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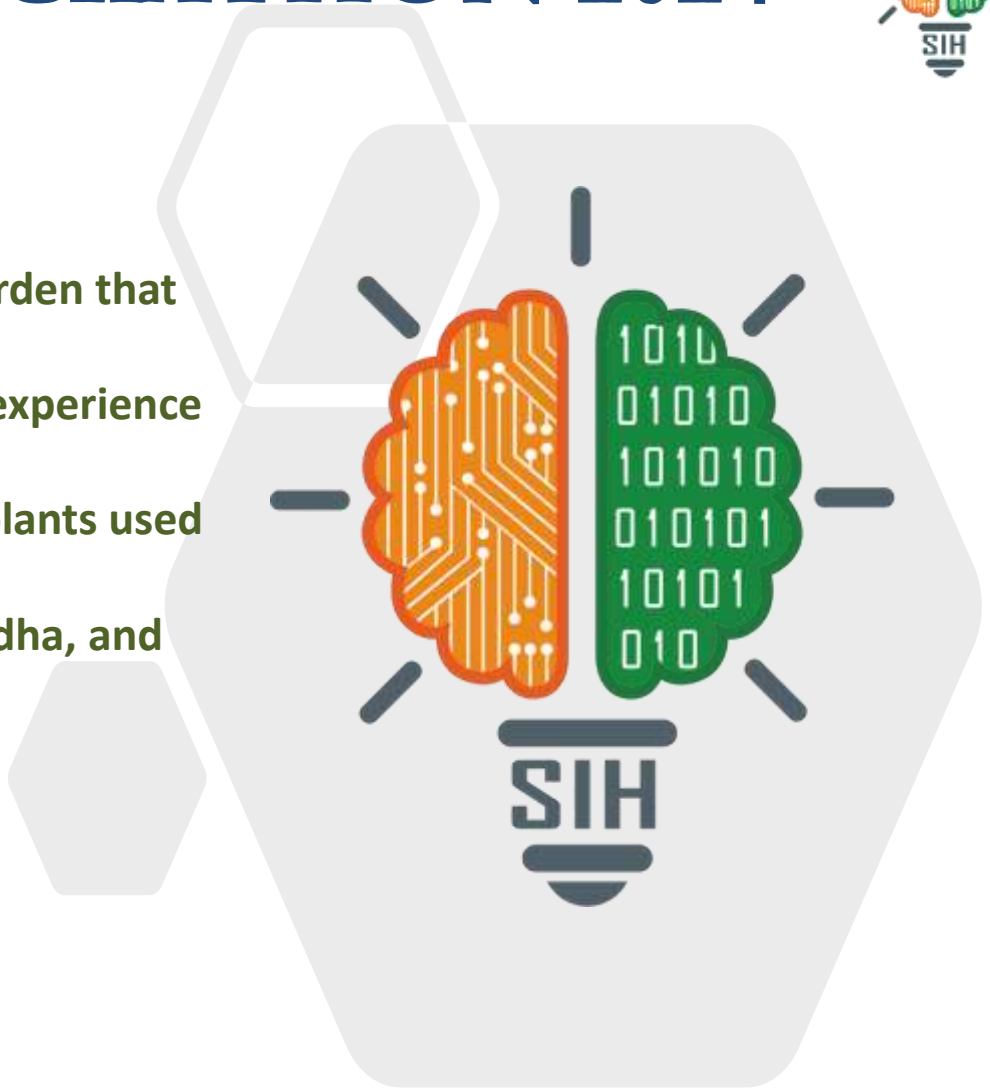

- **Problem Statement ID -** SIH1555
- **Problem Statement Title -** Create a Virtual Herbal Garden that provides an interactive, educational, and immersive experience to users, showcasing the diverse range of medicinal plants used in AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homeopathy).
- **Theme -** MedTech / BioTech / HealthTech
- **PS Category -** Software
- **Team ID -** 19549
- **Team Name -** LUMINX AXIOS

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Idea And Resolution

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Proposed Solution

Interactive 3D Virtual Herbal Garden leveraging **Three.js** for an immersive 3D ecyclopaedia environment to explore the AYUSH sector. An **3D Encyclopedia** consisting vast details of the sector.

In Addition with the **facility for the Ayush Authority** to **Add and Update** the environment leveraging **photogrammetry** and **AI driven system**. Gamified exploration with features like **Personalized garden, Different Theme simulation** etc.

Implementation/Features

- **Three.js/Babylon js** for Interactive virtual garden designing.
- **Photogrammetry technology** for acquisition of 3D herbal models.
- Methods like **Polygon reduction** and **LOD techniques** for fast smooth model rendering.
- **AI driven Interaction** with the 3D models e.g. **Advance Simulations of different aspects of the herbal plants.**
- **First person navigation** assisted by **voice guidance** using **NLP**.
- **Amazon Web Services for Storage**: Utilization of technologies like **cloudfront** for **3D model caching.**

Solution Resolution

- **Three.js Web App**: Universally accessible via any browser.
- **Optimized Performance**: Efficient rendering techniques reduce CPU load, allowing smooth performance even on low-end devices.
- **Cloud-Based Scalability**: **Scalable, fast loading and caching of the models for ease of retrieval**.
- **AI-Powered Interaction** makes the garden dynamic and responsive.
- **Customizable Gardens** encourages interaction, contribution, and deeper learning.

Unique Value Proposition

- **Photogrammetry** integration for easy model addition.
- **Personalized garden creation by bookmarking** their favorite **Herbs/plants and AI assistance for more interactivity**.
- **Different Themes** for different environment simulation.
- **Community and Ecosystem support** for AYUSH members.
- **Prediction of environmental conditions**, and **personalized recommendations** to users using **AI smart models**.
- **Gamified User experience**.

