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"Third Eye"-Enhancement of Women Safety Using Unmanned Aerial Vehicle

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ABSTRACT: In Recent Survey on Safety of Women, a study was released that ranked India as the most dangerous place because of its high incidences of sexual violence, lack of access of Precautionary Security measures. Our Project mainly focuses on the safety of Women 24x7 by using drones to avoid the crime against the women. Our Custom-made Mobile application, "The Third Eye" consist of SOS Facility which when triggered manually or by Bluetooth pendant sends the message with the real-time location to the registered guardians and control station. The police direct the drone to the location and to draw the attention of nearby people using buzzer (130 dB) and monitor the situation in real time via camera. By this we can identify the criminal through both drone camera and victim personal mobile camera. The other security measure is to apply pepper spray which will be shot from drone and controlled by drone operator to avoid any further attacks on victim by the criminal. Then the drone navigates the victim using tracking algorithm to the safe location by monitoring the real-time traffic data and by that time police arrives at the prime location.

KEYWORDS: Unmanned Aerial Vehicle (UAV), Geolocation, Bluetooth Pendant, Mobile Application

I.INTRODUCTION

It is True that the Unmanned Aerial Vehicles (UAV) are the emerging technologies that is been implemented in various fields. There are Different Journal Papers that showcase the Necessity of drones in enhancing the already existing solutions for a given problem. These Professional UAV's are applied in the field of surveillance in enhancing security of the Country. There are also different Journal Paper published regarding the women safety application but failed to provide immediate assistance to the women 24*7.Inorder to improve the efficiency of the system an integrated Project in which women security is enhanced through surveillance by adding a camera to the drone for live recording of the geolocation of the victim is present. To prevent the attacker from harassing the women, the Drone is fitted with a Pepper Spray which is enabled through sensor motor. Once the Panic Button is pressed by the victim, it automatically sends an alert to the nearby police station. The Geolocation of the Victim is also sent to the victim's guardians. The user initially needs to register themselves using the custom-made mobile application. In order to avoid imprecise or false information the user has to register themselves using the Aadhar ID. The Panic Button is displayed on the homepage.The Custom Made Mobile Application is also employed with other additional functionalities.The Custom Mobile Application is designed for the Smart Phone with enhanced functionality that provides assistance to the user and is designed using Android Studio, The Web Interface for the Control Station is implemented using REACT JS were the Geo-Location is tracked through Deploying Map box. The Drone Control is Implemented using MAVLINK protocol and is managedby the Mission Planner. The Person Tracking Algorithm is Implemented using OpenCV and Python were Object Detection is based on Histogram of Gradient Analysis.

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II.RELATED WORK

Ravi Sekhar Yarrabothu,Bramarambika Thota have stated an solution for the women safety using an mobile application which is deployed with an SOS button. This is similar to an alert system where the users can register themselves and send alert to their guardians and the police station. It provides tracking of the user's geolocation in which the geolocation of the user is received via SMS by which the victim can be tracked and rescued quickly. The application does not provide a clear view on how the user will alert the police if the SOS button cannot be pressed quickly by unlocking the phone and by the time the accuser attacks the women. [1]

Majed Alwateer,Wenny Rahayu,Seng W. Loke,"Drone Services- An Investigation via Prototyping and Simulation" 2018, IEEE 4th World Forum on Internet of Things (WF-IoT), the system has stated a drone management system thatImplements investigation via prototyping and simulation were the request from the user is evaluated and managed bychecking the availability of drone and driven for data collection, provisioning and processing. [2]

Syed Razwanul Haque, RobiKormokar,AkhlakUz Zaman,"Drone Ground Control Station with Enhanced SafetFeatures",2017 2nd International Conference for Convergence in Technology (I2CT), elaborates the implementation ofDrone management system by avoiding the crash of drones through software and hardware simulation such as joystick byretrieving the telemetry data and monitoring of drone navigation through map provisioning and driving them through non-military zones. [3]

III.EXISTING SYSTEM

The existing system proposed for Women Safety using drones has not been implemented yet. Several Women Safety mobile applications have been developed and available in the app store but none haven been utilized efficiently mainly due to lack of immediate assistance and awareness among the citizens. The Drones are emerging technology which are widely used for surveillance but integration of mobile application with a drone controlled through the base station has not been implemented in India.

