

LIGHTED
TO
ENLIGHTEN

45
YEARS



MUFFAKHAM JAH
COLLEGE OF ENGINEERING & TECHNOLOGY
(THE SULTAN UL ULOOM EDUCATION SOCIETY)
Affiliated to Osmania University & Recognised by AICTE
Banjara Hills, Hyderabad 500 034



ACES

HACK REVOLUTION



E CELL
MJCET

Team Details

- 1 Selected Track - Waste Management and Rural Development
- 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

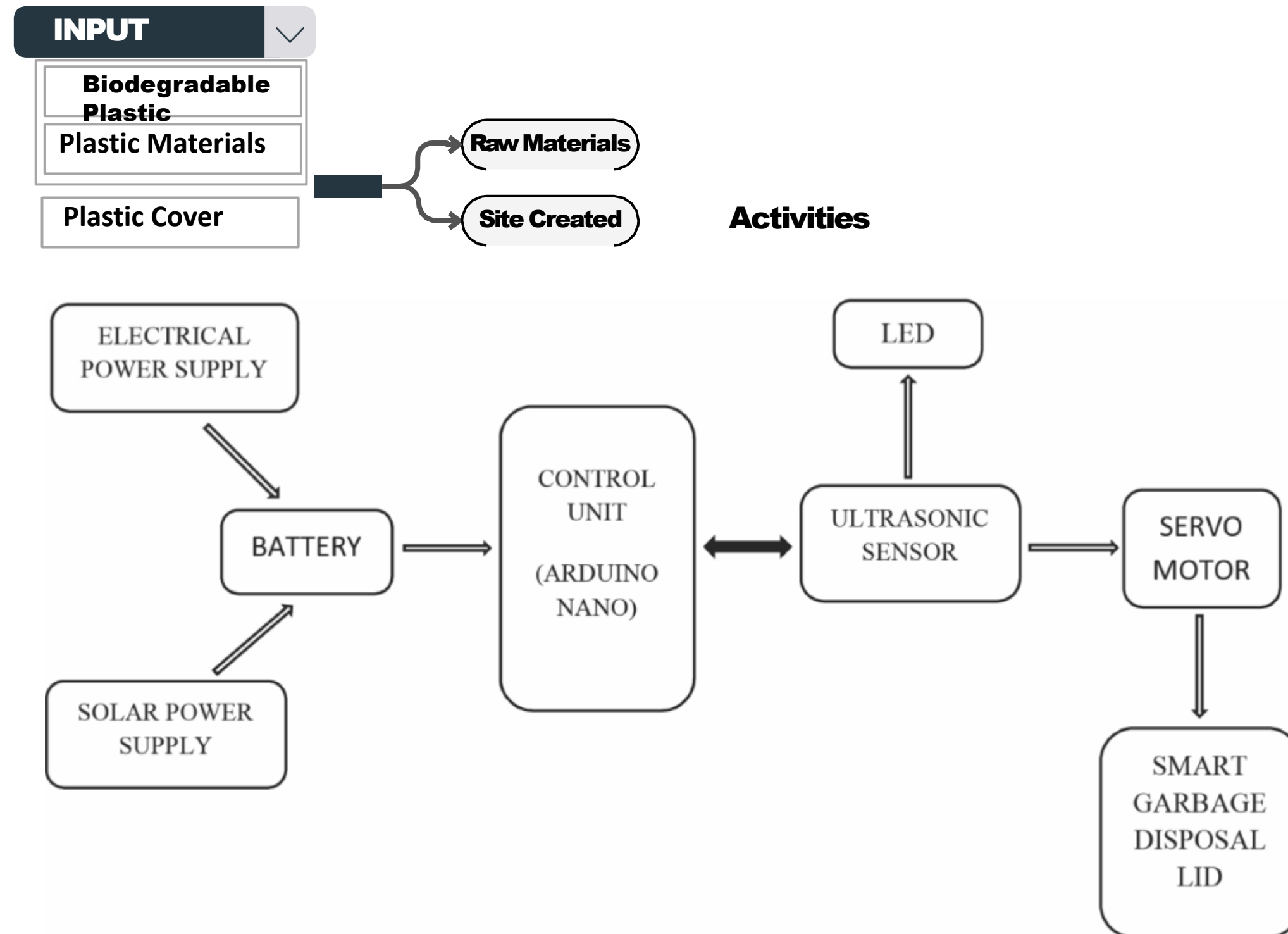
Describe Your Idea or Project

- 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.

