

SecNET - Security Network Of Drones, Flies In Neighborhood To Provide Security

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Abstract- Security is being prime concern for everyone nowadays. Everyone spend lot of money in this region. And It is difficult to observe a large region like summits and big expos. There are no more portable systems to keep track of this. These drones' flies in a pre-defined region keeping eye on possible adversity. These systems are costly as well as hard to handle, in this we don't have to worry about controlling the drone. It will automatically choose a path where there must not be blind spots through path perfection algorithms with Machine Learning and Artificial Intelligence. It passes the data with other drones configured in the same network. Object and motion detection is done through Image Processing. Any unwanted activities are notified to admin on front-end.

Keywords- Security Drones, Image Processing, Path Perfection, Motion Detection, Drone Network.

I. INTRODUCTION

SecNET is basically surveillance with the help of drones autonomously. Area is predefined for drone/s through front-end where required area is selected. Drones automatically select optimum path where no hidden spots are left. Drones flies autonomously and if there are any obstacles during the flight and the path will automatically changed and data will be sent to other drones as well. If it detects any unwanted activity it will notify us. A person can give identity by radio based tagging system. If any unwanted object is detected drone follows with the help of image processing and motion detection and gives live feed on front-end. It can also call other drone for backup and security is provided to large remote areas. No special training is required to operate this system but if user has some prior knowledge it certainly will be an advantage.

II. LITERATURE REVIEW

This system is widely used in large areas like yards, military and other security organizations for high-tech security. In current scenario there are some organizations provide this type of system where most of them are controlled manually. There are very few automatic flying UAVs. In India only one company (<http://www.ideaforge.co.in>) Ideaforge is providing this type of drones. Other companies

<http://www.aptonomy.com>, <http://www.nightingalesecurity.com> provides surveillance drones which are controlled with a manual controller which is little difficult and need some training for handling it. They also use Image processing for object detection and recognition. These drones are not build to work synchronously and no automatic tagging/recognition system is available. In it user has to turn on the drone and fly it. Live-feed, streaming is available on it so user can view live stream. These drones have some limitations it can't fly for long time as it requires more power to operate sensors, flight controllers and cameras. <https://sunflower-labs.com> These drones are fitted with current systems to enhance security also. There are companies which fit sensors on the land to detect any movement or person and it sends feedback to drone for security. And it sends notification to admin. If admin approves/grants request (these drones are configured with current security systems) the person is allowed to enter the premises.

SecNET drones have all the required features for autonomous flight which helps to improve performance and security. Even path perfection algorithm is used for efficient flight. Image processing algorithm is used for motion detection which helps to determine the current position of the object. Thus, it will make easy for person to enhance security.

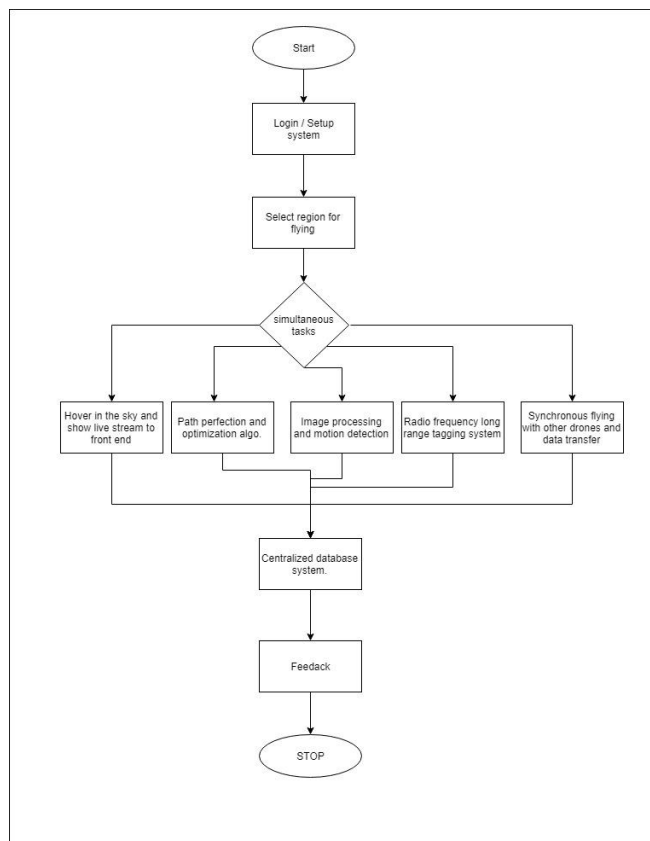
III. METHODOLOGY

SecNET - Secure Drone Networks is a product which helps to provide security. Main purpose is to help in high prioritized security. During our research we have developed a method to operate this system. The flow must not be same for all the systems as we have to integrate our product with the existing system, but we have developed a basic method to operate it.

1. An admin sets up and places the drone on flat surface for smooth landing and takeoff.
2. User has to login to his configured system and on map he will select a region where drone will fly.
3. The drone will automatically fly in the pre-defined region by applying path perfection algorithm.

4. Drone will fly autonomously if there is any problem/object in flight path it will change the path automatically and it will send it to other drones as well.
5. If any intruder is detected drone will call an backup drone.
6. If there is any failure or connection lost drone will automatically come to the base location.
7. Admin can handle each drone also and view live stream.
8. Through radio frequency tagging system authorized person can give their identity otherwise he will be considered as intruder.

A flow diagram is displayed below.



IV. SPECIAL FEATURES

Synchronous network of drones works in harmony for security with centralized database. Path optimization algorithms to find efficient path for full coverage of the area.

Image processing through thermal imaging camera. If any connection lost or error drone will be returned to the base station.

Radio frequency tagging system to identify authorized person. Image processing for recognizing objects and following the object/intruder with the help of drones.

Failsafe modes for drone for drone so above certain levels it will be disarmed. After any accident will have to arm it again.

A local server will manage all the activities as well as co-ordinate each drone for better performance. 2 way handling will be done for giving command to drones and receiving feedback.

Arduino mini pro is used to simulate drone so that it just don't depend on just one controller so not excessive load is on just one controller.

V. CONCLUSION

These drones are fully autonomous, user just have to turn on the system and other crucial tasks such as path perfection, distribution and intruder detection are done by drone itself. Object following within certain limits. New path are shared with other drones. Image processing, object and motion detection and object following. A drone is called for backup in any situation. User can identify him by tagging system. Nvidia Jetson TX is used for better image processing by programming on on-board GPU. It is expensive but also efficient in many ways regarding security concern.

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