NetWorld2020 SME Working Group

SME Success Story – April 2019

Visiona

5G capabilities allow us to implement VNFs to deliver computer vision services through the network by deploying them around the network. More precisely, for our use case, the deployment should be done in the edge as we need to lower the delay to the minimum to increase drone autopilot reaction. The drone is piloted by a VNF, having a manual, automatic and remote flight control. The computer vision results, done from another VNF, may change the drone path depending on the detection and drone flight mode.

Visiona's approach to the preventive maintenance aims to detect, from an autopilot drone, different changes in the target zones in order to predict possible dangerous conditions on the environment or in the structures.

Regarding the artificial intelligence applied to vision, Visiona developed three systems:

- People and vehicle detection system in critical locations.
- Change recognition system on UAV imagery.
- Abnormal hot points through thermal image.

Our target with the first implementation is to analyse infrastructures and detect elements that could imply a risk, such a person or a vehicle in a forbidden and hazardous zone.

The second one is focused on finding environmental changes in areas close to key infrastructures. To do so, the system needs to have a record of the initial status of the area to have a reference to compare with.

The third one, based on thermal image, implements an alert system for the hot points of the, in our case, dehydration chimneys of the gas plant. This can be applied to any other case.

All implementations are based on images obtained from Unmanned Aerial Vehicles (UAV). As a result, image processing techniques are a crucial part of the developments. More precisely, Deep

Learning techniques applied to this field such as Convolutional Neural Networks. This technique is the base of most of the cutting-edge implementations of deep learning based on images.

Different challenges are going to be addressed with our approach. First, the use of drone imagery is a demanding task for the detection system, due to the reduced size of the relevant objects related to the complete image. Subsequently, the development of an implementation robust to lighting variations, environmental conditions and other factors produced by the different scenarios is one of our main goals.

Related to the change detection system, the capability of adaptation is a crucial factor for the viability of the algorithm. The main variation between this approach and the deepest learning methods for image processing is that we need to have a previous reference to compare with. As a result, the development process has a different perspective from the standard designing of deep learning models for computer vision.

To complement the explained above, Visiona's quality probe may be deployed in the different nodes of the network to analyse the QoS and QoE of the video that the operator is receiving remotely. The quality probe can detect no video (video is cut), freezing, packet loss, colour errors or audio defects. It has also the feature of demanding a new network path in case one of those failures are detected in the video, if in the edge the video is correct, of course.

Contact: nsanchez@visiona-ip.es, jlalueza@visiona-ip.es