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.



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



Solution Approach

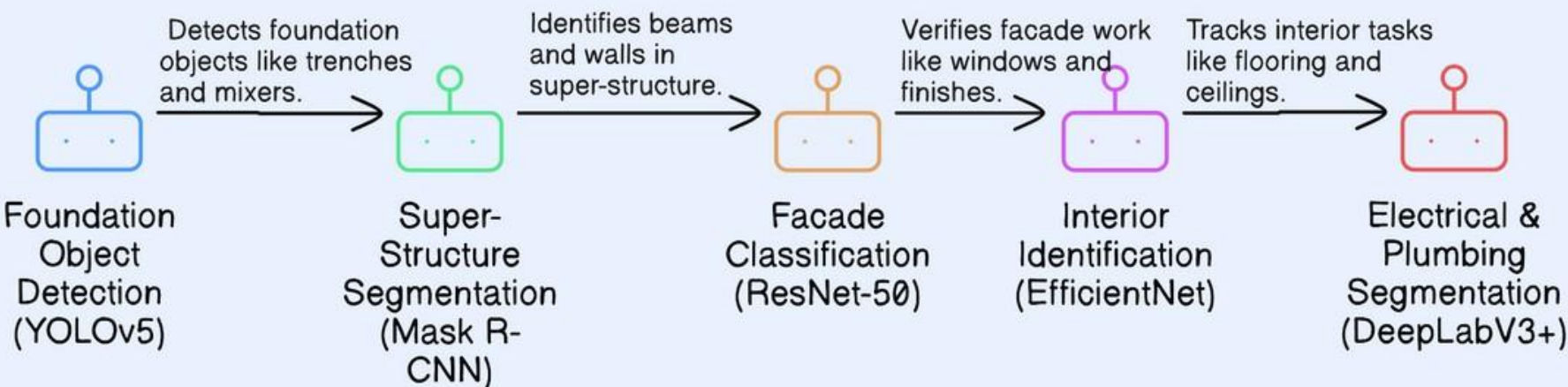
- **Mobile Collection & Conversion:** Solar-powered unit collects and converts plastic waste into fuel directly from local areas.
- **Real-Time Monitoring:** Tracks the conversion process to optimize energy production and efficiency.
- **Centralized Dashboard:** Monitors waste collection, fuel production,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



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.

Flow of construction activities & ML model used -



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.