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Process Flow and Implementation

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Technology Used

- **Frontend**
  React, Next js
- **3D modeling and styling**
  Three.js, Tailwind
- **Mobile App**
  React Native
- **Backend**
  Express js (server side logic), Prisma ORM (Database Management)
- **Databases**
  MySql, AWS S3
- **Logic/Algorithms**
  Python, Javascript

Prototyping Update

50% of the prototyping is completed.

Process Flow Diagram

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Feasibilities and Potential Challenges

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Feasibility of the Idea

Technical Feasibility

- **Industry Level Technologies** like **Three JS, photogrammetry** are **well suited** for scene creation to rendering of the models to creation.
- **Robust Cloud Infrastructure** for data storage to handle model storage, AI computations etc.
- **AI driven interactions** using ML models and navigations with NLP, using **established ML frameworks.**

Financial Feasibility

- **Funding Sources**: **Government grants**, **sponsorships**, **collaborations** with companies in the AYUSH and wellness sector.

Market Feasibility

- **Target Audience**: Students, healthcare professionals, researchers etc.
- **Less similar platforms** with less functionalities and interactivity to offer.
- **One could look up to Wikipedia for information, but to explore and learn in a real environment, one thing closest to it is to look up it's virtual form.**

Potential challenges and risks

Technical Challenges

- **Performance Optimization** for different platforms.
- **AI simulations** requires significant computing resources, slowing down the application.
- **Integration of Multiple Technologies** increases complexities.
- **Dataset accuracy, NLP accuracy**.

Financial Challenges

Maintenance Costs: cloud storage, server management etc. without enough users or funding.

Market Challenges

- Increasing Ayush market leads to increase in the application market, hence **Challenge in scalability**.
- **User Adaptation** to new Technology.
- **Limited Internet network areas** in target demographics **limits the accessibility**.

Strategies to overcome challenges

Technical Strategies

- **Use optimization techniques** like LODs and polygon reduction, caching etc.
- **Offloading AI Tasks to the cloud** could reduce computing resource consumption.
- **Modular design** reduces integration complexities.
- Improving dataset accuracy with **feedback loops** and **diverse training and hybrid models** for NLP accuracy.

Financial Strategies

Scalable Cloud Infrastructure: pay-as-you-go-model like AWS integration.

Market Strategies.

- Scalability using **microservice architecture**.
- **Simplified UI** and **smart navigation** implementation.
- **Edge Computing** to reduce latency for slower internet connection.
- Scalability **Localization** in different demographics.

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Impact and Benefits

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Impact on The Target Audience

Engaging And Improved way of exploring

- Deepening understanding and appreciation of herbal medicine.

Health and Wellness Awareness

- Fostering an **increased awareness and adoption** of AYUSH practices.

Personalized Wellness Recommendations

Help users **discover plants matching specific health needs, boosting interest in preventive and natural healthcare**.

Raising Awareness on Plant Conservation

- Help users **understand the importance of plants** in the ecosystem and to **contribute to environmental sustainability efforts**, e.g. planting medicinal gardens or conserving endangered species.

Community interaction and collective learning by features such as **Personalization** and **Sharing of Information**.

Introduction of advanced technologies to traditional sectors, enhancing digital literacy

Benefits of the Solution

Social Benefits

- Helps preserve and spread AYUSH herbal knowledge.
- **Community Interaction**: Facilitates knowledge-sharing.

Economic Benefits

- **Cost-Efficient Education** for an affordable alternative to physical gardens and field trips.
- **Potential Market Expansion**: Increases interest in herbal remedies, potentially boosting the AYUSH and natural medicine sectors.

Environmental Benefits

- **Raises awareness of eco-friendly gardening practices**.
- **Encourages sustainable planting habits** by suggesting plants suited to environmental conditions.

Technological Benefits

- Cloud-based platform ensures **smooth performance worldwide**.
- AI-driven models offer **insights into plant growth and sustainability**.

Personalization User Experience

- **Tailored Learning**: Personalized gardens and plant exploration enhance the learning experience.

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Research and References

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Important References taken for the Research Work

- Initial Demo testing models collected from https://www.cadnav.com/3d-models/plant/
- Ayush medicinal dataset collected from https://www.kaggle.com/datasets/aryashah2k/indian-medicinal-leaves-dataset/data
- Market & Industry Research done from
  - https://www.investindia.gov.in/sector/ayush#:~:text=One%20of%20the%20fastest%20growing,nearly%203%20Mn%20job%20opportunities
  - https://www.ibef.org/industry/ayush
- Three js Documentations for integration feasibility: https://www.bing.com/ck/a?!&&p=508da220416cc841e0ac224c58f7f5a37dfc2d11a7d2d57352a8a94ce76011f2JmltdHM9MTcyNjcwNDAwMCZpbnNpZD01Njg2&ptn=3&ver=2&hsh=4&fclid=2bcdaf0f-6de4-6915-1702-bcb76c9368c1&psq=threejs&u=a1aHR0cHM6Ly90aHJlZWpzLm9yZy8&ntb=1
- Photogrammetry technology: https://www.bing.com/ck/a?!&&p=328814734b6d1da9a0a574aa1f057dce554be3e1c4bfd4d1af028665835deba9JmltdHM9MTcyNjcwNDAwMCZpbnNpZD01Mjg5&ptn=3&ver=2&hsh=4&fclid=2bcdaf0f-6de4-6915-1702-bcb76c9368c1&psq=photogrammetry+technology&u=a1aHR0cHM6Ly9ibG9ncy5udmlkaWEuY29tL2Jsb2cvd2hhdC1pcy1waG90b2dyYW1tZXRyeS8&ntb=1
- Other searches are from various sources from the web.