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**COMSATS University Islamabad (CUI)**

**Project Proposal**

**for**

**Project Title**

A i r w o r x

Version 1.0

***By***

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**Project Description**

In the case of disaster relief, the search operation and damage cost accumulation are quite challenging task and that being done manually can be trickier. Recent advances in unmanned aerial vehicle (UAV), now synonymously, “drone” technologies will be suitable for this purpose and can help in the effort to search for living survivors in the aftermath of a disaster (Flood/Earthquake). Moreover, our system will allow the user to generate a detail report of the disaster comprehending all the aspects of calamity including damage cost, building/houses affected, people and livestock affected. The proposed system will include more in-depth features like measuring the height and area covered by a building to make sure it fits the government given regulatory and another useful feature is to locate a criminal using the novel computer vision technology, identifying its number plates of vehicles and faces of criminals. It will also help authorities to automatically detect fire like forest fires at initial stages before it spreads wider. The proposed system will be able to process live image and display the results in real time.

**Project Methodology**

Computer vision will be used to process the data coming from drone footages, system will process the footage and data received and then appropriate outputs will be displayed.

All data will be gathered from different footages and then the data will be used for further processing.

For reports and analysis, the system will use the processed data of footages to generate appropriate results after further processing.

# Tools and Technologies

Table 2: Tools and Technologies for Proposed Project

|  |  |  |  |
| --- | --- | --- | --- |
| **Tools**  **And**  **Technologies** | **Tools** | **Version** | **Rationale** |
| PyCharm | 2020 | IDE |
| MongoDB Compass | 2021 | DBMS |
| VS CODE | 2021 | Code Editor |
| Sublime Text | 2021 | Code Editor |
| Google Chrome | 2022 | Web Browser |
| Adobe illustrator | 2022 | Design Work |
| Figma |  | Prototype Design |
| MS WORD | 2016 | Writing |
| MS Project | 2016 | Project Manager |
| PowerPoint | 2016 | Presentations |
| **Technology** | **Version** | **Rationale** |
| NodeJS | 17 | Back End Development |
| OpenCV | 3 | Computer Vision |
| ImageAI |  | Computer Vision and AI |
| Python Utils |  | CV |
| Tenserflow |  | AI and DL |
| HTML CSS JS |  | Front End Development |
| Firebase |  | Database |

# Project Outcomes

Airworx is an AI based system which will have multi-dimensional uses in practical life. There are a lot drones in the market which are used for various purposes but by integrating AI with existing systems will make things more efficient and much advanced. The proposed system is going to be very useful for daily tasks which are being done manually this will be useful in many fields from crime control to construction, from surveillance to disaster management/fire detection it will help people and make all of the processes much easier and accurate. This system will be using AI on the footages of drone, and it will carry multiple functionalities with those footages. System will have certain different tasks which it will carry out using image processing. The system will be designed to establish solutions for a number of challenges, including handling blurring in the captured images, data from multiple sources (e.g., drones or helicopters), the scarcity of labeled flood images (i.e., since disasters are uncommon), enabling the considered networks to work well on top-view images on which they are not originally trained as well as avoiding over-fitting to training data.

**Modules**

1. **Flood detection**: In this module, we will be using open cv to detect the flood depth and the dimension of the area and population affected by the flood. Our unique algorithms will be able to calculate damage cost.
2. **Earthquake detection & Approximation**: In this module, with open cv the system will be able to detect number of people and buildings affected by the earthquake calculate the cost of the damage.
3. **Building Structure estimation**: In this module, the system will detect height and area of the building and compare it with their previous forms to estimate the damage caused by the natural disaster.
4. **Vehicle detection**: we will achieve the above feat through detecting vehicle’s number plate using AI.
5. **Face Detection**: We will be detecting faces of people using Computer Vision.
6. **Fire Detection:** This module will allow authorities to detect forest fires or fire in area at initial stage so action could be taken before fire spreads wider.
7. **User profile management**: This module in the System is a core app used to manage all user information and access. Each user will be assigned a core identity user account with a single profile within the system.
8. **Reports generation**: This module will allow the system to generate a report of the disaster that will contain all the necessary information regarding the disaster to help a layman understand the damage and cost of the disaster due to flood or earthquake in specific area.
9. **Comparison charts**: This will make the report look more professional and make it understanding better. We will be using a library called recharts to achieve this feat.
10. **Police Surveillance Assist & Alerts**: In this module, as soon as our system detects something anomalous activity (i.e guns or blood) in its footage it will instantly alert the police with its GPS location and the possible threat.
11. **Analysis**: In this module, the system will analyze the current disaster info with the disasters in the past and generate a report to compare both the disaster to help the user get a broader view of the situation.
12. **Connection**: In this module, the user will be able to make a connection with the drone and open cv project through our web app.
13. **DDOS attack protection**: This module will allow the system to be protected from different kind of attacks that can intervene in the working of the system. We will achieve this using different techniques.
14. **Data encryption**: We suppose our data will be confidential and needs to be protected from unauthorized users so all our confidential data will be encrypted.