Abstract

In this paper an automated drone solution for fence inspection was developed. This system will contribute to maintenance and heightened security of different high-end security places e.g. an airport. A test of the different sensors has been completed, to find the sensor most suitable for the task. Furthermore, an automated route planning algorithm has been developed with easy tuning for the end-user. This will help the end-user setup the drone for their companies specific needs. A deep analysis of different vision algorithms has been conducted to achieve the best possible outcome with data from the chosen sensor.

Moreover, Convolution Neural Network (CNN) has been developed and trained to locate breaches in the grid structure of the fences. This has been done using mask-rcnn. The network was trained with an augmented dataset of almost 7000 images which consisted of artificial snow, rain, fog and other kinds of noise in the images to replicate real-life scenarios. This yielded good results with an mean average precision (mAP) of 0.874 in the augmented test set of 1395 images as well a correct detection of all custom made breaches in the final acceptance test.