Mobile Disaster Victim Detection with Raspberry Pi and Quadcopter

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#Victim-Detection #Deep-Learning
#RaspberryPi #QuadCopter #Google-Cloud

These days, Natural disasters are more common especially in Indonesia, such as earthquake or landslide. Detecting disaster victims is more complicated than detecting ordinary pedestrian. Sometimes, victim seen only on the his/her leg, arm, head or whole body with different poses and his/her color interfered by dust or other ruins.

I proposed a system to quick search for victim in areas affected by the disaster from the air with QuadCopter (drone). The goal is generate an online map that can suggest possible location of the victim for SAR team. We proposed a system shown on Figure 1 that consist two blocks, the embedded system carried by QuadCopter and Google Cloud Server.
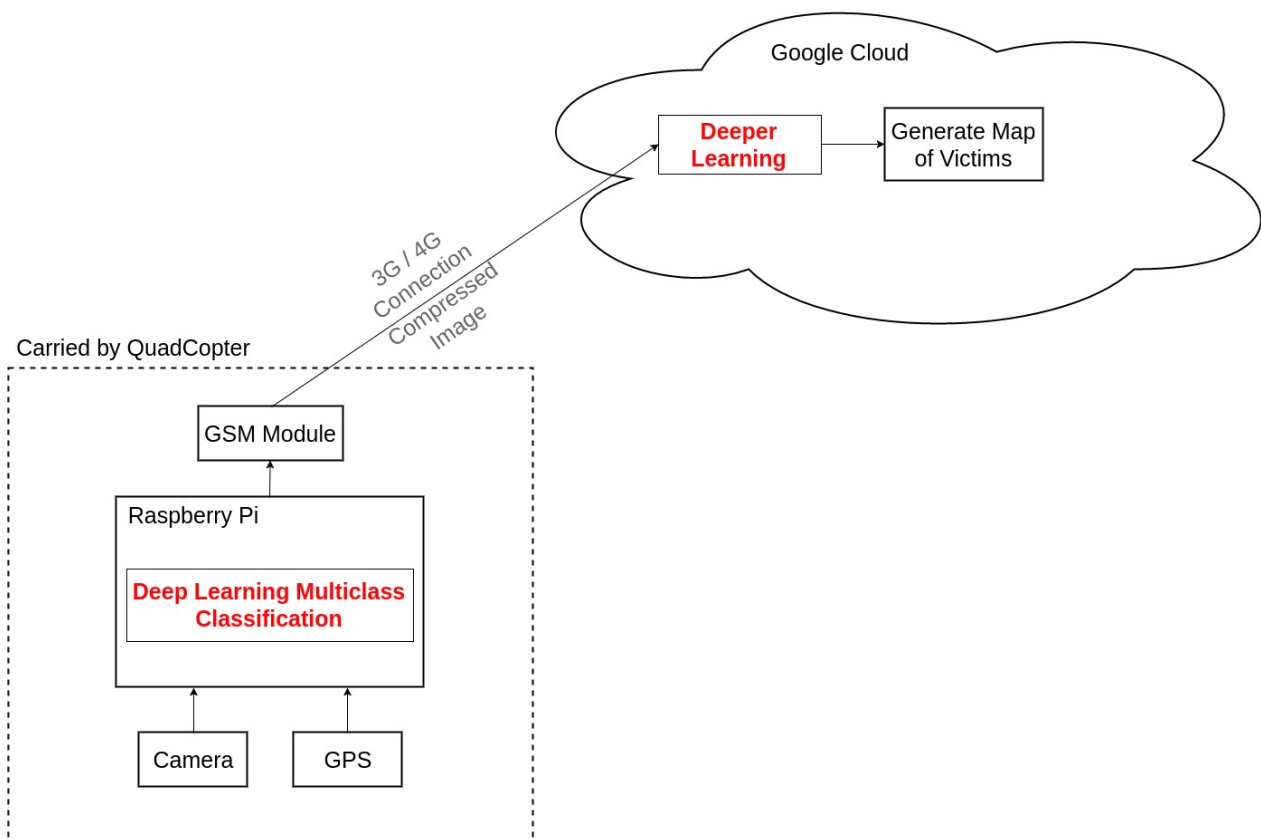

Figure 1. Proposed Embedded Device and Server Block Diagram

The QuadCopter and interfacing from Raspberry Pi (Raspi) to other hardware modules was fully tested. I will implement paper "*Dynamic Network Surgery for*

Efficient DNNs" from 2016 NIPS Conference using TensorFlow and Keras on the Raspberry Pi side. Due to Raspberry Pi 3 limited Resource we need pruning method without any accuracy loss and this paper seem fit the requirement. The raspi will classify at least 4 classes, leg, arm, head and a whole body. If at least one class detected than mark the image and send it together with gps position. Else, just send them without marking.

On the server side, it will receive the image, classify non-marked image and stitch several image. It will use "*Faster R-CNN*" to take advantage of accurate bounding box coordinate and make a new bounding box based on group of nearest victims plus count it. It will be more convenient for SAR Team to make a decision of fastest route.

Guo, Y., Yao, A. and Chen, Y., 2016. Dynamic Network Surgery for Efficient DNNs. In *Advances In Neural Information Processing Systems* (pp. 1379-1387).

Ren, S., He, K., Girshick, R. and Sun, J., 2015. Faster R-CNN: Towards real-time object detection with region proposal networks. In *Advances in neural information processing systems* (pp. 91-99).