solar energy for night operations.

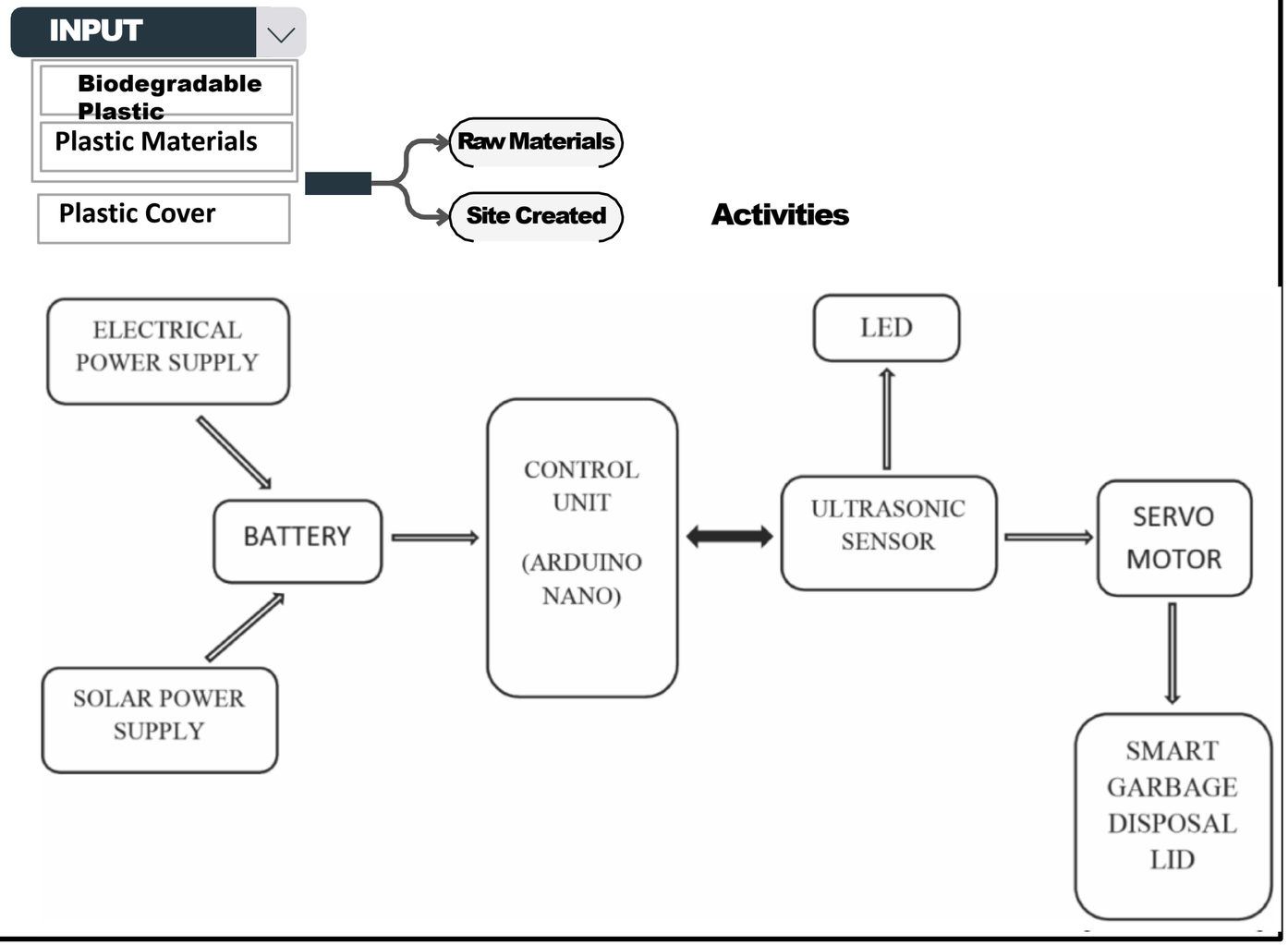
•**Pyrolysis Chamber:** Thermally decomposes plastic waste into fuel, gas, and char.

•**Emission Control:** Filters harmful gases to ensure eco-friendly operation.

Syntax Squad

TECHNICAL APPROACH

ARCHITECTURE



METHODOLOGIES

YOLOv5 (Plastic Collection Stage): Detects plastic waste types to ensure efficient collection from local areas

- **Mask (Pyrolysis Stage):** Segments and monitors the plastic conversion process into fuel, ensuring optimal pyrolysis.
- **ResNet-50 (Fuel Separation Stage):** Classifies and verifies the separation of fuel types (diesel, gasoline, char) for proper distribution.
- **EfficientNet (Energy Storage Stage):** Identifies energy storage efficiency, ensuring adequate solar power is stored for continuous operation.
- **DeepLabV3+ (Emission Control Stage):** Segments and monitors the emission levels to confirm proper filtration and eco-friendly operations.

