

#Instructions

- Please make a copy before you edit it: File -> Make a copy.
- Please find the problem statement and detailed template below.
- From where the template starts you will be allowed only 3 pages for the solution summary
- Please submit the final solution document with an access link in the [submission form](#)

Girl Hackathon 2024

[Do not edit this section. This is read-only]

AI for Social Good

Theme:

The evolution of AI has been nothing short of extraordinary. From humble beginnings, machines now learn, adapt, and even create with startling sophistication. Let's focus on using this power to address the challenges we face.

The greatest innovations are those that solve real-world problems and make a positive difference. This hackathon is a chance to create solutions that improve lives, streamline processes that make a tangible difference in healthcare, education and sustainability, and countless other fields for the next billion users. Let's make this hackathon a testament to a future where AI isn't just intelligent – it's transformative.

Participants are encouraged to create an application or enhance existing platforms to achieve the following goals: **[Choose 1 of the following]**

Problem Statements:

- **Adaptive Learning for Basic Education:** Develop a virtual tutor platform that assesses the learner's understanding level at every step and curates relevant content to enhance the learning experience.
- **Disaster Relief:** Enhance disaster relief and response efforts by leveraging satellite imagery during disasters like floods and wildfires, integrating existing geospatial information, and utilizing environmental data for affected regions.
- **Medical Assistant:** Develop a healthcare recommendation system that analyzes user symptoms leveraging symptom data (using mock data), healthcare provider databases, and user ratings, recommends doctors with matching specialties and aligned schedules

Goodluck!

Submission:

Participants are required to create a PDF document as the final submission. The document should contain the link to a public GitHub repository (accessible and open to all).

The repository should have all the collaterals of the code, along with a README file. The code can be written in any open-source programming language using standard open-source libraries.

The README file should cover how to generate the environment needed to run the code, how to run the code, and any other necessary information.

Evaluation Rubrics:

- Potential Impact of Proposed idea (25%)
- Usage of correct DS/Algorithm and AI technique (40%)
- Code Quality (20%)

- Testing (15%)

[Find Template to use below](#)

[\(3 Pages Maximum from the template below\)](#)

2024 Girl Hackathon Ideathon Round: Solution Submission

Project Name: Wildfire Prediction

Participant Name: Vanshika Rana

Participant Email ID: vanshika077btainl22@igdtuw.ac.in

Participant GOC ID: **162759454277**

ReadMe File Links (Eg: Github) https://github.com/VanshikaRanaa04/Vanshika_Girl-Hackathon_2024

Brief summary

Problem Statement-Disaster Relief: Enhance disaster relief and response efforts by leveraging satellite imagery during disasters like floods and wildfires, integrating existing geospatial information, and utilizing environmental data for affected regions.

Solution-I aim to develop an application that provides:

1. Data Fusion: Combine drone, weather, and satellite data for robust analysis.
2. AI Prediction: Employ deep learning models like cnn for precise wildfire forecasting.
3. Optimized Routing: Refine algorithms for efficient rescue pathfinding using dijkstra algorithm.
4. Real-time Collaboration: Enable seamless responder coordination.

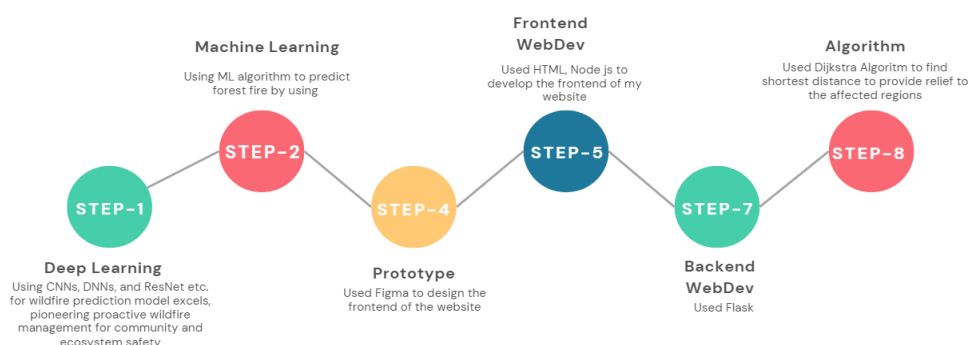
Problem Statement

What are you doing, why, and for whom?

As the statistics by Global Forest reveal there was a distressing loss of 16.6 million acres of tree cover to wildfires in 2022, I'm developing an application tailored to predict wildfires, provide real-time mapping, and optimize rescue routes. This endeavor is fueled by a deep empathy for those affected and a fervent commitment to leveraging technology for the greater good. My aim is to empower emergency responders with timely insights, ultimately safeguarding lives and preserving our precious natural ecosystems.

