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A Project Report on

Smart UAV Framework for Multi Assistance

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in
INFORMATION TECHNOLOGY

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1.Project Conception and Initiation

1.1 Abstract

- Unmanned aerial vehicles, which are also familiar as drones, play an important role in military and National emergency.
- UAV’s can be practically used to transport essential goods on demand, locate people stuck during floods, analyze the scale of damages, monitor large performance inspection activities, human gatherings, deliver food and other necessary material, support rescue operations and for other such emergency transport activities.

1.2 Objectives

- To monitor high risk places by real time detections of people in public areas
- To count the number of people in the crowd in real-time and mark the frame as red if any two people cross a specific distance there by monitoring the crowd
- To reduce human efforts and at the same time keeps human operators out of harm.
- To make necessary announcements or instructions upon violation of lockdown rules, i.e crowding at a public place.
- Storing the results of Real-time detections into cloud storage automatically for futher reference.
- To make use of UAV to spray disinfectant in public area

1.3 Literature Review

- Dr. Usha Rani. Nelakuditi, M. Manoj Vihari , M. Purna Teja [1] proposed an architecture stating IoT based Unmanned Aerial Vehicle system for Agriculture applications. Pesticides and fertilizers help to maintain the health of the crops and avoid the damage caused by pests respectively. Using Unmanned Aerial Vehicles (UAV) for spraying pesticides can cover large area in short time with reduced use of chemicals and water. A sprayer mechanism was added to the body of Quad copter. They can spray the pesticides uniformly to nook and corner of the field without need of a farmer.
- Elloumi, M., Dhaou, R., Escrig, B., Idoudi, H., Saidane, L. [3] proposed their design in 2018.In this paper contains design for monitoring road traffic with a UAV-based system..This UAV is capable of monitor the traffic situation on a road, they collect and send the real time data of information about the vehicle to a traffic processing center to regulate the traffic. This paper states that the performance of their system is better than the performance of the fixed UAV trajectory traffic monitoring system in the sense of coverage and events detection rates.

1.3 Literature Review

- Mikhail Yu.Kataev, Maria M. Dadonova Qadeer[2] presented a model According to the model the monitoring of the research processes, controlling the phases of plant growth, predicting crop yields, using unmanned aerial vehicles are relevance for farming. One of the options for solving the problem is to process the received images from the board of an unmanned aerial vehicle (UAV). An important part of image processing connected with application of the clustering method to isolate different types of plants in the field, such as, weeds.
- Naser Hossein Motlagh, Miloud Bagaa, and Tarik Taleb [4] proposed a very clear and precise description about UAV-Based IoT Platform A Crowd Surveillance Use Case.A highlevel view of a UAV-based integrative IoT platform for the delivery of IoT services from large height, along with the overall system orchestrator, is presented in this paper. As an envisioned use case of the platform, the paper demonstrates how UAVs can be used for crowd surveillance based on face recognition.

1.4 Problem Definition

- In the current situation of National Emergency due to rising cases of Covid-19, preventive measures such as lockdown and strict actions on gathering at public places have been imposed. Due to this regulations, police officials are at high risk during monitoring the areas.
- To improve this working cycle, a Smart UAV framework has been developed for surveillance of public areas and counting the crowd in particular area.
- Along with this Important announcements will be made on detecting any crowd gathering.

1.5 Scope

- In pandemic situation UAV can be used for monitoring crowd.
- Can be helpful for police authorities to keep a check if the rules are been followed by people or not.
- Can be used in public area like Railways station,parks,market area to analyse the crowd.