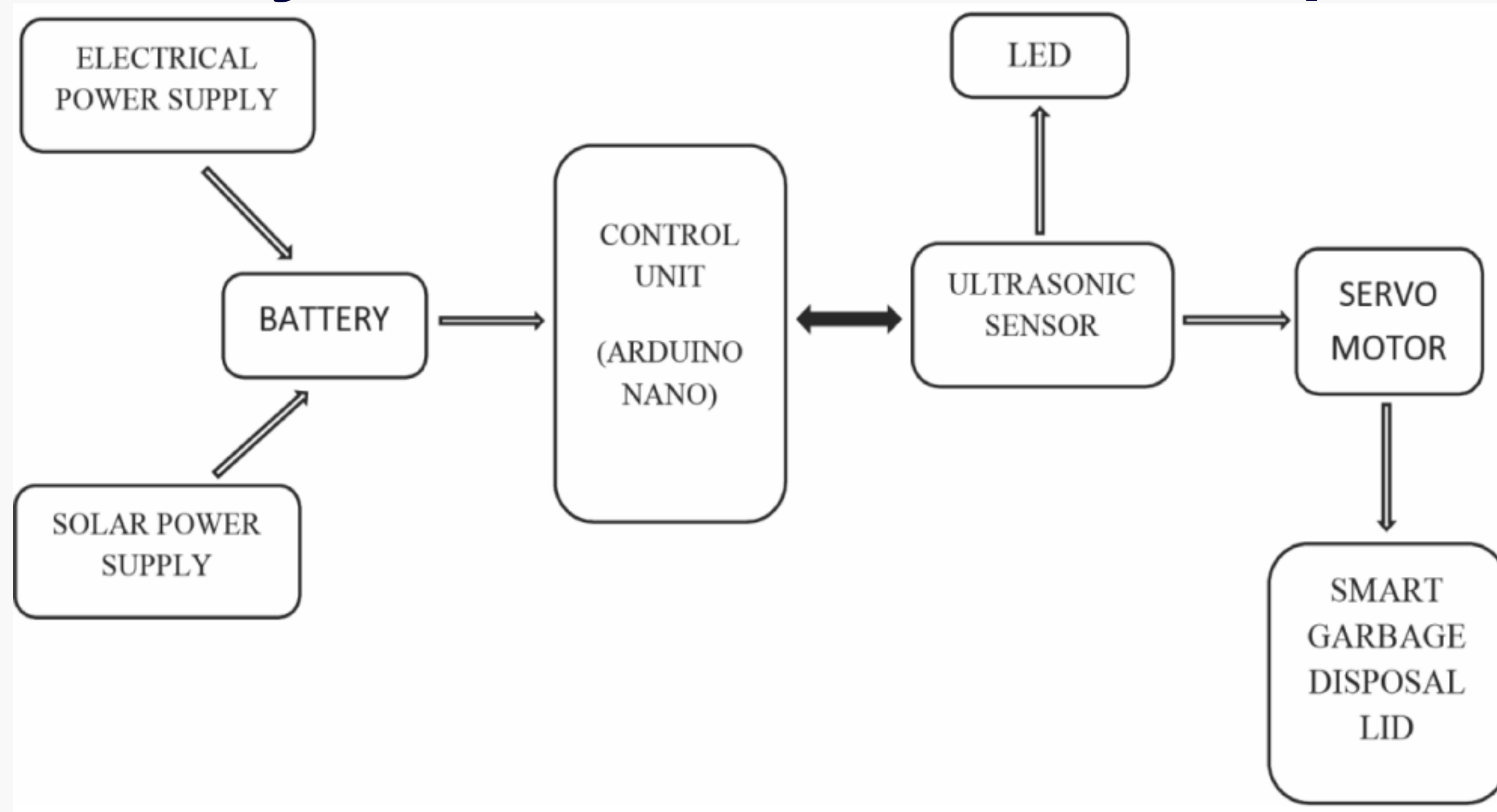
Overcoming Challenges

- **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

Team Leader Name: (Shaik Sameer Hussain)

Year: 3rd Department: CSE College Name: CMR Technical Campus

Team Member 1 Name: (Mohammed Sufiyan)

Year: 3rd Department: CSE College Name: CMR Technical Campus

Team Member 2 Name: (Syed Afzal)

Year: 3rd Department: CSE College Name: CMR Technical Campus

Team Member 3 Name: (Muzammil Shareef)

Year: 3rd Department: CSM College Name: Vageshwari Institute of Technology

Team Member 4 Name: (MD Farman)

Year: 3rd Department: CSC College Name: CMR CET

Team Member 5 Name: (Jawad ul Hassan)

Year: 3rd Department: CSC College Name: Sri Chaitanya

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5

Institute Name

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Describe Your Idea or Project

Add your text here.

Describe the Technology Stack Required:

Add your text here.

Describe your use cases

Block Diagram and List of Hardware Components

(Only for teams who have opted for generic hardware track).

Team Members' Information

Team Leader Name: (Type your name here)

Year: Department: College Name:

Team Member 1 Name: (Type your name here)

Year: Department: College Name:

Team Member 2 Name: (Type your name here)

Year: Department: College Name:

Team Member 3 Name: (Type your name here)

Year: Department: College Name:

Team Member 4 Name: (Type your name here)

Year: Department: College Name:

Team Member 5 Name: (Type your name here)

Year: Department: College Name:

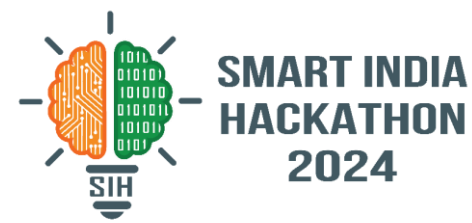
GUIDELINES

1	Please keep the number of slides as minimum as possible.
2	Present your ideas in bullet points, avoiding lengthy paragraphs.
3	Ensure clear and concise explanations for easy understanding.
4	Omit any form of code from the abstracts.