IV.PROPOSED SYSTEM

The Proposed system consists of different modules each carrying a specific task which integrated together forms the final product. The Client Interface is the Mobile Application which is installed in the mobile of the user who is the women. The Mobile Application [1] is developed using Android Studio. For efficient usage the user interface module is enriched with user friendly display such as with single click of the SOS Button [4] an alert is triggered to the base station. The Police directs the control of flight path tracker of the Unmanned Aerial Vehicle (UAV)The Alert send by the user is evaluated in the Alert Monitoring Module. The Alert is monitored through the MAP integrated by tracking the geolocation of the victim by visualizing the co-ordinates of the location. The management of a swarm of drones for a particular range of area is managed and controlled by the UAV Management and Monitoring Module.This Module depicts the overall control of the UAV and storing of their sensor data, flight path tracking of the UAV,checking the availability of the UAV, Assigning the nearest UAV to the mission,Navigation of the UAV and its functionalities.The UAV is monitored in the ground base station using the Mission Planner.The Mission Planner is a software used for control of the UAV in ground base station. The server module is the Web Interface which is implemented using the REACT JS for Map provisioningand tracking. The MongoDB is used as database for storage of details.An integrated system using mobile application [1],[5] which is interfaced with drone controlled through base station [3],[4],[6] for management of drones [7] ,[8] and monitoring of swarm of drones [9],[10],[11],[12] is employed for women safety enhancement.

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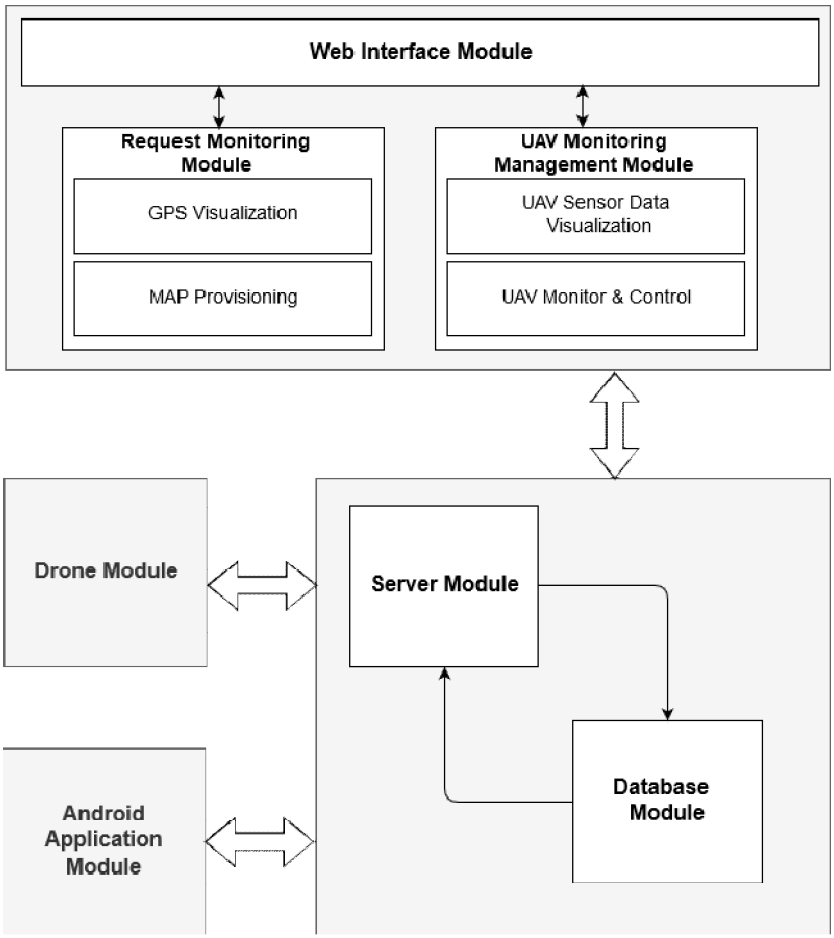

4.1 Architectural diagram

4.1 illustrates the Development scope entity consists of the Web interface which is employed through Mission Planner and The Base Server. The Mission Planner is a ground control station for the quad copter used as a configuration entity of dynamic controlled supplement for autonomous vehicle. The Telemetry hardware connected involves Monitoring of the Drone operation, Visualizing, Recording and Analyzing Telemetry logs. The Recorded Telemetry Logs are stored in the Local Base Server for analyzing the performance factor of the UAV.