1.6 Technology stack

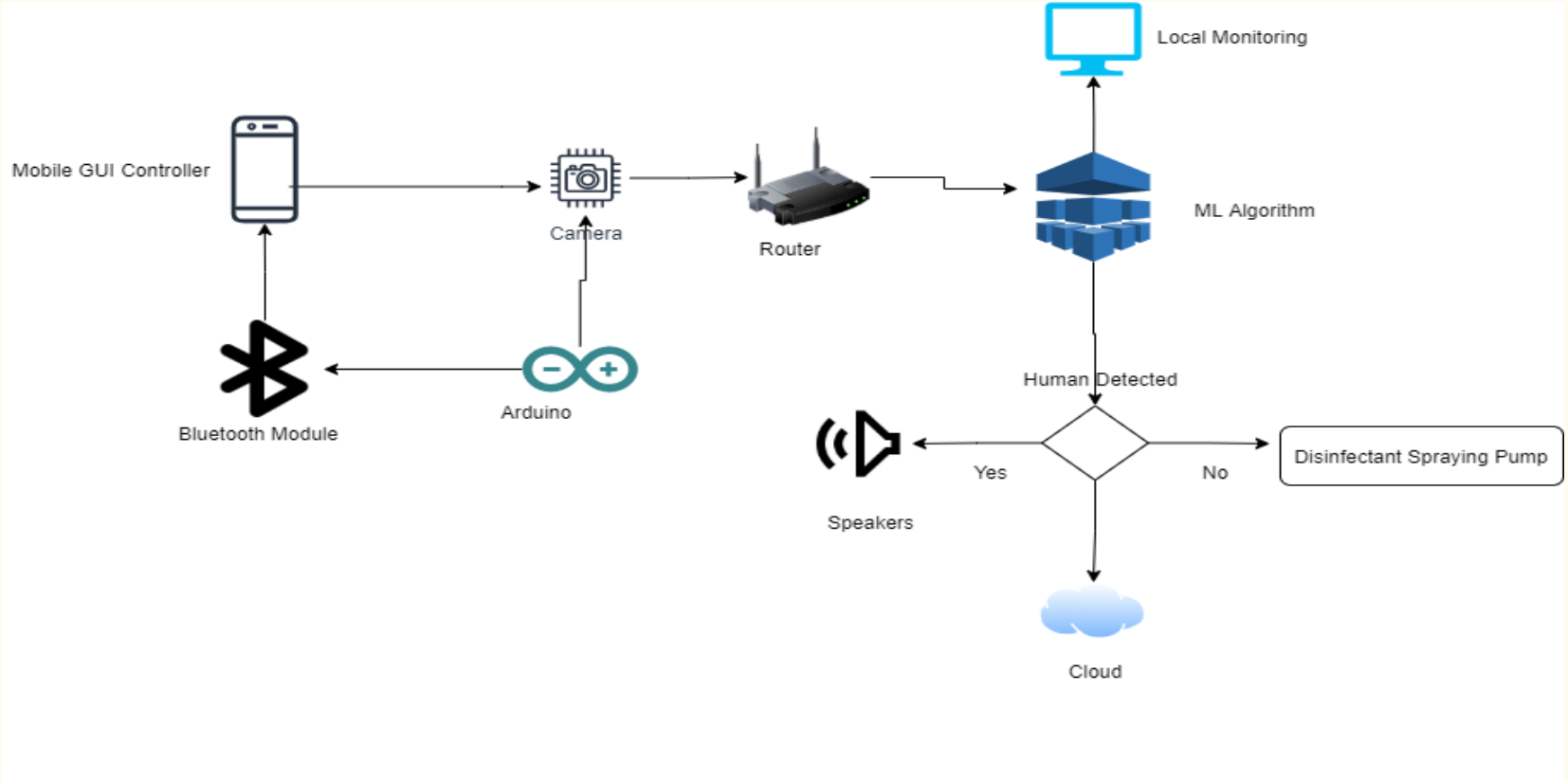
- PyCharm Community Edition 2021.1.1
- Python 3.9
- Brushless DC Motors
- KK 2.1.5 Flight Controller
- IP Camera
- Propeller
- Arduino UNO & Genuino UNO
- Drone Frames
- LIPO Battery
- GPS Module
- Transmitter & Receiver
- Nozzle
- Cloud