[For more information visit our website
https://hackrevolution.in/](https://hackrevolution.in/)

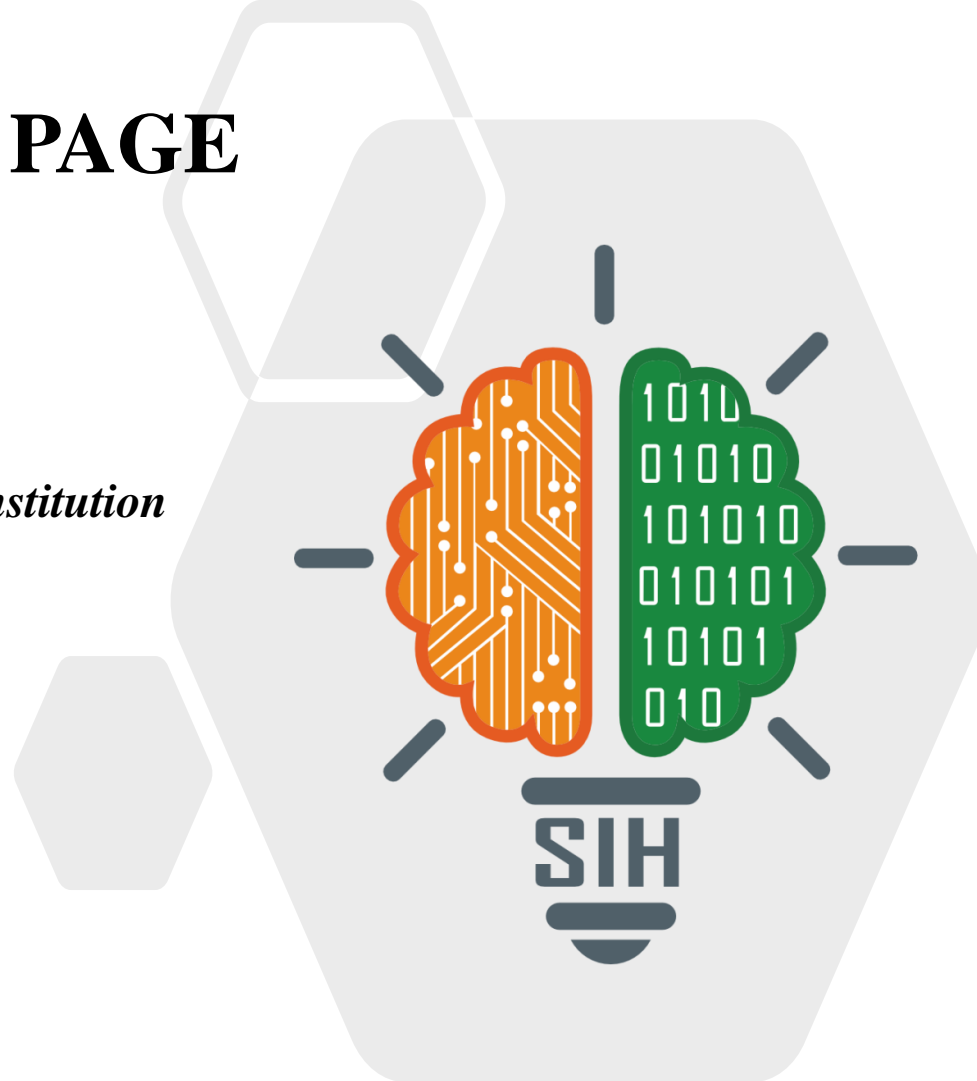
You may remove this slide (guidelines) when uploading your ideas to our website.

SMART INDIA HACKATHON 2024



TITLE PAGE

- **Problem Statement ID – 1703**
- **Problem Statement Title-** *Let's Learn Constitution in a Simpler Manner-Institution Perspective*
- **Theme-** *Miscellaneous*
- **PS Category-** *Software*
- **Team ID-**
- **Team Name –***CODE BERRY*



Proposed Solution

The "Nagrik Aur Samvidhan" platform is an advanced, AI-powered, and **gamified digital solution** aimed at enhancing constitutional literacy among citizens. Leveraging **cutting-edge technologies**.