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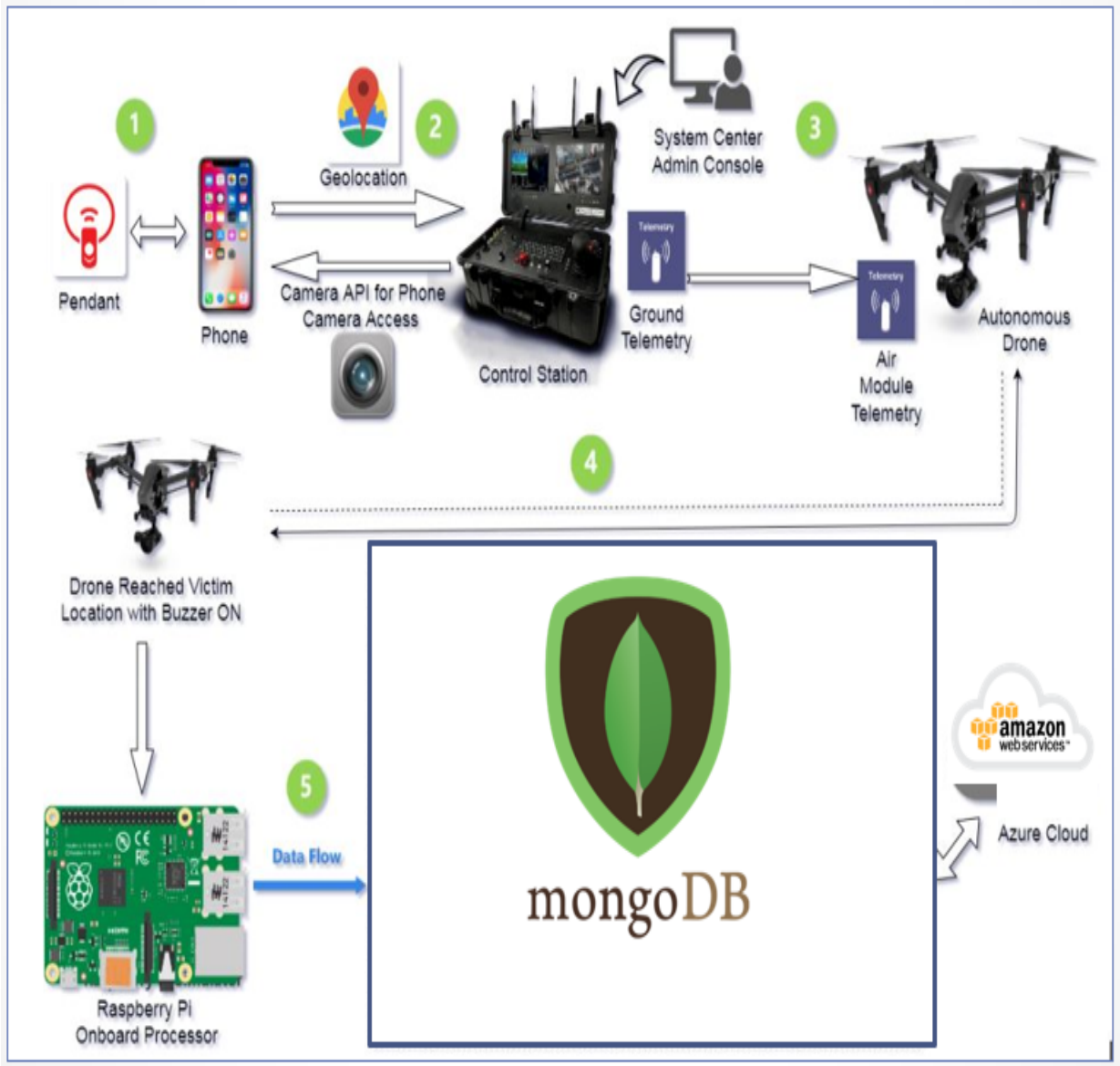

4.2 Systemmodel

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V.MODULES AND ITSDESCRIPTION

MODULES:

1. A Mobile application
2. A Bluetooth Pendant
3. The Drone
4. The Base Station

1. A MOBILE APPLICATION

The Custom-made mobile application is the user interface module of the system. Initially, the user needs to do a one timeregistration of themselves with the mobile application, "The Third Eye". The Application prominently consist of the SOS button. The SOS button is a panic button employed in order to trigger the alert to the base station. Inorder toavoid imprecise or false information the user has to register themselves using the Aadhar ID. The Panic Button isdisplayed on the homepage.TheCustom-Made Mobile Application is also employed with other additional functionalities. The Functionalities include,

i. The Contacts of the Nearby Police Stations and their respective Inspectors, nearby Hospitals.
ii. The Contacts of the nearby Psychiatrist incase the women need any help regarding mental health issues.
iii. The Self Defensing Video inorder to enhance the personal traits of the women.
iv. The E-Complaint Registration Facility for the women to register their complaints against the accuser.

2. A BLUETOOTH PENDANT

The Bluetooth pendant can be worn as a smart jewelry by the women. Thiscan be used in the case where the useinis danger and need to press the SOS Button Immediately without any fraction of delay. The Pendant can be worn asneckpiece dollar or as a bracelet.Once the Pendant is pressed the alert is sent to the base station and to theguardians of the victim. The Guardians of the Victim are the Contacts which is already stored by the victim during the creation of the profile which can also be edited later.