1.7 Benefits for environment & Society

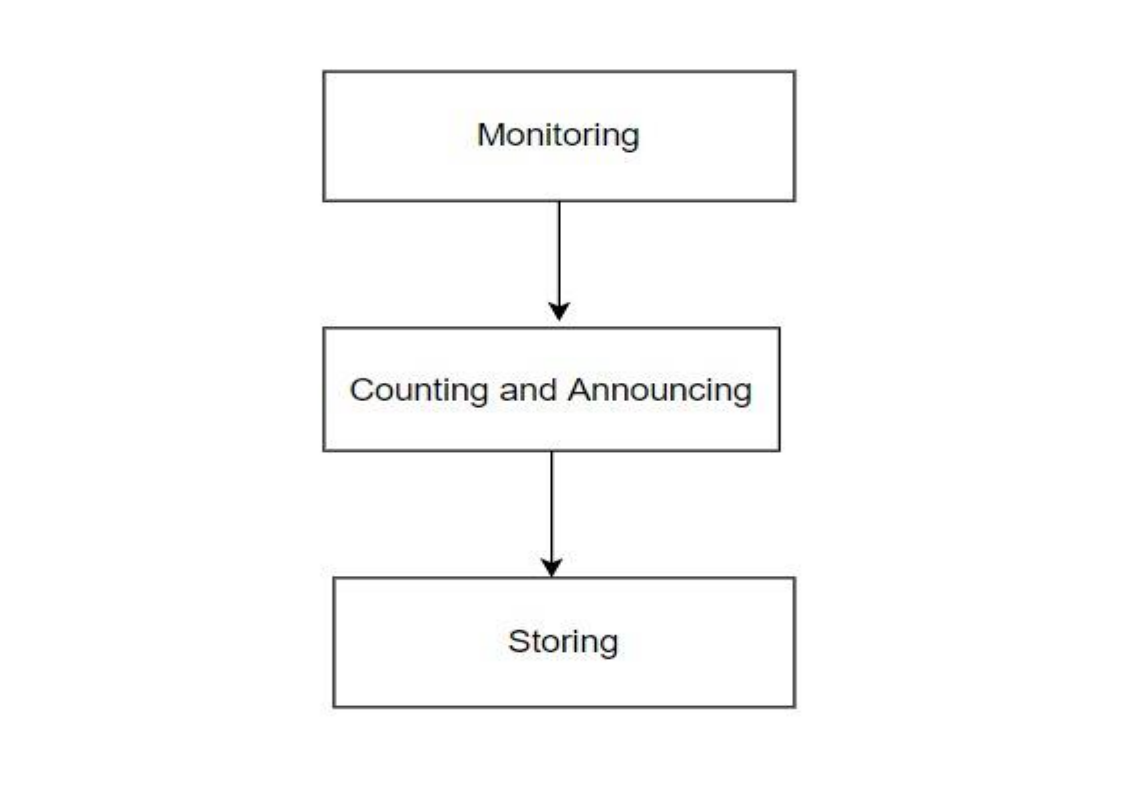
- In situation where people are suggested to stay home to avoid the spread of virus the concerned authorities who are monitoring the same,their health is also at risk.With UAV we can overcome this issue
- With necessary announcement and instruction the UAV can alerts the crowd