Describe your use cases

Community Engagement: Locals bring plastic waste to the mobile unit for conversion into fuel.

Eco-Friendly Process: The unit operates entirely on solar power, reducing carbon emissions.

Waste-to-Energy: Converts plastic waste into valuable fuels like diesel and gasoline.

Local Impact: The produced fuel can be used for local transportation, farming, or sold for revenue.

Mobile Solution: The unit's mobility ensures it can be deployed to different areas as needed.

Sustainable Model: Creates a self-sustaining system for waste management and energy generation.

Cost-Effective: Uses free solar energy, reducing operational costs and reliance on external power sources.

Economic Empowerment: Offers a new revenue stream and potential job creation in underserved areas.

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InfraSnap

Idea/Solution/Prototype

- **Automated Plastic Waste Collection:** Implement a mobile, solar-powered unit to automatically collect plastic waste from local communities, reducing plastic pollution and promoting recycling.
- **Pyrolysis Process:** Utilize solar energy to power a pyrolysis reactor that thermally decomposes plastic waste into usable fuel, including diesel, gasoline, and char.
- **Community-Driven Model:** The system allows local users to bring plastic waste, with incentives provided, ensuring continuous participation and promoting sustainable energy production

Innovation & Uniqueness

Mobile Waste Collection: The solar-powered unit is mobile, allowing it to travel to remote areas and collect plastic waste directly from locals, making waste management accessible and efficient.

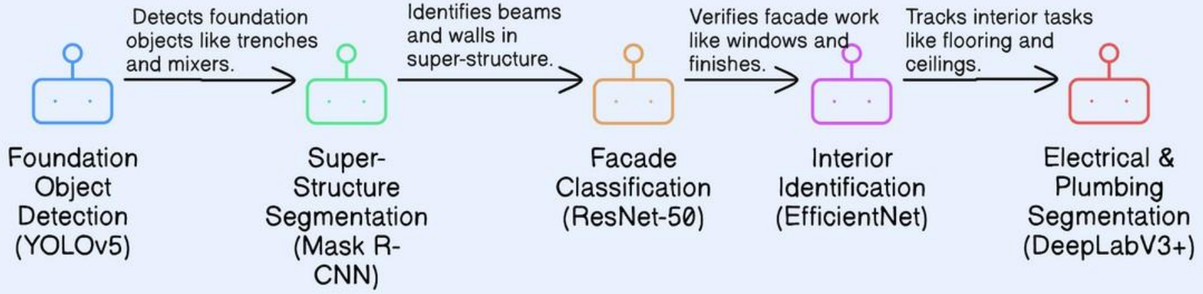
Energy Production from Plastic: Converts non-biodegradable plastic into valuable resources like diesel, gasoline, and char using solar energy, reducing plastic pollution while generating fuel.

Community Engagement & Incentives: Encourages local participation by offering incentives, such as discounts on fuel or essential goods, for plastic waste contributions, promoting sustainability and circular economy principles.

Solution Approach

- **Mobile Collection & Conversion**: Solar-powered unit collects and converts plastic waste into fuel directly from local areas.
- **Real-Time Monitoring:** Tracks the conversion process to optimize energy production and efficiency.
- **Centralized Dashboard:** Monitors waste collection, fuel production, and distribution in one interface for easy management.

Flow of construction activities & ML model used -



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FEASIBILITY AND VIABILITY

Feasibility Analysis

- **Technological Feasibility:** Utilizes solar power and pyrolysis technology for efficient plastic-to-fuel conversion.
- **Integration with Existing Systems:** Can be integrated with local waste management systems for smooth operations.
- **Scalability**: The mobile unit can be scaled to different regions, with modular components to expand capacity as needed

Potential Challenges & Risks

- **Accuracy Concerns:** Ensuring consistent pyrolysis output quality across diverse types of plastic waste.
- **Material Variability:** Variations in plastic waste quality may affect fuel yield and efficiency.
- **Regulatory Compliance:** Navigating local regulations for waste management and emissions, ensuring adherence to environmental laws.