1. Gamified Learning with AI : suite of **engaging games** such as **Spin the Wheel, Trivia Cards, and Interactive Story Games** that teach constitutional concept. These games are enhanced by **AI**

2. A Natural Language Processing (NLP) engine parses the original text of the Constitution and simplifies complex legal jargon. Using **Machine Learning** models trained on constitutional .**Multimedia Integration:** Incorporates videos, **infographics**, and quizzes to enhance **user engagement and retention**.

3. Language Translation and Accessibility: Available in multiple regional languages and designed for easy navigation, including **options for those with disabilities**.

Innovation And Uniqueness Of The Solution:

1. Constitutional Scenarios Simulation:

Create interactive simulations where **users make decisions as a judge, legislator, or executive**.

2. AI-Driven Customization: An AI-based recommendation engine suggests games and quizzes based on user progress, enhancing personalized learning experiences.

3. Blockchain for Trust: Secure blockchain technology is used to store progress and certifications earned by users,

4. Virtual Reality (VR) Features: Integrates VR to offer immersive learning experiences where users can interact with **3D models of historic events**.

How it Addresses the Problem:

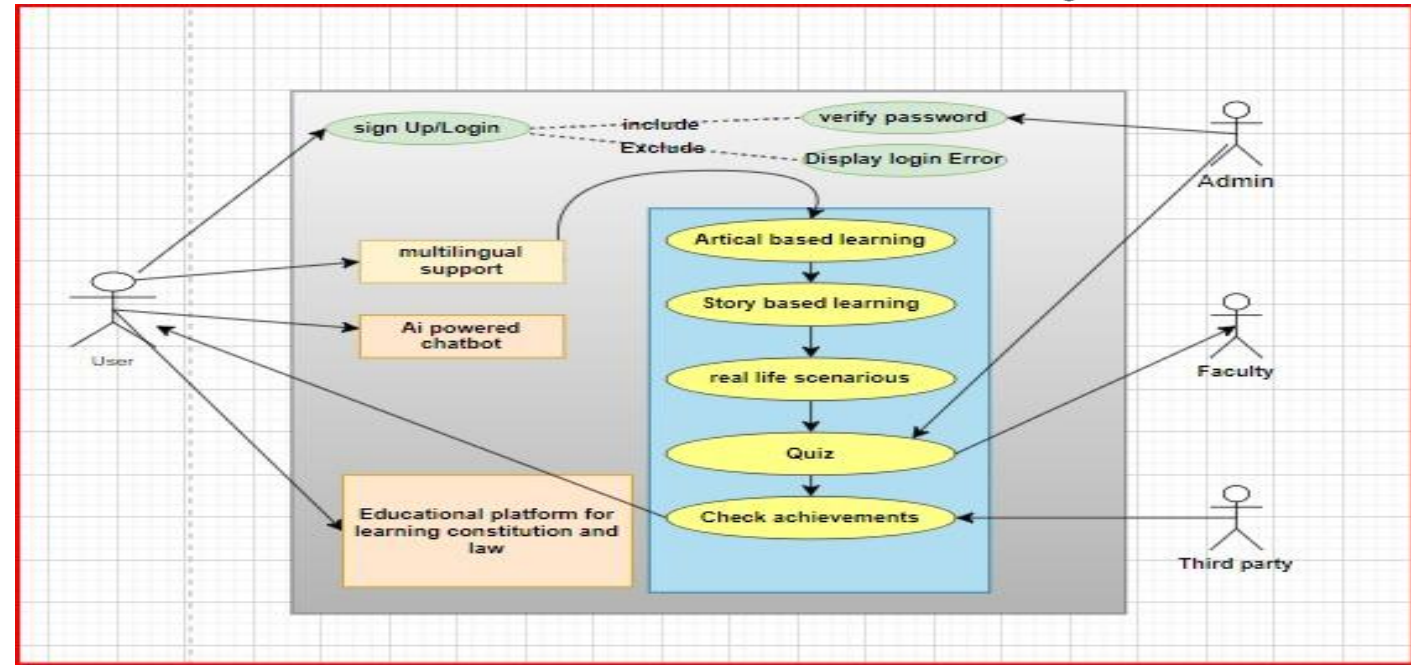
1. Bringing the Knowledge Gap

2. Engaging Youth and Adults Alike

3. Promoting Active Citizenship:

Architecture and Platform Design:

- **Cloud and Infrastructure:** AWS and GCP For cloud storage, hosting, and scalability. GCP will be used for **deploying AI and machine learning models**, and AWS will handle data storage and server-side processing.
- **Natural Language Processing (NLP):** Simplifies legal jargon and powers the translation system, making the content accessible to users in multiple languages.
- **Recommendation Engine:** AI-based model that tracks user engagement and suggests games or quizzes tailored to their knowledge level.
- **Blockchain technology** will be used to securely store user certifications and progress, ensuring data integrity
- **OAuth 2.0** and **JWT (JSON Web Token)** protocols will handle secure authentication and authorization.
- **VR.js** or **Three.js**: To create **interactive VR** experiences where users can visualize important events in constitutional history.



Frontend and backend: Our Tech Stack



Analysis of the feasibility of the idea:

- **Scalable Tech Stack:** Utilizing **cloud infrastructure (AWS/GCP)** ensures that the platform can scale to **accommodate millions of users**, maintaining performance even during high traffic.
- **Cross-Platform Compatibility:** Using **React Native** allows for seamless deployment across **web, iOS, and Android devices**.
- **AI-Driven Personalization:** **AI models (TensorFlow, OpenAI GPT)** can personalize quizzes and learning paths based on user performance, enhancing engagement.
- **Blockchain Integration:** Employing **blockchain** for storing user achievements ensures secure, **tamper-proof credentials**.
- **Cloud-Based Multiplayer System:** Implementing a real-time multiplayer option with **Firebase** enhances interactivity, allowing users to challenge each other in quiz battles or collaborate on constitutional challenges.

Potential challenges and risks:

- **Content Simplification:** Maintaining accuracy while simplifying complex constitutional articles.
- **User Engagement:** Ensuring long-term retention with compelling content.
- **Technological Integration:** Optimizing advanced features like **AR** and **AI** for all device types.

Strategies for overcoming these challenges:

- **Expert Collaboration:** Partner with legal professionals for content accuracy.
- **AI for Translation & Content:** Leverage **NLP** and **AI** to simplify and translate content efficiently.
- **Gamification & Blockchain Rewards:** Use **blockchain-based rewards** to incentivize continuous learning.

Potential impact on the target audience:

- **Empowering Youth:** With its gamified structure, the platform targets **8th-grade students and above**, ensuring early engagement with civic duties and constitutional rights, fostering responsible future citizens.
- **Widespread Civic Awareness:** The platform will play a key role in bridging the **constitutional literacy gap** across rural and urban populations by providing multilingual access to constitutional knowledge.
- **Community Engagement:** By incorporating interactive elements like **community challenges** and leaderboards, users will not only learn but also engage in **local civic discussions**, fostering a stronger democratic mindset.

Benefits of the Solution:

Social Benefits:

- **Reducing Social Inequality:** By making the Constitution understandable for the common man, the platform can bridge **educational and informational divides** across **socioeconomic**.
- **Multilingual and multimedia** support will ensure the platform is accessible to **people of all backgrounds**, including individuals with disabilities.

Environmental Benefits:

- **Digital Transition:** The gamified platform reduces the **need for paper-based** educational materials, contributing to **environmental conservation**.
- **Reduced Carbon Footprint:** The online nature of the platform eliminates the need for physical gatherings or seminars, **cutting down on transportation emissions**.

Economic Benefits:

- **Upskilling & Employment Opportunities.**
- **Cost-Effective Education:** The platform eliminates the need for expensive textbooks or private tuitions, providing **affordable or free education** to millions.

RESEARCH AND REFERENCES

India Code Documentation:

Link: <https://www.indiacode.nic.in>

Use: Provides access to the full text of the Constitution of India, useful for content extraction and simplification.

Legislative Department:

Link: <https://legislative.gov.in/>

Use: Provides access to legal documents, Central Acts, and Constitutional amendments of India

Google Cloud Firebase:

Link: <https://firebase.google.com/docs>

Use: Backend service for real-time databases, authentication, and hosting. Can be used to build and maintain your platform's database.

National Digital Library of India (NDLI):

Link: <https://ndl.iitkgp.ac.in/>

Use: A comprehensive digital repository of educational resources, potentially useful for referencing detailed constitutional information.



VR TECH