2. Project Design

2.1 Proposed System

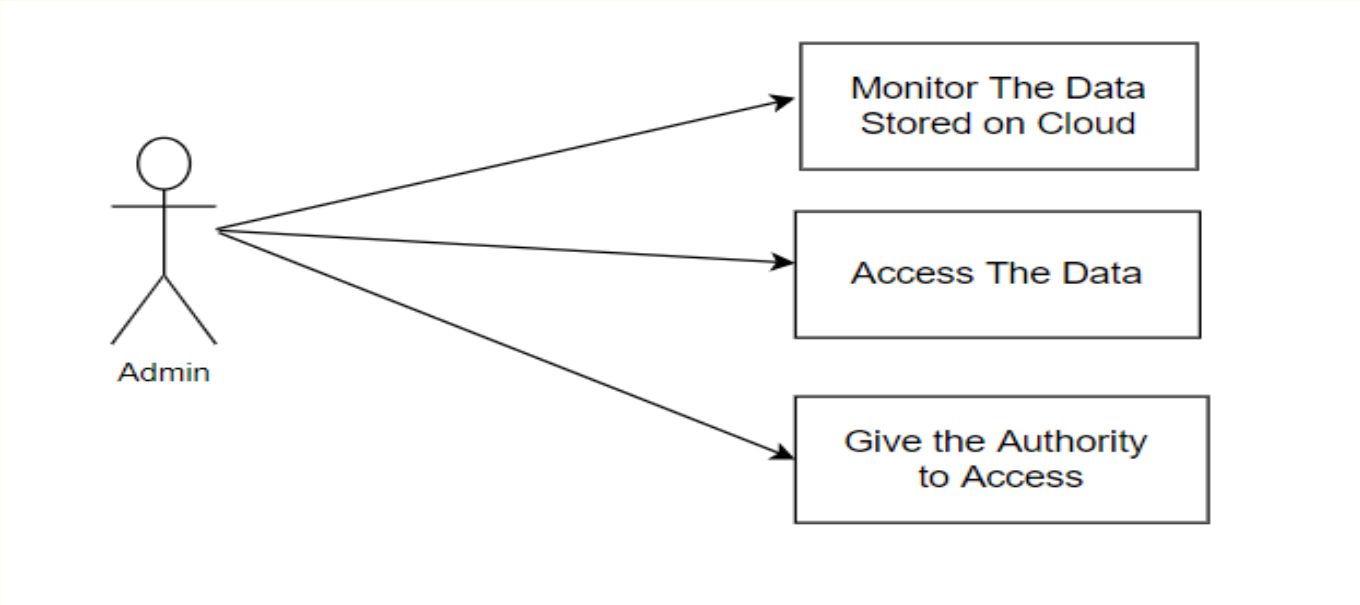


2.2 Design(Flow Of Modules)

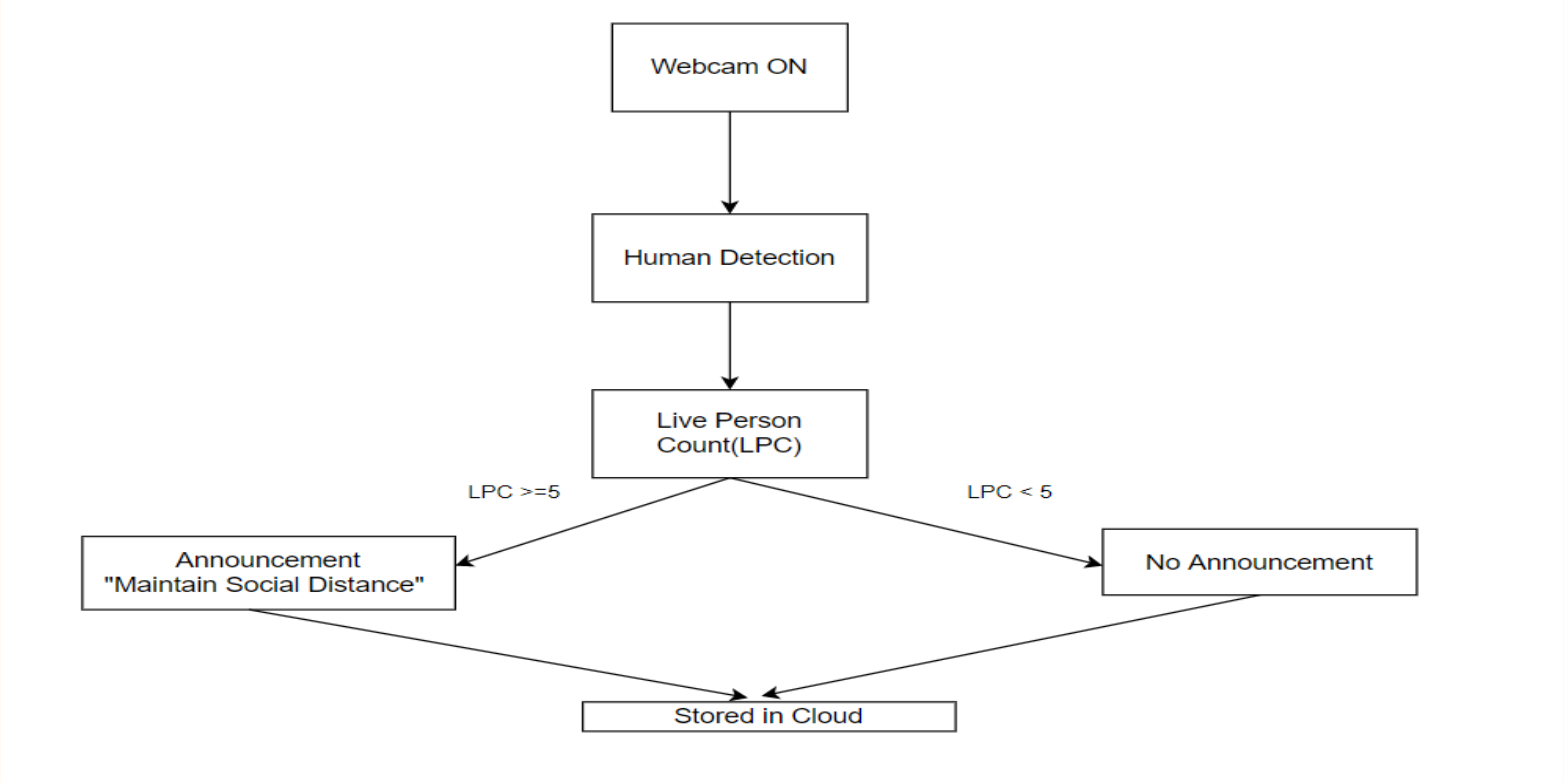


2.3 Description Of Use Case

This is diagrammatic representation of Use Case. Its steps that the admin can do.



2.4 Activity diagram



2.6 Module-1

Monitoring

- With the Ip camera the real time detection is done.
- From the video frame the person are detected using Machine Learning Algorithm.
- The boundary box of each person is generated which is done using Non-Max Suppression

Module-2

Counting and Announcing

- The counting of person is done by Centroid Tracking method.
- The system generated announcement are made when more than 5 people are seen in the frame

Module-3

Storing

- The real time captured frame is then stored in cloud Mega and can be accessed when required.

2.7 References

- Dr. Usha Rani. Nelakuditi, M. Manoj Vihari , M. Purna Teja IoT based Unmanned Aerial Vehicle system for Agriculture applications. 2018 International Conference on Smart Systems and Inventive Technology (ICSSIT). doi:10.1109/icssit.2018.8748794
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- Motlagh, N. H., Bagaa, M., and Taleb, T. (2017). UAV-Based IoT Platform: A Crowd Surveillance Use Case. IEEE Communications Magazine, 55(2), 128–134

3. Conclusion and Future Scope

3.Conclusion and Future Scope

- The UAV can provide the best and quick possible medical attention to all needy people over a specified region along with optimizing for time and cost efficiency.
- The drone can also be used as a function of surveillance and counting a crowd in a specific location which can be treated as future advancement of our UAV.
- Also drone can be made more efficient by increasing its weight capacity which can be then also used for emergency delivery system in remote regions as to bring healthcare at convenience .
- The change in direction of wind flow, increase in distance between controller and the drone, or any other environmental changes like heavy rain, fog can limit the efficiency of proposed UAV.

Thank You