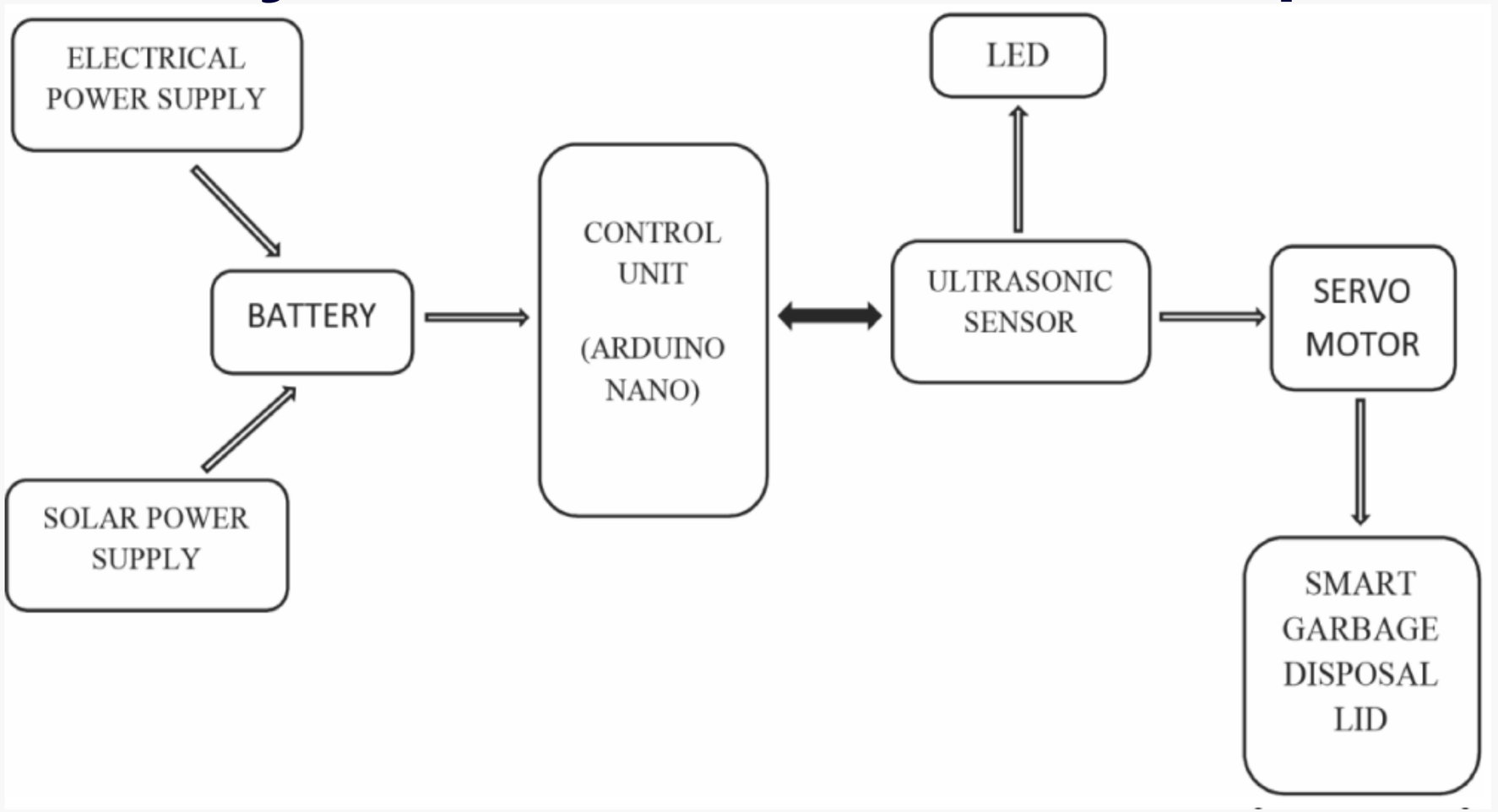
Overcoming Challenges

- **Diverse Model Training:** Regularly update the pyrolysis models with data from various types of plastic waste for improved fuel production accuracy.
- **Quality Assurance**: Conduct routine quality checks on the plastic waste before processing to ensure optimal pyrolysis efficiency.
- **User Training:** Educate locals on proper waste segregation and safe handling practices for effective waste input.

REVENUE RESOURCES

- **Subscription Fees** Recurring revenue generated through monthly or yearly subscriptions for access to the solar-powered pyrolysis service.
- **Consultation and Customization**: One-time fees charged for consulting and tailoring the solution for specific client needs, such as customizing pyrolysis units or waste collection strategies.
- **By-Product Sales**: Revenue from selling by-products like char, syngas, or fuel to local industries or energy producers.

Block Diagram and List of Hardware Components



Team Members' Information

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