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| **Problem Statement** | **Ghana Trolling and Illegal Fishing**   * **Stop Ghana's bottom trawling for fish** * **Damage natural habitats and generate conflicts between small-scale fishing activities** * **Few number of patrol boats and surveillance tools** |
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| **Solution Description** | **Quadcopter Monitoring System**   * **Keeping in mind that the problem deals with information that is very sensitive, we decided to create a solution that would not deal directly with people, but automatically.** * **Quad-sys is an automated solution, that will generate most of the information without the need of a user report** * **It is also a way to get information about the amount of people fishing, the places, and many statistically relevant data** |
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| **Product/Tool** | **Quad-sys**   * **The product is a Quadcopter with a built-in processor and a high quality camera** * **The product will take several images in a time span** * **Those images will only be sent to the database after any object is detected using Morphological Methods and basic image processing operations** * **A charging dock station will also be developed, and it will charge and update the device when it arrives, automatically** * **Two databases are going to be used, one inside the government and another at the University for safety reasons** * **A peer, from the government, will review the information to verify what is and what is not legal fishing** * **It is also possible to change the route of the drone, asking it to go to a certain place, take a picture and go back to the origin, while it is still in route** |
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| **Innovation** | * **Taking advantage of high-tech software and tools such as drones that have already been proved efficient in realizing tasks in the surveillance field** * **Equipping Drones using image processing algorithms to identify possible bottom trawling boats, take pictures (that can be used as evidence in court) and send them to authorities** * **Using two different servers to store all the data in order to improve the safety and reliability of the data** * **Using cryptography algorithms to guarantee that no one that is not allowed to, will be able to identify the data** |
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| **Interface** | * **The interface is simple and intuitive.** * **It is easy for anyone who has being in contact with GPS tools.** * **It requires to the user to click in the screen to select the area that he wants to the drone inspects.** * **If the drone's algorithm identify a possible bottom trawling boat, the picture will be sent to the main server and someone will be in charge of notifying the authorities.** |
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| **Impact** | **In Ghana the Quadcopter will allow data to be held in servers available to be accessed by University and Governments. Data like this is easily transferred to the people dealing with ground studies or other countries. Having this data accessible will allow regulations change the way trawling fisheries operate today. Tracking the boats and managing data will further the security of individual fisheries as well focus on stopping exploitation of operations. Setting a standard of the highest quality cloud based data using our software that will be transferred in all field research for fisheries. Allowing all people who involve their time and missions to work fluently together.** |
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| **Implementability** | **We have contacted Paul Bannerman from the fishery ministry in Ghana to start a relationship on getting this automated drone in the air of Ghana. We will be working on building a LOI from Paul and other organizations in Ghana or America to further prove our idea is fully necessary in proposed market. Furthering our studies and completing a full proof prototype starting in here America we will complete the hardware and software to be implemented. Finally, we will work with David J. Die (Cooperative Institute of Marine and Atmospheric Studies) and Felimon Gayanilo (Systems Architect, HRI, TAMU-CC) to build education every step of the way to support our sustainable model.** |
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| **Other Remarks** | * **The same kind of technology has already been applied to monitor the marine environment, to observe Animals, Surveillance and many other cases** * **The difference is that our technology is going to be automated and is implemented with Image Processing techniques. This way, a pilot is not necessary** * **We are worried about signal range, and due to that, we are not relying on smartphones** |
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