3. THE DRONE

The Drone is an Unmanned Aerial Vehicle which is used in this project for immediate help and assistance to the women.Once the alert is received to the Base Station, the Base station Manager/The Police controls the drone and directs the droneTo the Geolocation of the victim.The Direct Flight Path is drawn between the Drone's Location and the Victim'sGeolocation.The MAV-link protocol is employed for directing the flight paths and for communication between the swarmOf Drones.It supports the MAV-Link protocol for communication with Ground Stations and CompanionComputers.

The Unmanned Aerial Vehicle is Equipped with the following functionalities,

- Pepper spray is added to the drone for helping the victim during crisis.
- GPS Module is added to the drone for obtaining the GPS Co-Ordinates.
- Buzzer (130 DB) to alert the nearby passerby of the alert situation.
- Live Recording of the situation through the camera fixed to the drone in order to use these as evidences for future
- Investigations.

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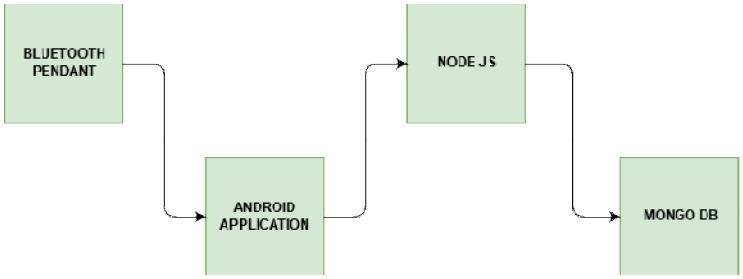
4. THE BASE STATION:

The Base Station[3] acts as a mediator between the user and the police station. It is the server interface. The Alert is initially received at the base station. The Base Station is controlled by the Base Station Manager/Police. The Tracking of the location of the victim is monitored in the Base Station. All the User Profiles and their credentials has been monitored and storage in the database. The MongoDB is used for Storing of the User Details for validating, the information from the UAV, Live Recordings of the drone camera for future investigation of the crime scenes.

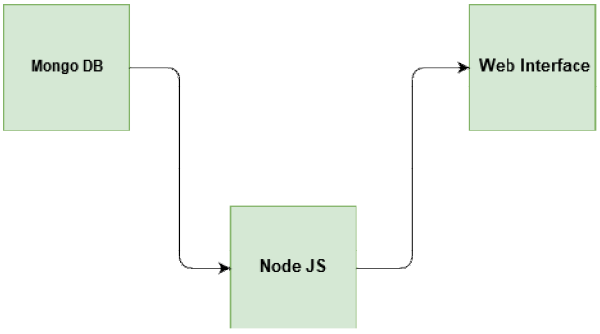
5.MODULE 1:

The Module 1 consists of the communication channel established by triggering the alert using either the SOS Button or the Bluetooth Pendant which sends the Json data to be stored to the MongoDB which is retrieved in the Base Station.This illustrates the user side working of the system



6.MODULE 2:

The Module 2 consists of the communication established between the" MongoDB ",the database through which the web interface is operated.This can be employed using REST API through CRUD Operation.



VI.ADVANTAGES OF THE SYSTEM

- Reduced Response time for any Incident with patrol vehicles, dash-cam enabled vehicles, UAV etc.
- Improved Awareness and Security through laws and programs, safety through structured and strengthen outreach programs for citizens.
- Reduced Crime Rates due to Continuous Monitoring and Immediate Response.
- Tracking of the Accused becomes easier due to the capturing of the live location which is stored In database for later use
- Provides Surveillance, Monitoring and Management of the Crime Scene.

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VII.RESULTS

The Geolocation of the Victim is obtained and the police as well as the guardians are able to track the victim through the GPS co-ordinates sent by the victim through the emergency alert message. To enhance security of women through immediate assistance by employing drones for surveillance and security in outdoor and will enrich the safety measures of women as a part of Smart City Project. The evidences obtained is evaluated for future investigations.

VIII.CONCLUSION

We have proposed a real time model which enhances the security and safety of the environment. Although many Women Safety Application are present none provide Immediate Assistance nor enabled with drone services. Additionality of Drones enhance the efficiency of the System as they are smaller in size which means able to fly into areas which were not possible before and can capture landscape using 360-degreerotation, Time Lapse and Drone Aerial Views. In Future the Functionality of the equipped drone can be generalized to various real time problem assistance such as Immediate Medical Assistance, Surveillance of a particular area, Control of Mob through smoke bomb added to the drone as a part of Smart City Project.

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