Literature Survey

1. Georgi Hristov , Jordan Raychev , Diyana Kinaneva, Plamen Zahariev " Emerging methods for early detection of forest fires using unmanned aerial vehicles and LoRaWAN sensor networks, 2018".

- Emerging methods for early detection of forest fires using unmanned aerial vehicles and LoRaWAN sensor networks
- Two different emerging solutions for early detection of forest fires.
- The first of these solutions involves the use of unmanned aerial vehicles (UAVs) with specialized cameras. Several different scenarios for the possible use of the drones for forest fire detection will be presented and analysed, including a solution with the use of a combination between a fixed-wind and a rotary-wing UAVs.
- In the next chapter of the paper, the possibilities for development of systems for early forest fire detection using LoRaWAN sensor networks was discussed.

Merit:

Greater potential.

Demerit:

Still under development.

2.DAI QUOC TRAN 1, MINSOO PARK 1, YUNTAE JEON 1, JINYEONG BAK 2, AND SEUNGHEE PARK 1, "Forest-Fire Response System Using Deep-Learning-Based Approaches With CCTV Images and Weather Data", VOLUME 10, June 2022.

- The purpose of this study is to construct a model for early fire detection and damage area estimation for response systems based on deep learning.
- Neural architecture search-based object detection (DetNAS) is implemented for searching optimal backbone. Backbone networks play a crucial role in the application of deep learning-based models, as they have a significant impact on the performance of the model.
- A large-scale fire dataset with approximately 400,000 images is used to train and test object-detection models. Then,the searched light-weight backbone is compared with well-known backbones, such as ResNet, VoVNet and FBNetV3

Merit:

Great Accuracy. The estimated damage area of 2020 March 19 forest fire at Ulsan, South Korea was approximately 519 ha

Demerit:

It is likely to overfit the training set and provide incorrect predictions on the test set because of the lack of training data.

3.Aymen Mouelhi, Moez Bouchouicha, Mounir Sayadi, Eric Moreau,"Fire Tracking in Video Sequences Using Geometric Active Contours Controlled by Artificial Neural Network" , 2020

- Robust tracking method for fire regions using an artificial neural network (ANN) based approach combined with a hybrid geometric active contour (GAC) model based on Bayes error energy functional for forest wildfire videos is implemented
- An estimation function is built with local and global information collected from three color spaces (RGB, HIS and YCbCr) using Fisher's Linear Discriminant analysis (FLDA) and a trained ANN in order to get a preliminary fire pixel classification in each frame.
- This function is used to compute initial curves and the level set evolution parameters to control the active contour model providing a refined fire segmentation in each processed frame.

Merit:

Accuracy for fire detection (93.2%)

Demerit:

Take more time to detect fire.

4. Vladimir Khryashchev Roman Larionov,"Wildfire Segmentation on Satellite Images using Deep Learning", 2020

- A convolutional neural network for automated wildfire detection on high-resolution aerial photos is presented.
- Two databases of satellite RGB-images with different spatial resolution containing 1457 and 393 high-resolution images, respectively, were prepared for training and testing the neural network.
- Various techniques of data augmentation are used to enlarge training and test sets generated by data windowing.
- U-Net neural network with the ResNet34 as encoder was used in research.
- Neural network training was learning using the NVIDIA DGX-1 supercomputer.

Merit:

Robustness and accurate

Demerit:

Due to unbalanced training and test set the learning model of developed CNN can be affected.

5. Jialei Zhan a,1, Yaowen Hu a,1, Guoxiong Zhou a,*, Yanfeng Wang b,*, Weiwei Cai a, Liujun Li," A high-precision forest fire smoke detection approach based on ARGNet" 2022

- The Adjacent layer composite network is proposed to enhance the extraction of smoke features with high transparency and no clear edges, and SoftPool in it is used to retain more feature information of smoke.
- Recursive feature pyramid with deconvolution and dilated convolution (RDDFPN) is proposed to fuse shallow visual features and deep semantic information in the channel dimension to improve the accuracy of long-range aerial smoke detection.
- Global optimal nonmaximum suppression (GO-NMS) sets the objective function to globally optimize the selection of anchor frames to adapt to the aerial photography of multiple smoke locations in forest fire scenes.

Merit:

Improved feature extraction capability.

Demerit:

Faster detection speed.
