**Major Project Proposal**

# Team Id: 25\_CS\_4A\_09

# Team Details:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S**  **No** | **Full Name** | **Roll No** | **Branch &**  **Section** | **Mob No** |
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**Project Title:**

Geospatial Remote Sensing Platform for Environmental Monitoring and Analysis.

# Domain: (Select all relevant Options)

|  |  |
| --- | --- |
| **1. Software-Web Application** | 2. Software-Mobile Application |
| **3. Artificial Intelligence/Machine Learning/Deep Learning** | **4. Computer Vision/Image Processing** |
| 5. Blockchain | 6. Internet of Things |
| 7. Natural Language Processing | **8. Big Data / Cloud Computing** |
| 9. Others (Specify if any): | |

**Problem Statement:**

In the face of rapid urbanization and environmental shifts, the effective management and analysis of geospatial data pose formidable challenges. Current solutions are plagued by accessibility barriers, scalability limitations, and a lack of advanced analytics capabilities, impeding the efficient utilization of remote sensing data. This shortfall stifles crucial tasks like watershed analysis, deforestation monitoring, and habitat suitability assessment. Consequently, researchers grapple with the complexity of analysing satellite data for deforestation tracking, while policymakers lack intuitive tools to assess flood risks in specific watersheds. Even environmentalists encounter difficulties in harnessing remote sensing data for habitat protection initiatives.

The repercussions of these limitations extend beyond inconvenience. Inefficient resource management persists due to the unavailability of precise environmental data, leading to misallocation of resources. Delayed responses to environmental emergencies exacerbate the severity of crises, and the path to achieving sustainable development is obstructed by challenges in monitoring environmental health and implementing effective conservation policies. Hence, a critical need emerges for a user-centric Remote Sensing and Geospatial Data Analytics Platform. The proposed solution must transcend current limitations by providing intuitive accessibility, robust scalability, and comprehensive analytics tools tailored to the diverse needs of stakeholders involved in environmental monitoring and management.

# Proposed Solution:

Our proposed solution is to develop a state-of-the-art Remote Sensing and Geospatial Data Analytics Platform that addresses the pressing challenges outlined in the problem statement. This platform will revolutionize the way geospatial data is managed, analysed, and utilized for environmental monitoring and management purposes. The platform will feature a user-centric design, offering intuitive interfaces and comprehensive tutorials to empower users of all technical backgrounds to leverage its functionalities effectively. Leveraging cutting-edge technologies such as machine learning, image processing, and geospatial analysis algorithms, the platform will enable users to extract actionable insights from complex geospatial datasets with ease.

Major highlights of the platform include:

* **Interactive Map Interface:** allowing users to navigate and explore geospatial data effortlessly.
* **Advanced Analytical Tools:** providing capabilities for watershed analysis, deforestation monitoring, habitat suitability assessment, and more.
* **Data Retrieval and Integration:** seamlessly integrating diverse geospatial datasets, including satellite imagery, climate data, and land cover maps.
* **Visualization and Reporting:** enabling users to visualize analysis results through interactive charts, graphs, and maps, and generate comprehensive reports for decision-making.

By offering a comprehensive suite of tools and functionalities, our platform will empower researchers, policymakers, environmentalists, and other stakeholders to make informed decisions and take proactive measures for environmental conservation and sustainable development.

# Unique/Distinctive feature of the solution:

1. **Intuitive Accessibility:** Our platform prioritizes user experience, offering intuitive interfaces and comprehensive tutorials to make geospatial data analysis accessible to users of all skill levels, fostering greater understanding and proficiency.
2. **Scalability and Flexibility:** Unlike existing solutions that often struggle with scalability and customization limitations, our platform is meticulously designed to scale seamlessly and adapt flexibly to the evolving needs of users, ensuring optimal performance, and usability across diverse environmental monitoring and management scenarios.
3. **Comprehensive Analytics:** While some competitors may offer basic geospatial analysis capabilities, our platform stands out by providing a comprehensive suite of tools for advanced analytics, including a wide array of machine learning algorithms and sophisticated predictive modelling capabilities, empowering users to derive deeper insights from their geospatial data.
4. **User-Centric Design:** Unlike complex and difficult-to-use solutions in the market, our platform prioritizes user experience and ease of use, ensuring that users, regardless of their technical background, can quickly and effectively analyse geospatial data without the need for extensive training or specialized expertise, thereby democratizing access to powerful geospatial analytics tools.

# Tools/Technology Uses:

1. **Hardware Requirements:**
2. **Processor:** i5/ Ryzen5 or equivalent
3. **RAM:** 8GB minimum, 16GB recommended
4. **Storage:** 256GB SSD or higher
5. **Graphics Card:** NVIDIA GeForce GTX 1650 or equivalent
6. **Others:** High-speed internet connection
7. **Software Requirements:**
8. **Operating System:** Windows 7 (or higher) or Linux (Ubuntu 16.04)
9. **Development Tools:** Geospatial Platform Software (e.g., QGIS, GeoServer), Jupyter Notebook, Google Colab, Git, VS Code/ WebStorm
10. **Database:** MongoDB, MySQL, PostgreSQL
11. **Web Browser:** Standard web browser (Chrome/ Firefox)
12. **Others:** Programming Languages (Python, JavaScript), Data Analysis Tools (Machine Learning Frameworks, Data Science Libraries)
13. **Others:**
    1. **Dataset:** Integration with satellite imagery providers (e.g., NASA, ESA)
    2. GIS software (e.g., ArcGIS, QGIS) for data visualization and analysis

(To be Filled by Faculty/Evaluator)

## Proposal Evaluation:

1. Right Identification of the Problem (Appropriate selection of the problem)?
   1. Excellent b) Good c) Needs Improvement d) Unacceptable
2. Relevance of the Solution (Adequately addressing the problem/need)?
   1. Excellent b) Good c) Needs Improvement d) Unacceptable
3. Innovativeness in the Solution (Distinctive innovative components/features of the solution)?
   1. Excellent b) Good c) Needs Improvement d) Unacceptable
4. Uniqueness of the Solution (Intellectual Property Component)?
   1. Excellent b) Good c) Needs Improvement d) Unacceptable

## Improvements/ Suggestions by the Evaluator:

1.

2.

3.

4.

**Name of Faculty:**

## Designation:

**Signature with Date:**