Design Idea and approach

A short and sweet overview of your implementation ideas. You don't need to contain every detail of your implementation, and should omit code here specifically. Use a diagram that illustrates your solution when necessary.



The approach used to generate the algorithm.

1. Deep Learning (Wildfire Prediction):

- Experiment with different CNN architectures such as ResNet, VGG, or custom models.
- Utilize techniques like data augmentation and transfer learning to enhance model performance.

2. Machine Learning (Forest Fire Damage Area Estimation):

- Explore regression algorithms beyond random forests, such as gradient boosting or support vector regression.

3. Dijkstra Algorithm for identifying the shortest path.

Impact

How will the proposed project address a societal challenge, and to what extent? Is the application grounded in research and data about the problem and the solution? Is there a clear plan to deploy the AI model for real-world impact, and what are the expected outcomes?

1. Early detection and prediction of wildfires, enabling proactive measures to mitigate fire risks and protect vulnerable areas by using Deep Learning.
2. Accurate estimation of forest fire damage areas, facilitating efficient resource allocation for firefighting and post-fire recovery efforts using Machine Learning..
3. Improved decision-making for wildfire management authorities, leading to reduced property damage, loss of life, and environmental impact associated with wildfires.
4. Real-Time Analysis of Disaster
5. Utilization of Dijkstra's Algorithm for Early Rescue Operations

Feasibility

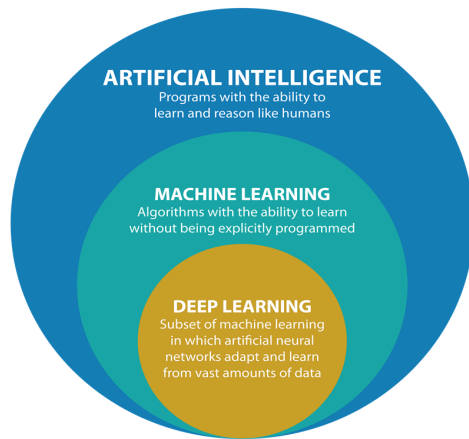
Does the team have a well-developed, realistic plan to execute on the proposal? Does the team have a plan to access meaningful dataset and technical expertise to apply AI to the problem? Have they identified the right partners and domain experts needed for implementation?

1. Execution Plan:
 - The plan for execution is well defined, including AI model development, data collection, and deployment phases.
2. Dataset Access:
 - Access to relevant datasets, including historical wildfire data and satellite imagery, ensures comprehensive data availability on sites like Kaggle and IEEE..
3. Technical Expertise:
 - Technical skills in AI, including machine learning algorithms and deep learning architectures and Data Structure and Algorithm along with the knowledge about Frontend and Backend Web Development.
4. Partnership and Expertise:
 - Collaboration with wildfire management authorities and AI domain experts in future could enhance project effectiveness.

Use of AI

Does the proposal apply AI technology to tackle the issue it seeks to address?

1. Deep Learning (DL) Aspect:
 - a. Utilizes convolutional neural networks (CNN) and DNN for satellite imagery analysis and wildfire pattern detection.(Doc-1)
 - b. Implements deep learning architectures like ResNet or VGG for enhanced feature extraction and prediction accuracy.(Doc-2)
2. Machine Learning (ML) Aspect:
 - a. Applies algorithms such as random forests regression, ridge regression ,lasso regression,svm for forest fire damage area estimation.



Alternatives considered

Include alternate design ideas here which you are leaning away from.

1. Real-Time Map Integration:
 - Implement a dynamic map to visualize active wildfires and their locations.
 - Provide key metrics like wildfire count and intensity for situational awareness.
2. Dijkstra's Algorithm Integration:
 - Optimize response routes using Dijkstra's algorithm for swift and safe navigation.
 - Guide responders in real-time to reach wildfire locations efficiently.
3. Enhanced User Experience:
 - Develop an intuitive interface with zoom, pan, and search functionalities.
 - Allow customization of map layers and alerts for user preferences.
4. IoT and Sensor Integration:
 - Integrate IoT devices for real-time weather and environmental data.
 - Provide early warnings based on sensor analysis for proactive response.

References and appendices

Any supporting references, mocks, diagrams or demos that help portray your solution.

Any public datasets you use to predict or solve your problem.

I have used two public datasets :

1)<https://www.kaggle.com/datasets/abdelghaniaaba/wildfire-prediction-dataset>

2)<https://www.kaggle.com/datasets/phylake1337/fire-dataset>

