**All files have been added to https://github.com/doganferdi/windturbinedefectdetection/tree/main.**

**In addition, the files used in the studies are included in mat files. It is not possible to give them in a different format. There is no file in a format such as csv xls, there cannot be. Since images are used as a dataset, information about the images, that is, dataset (images), is given.**

**Wind Turbine Damage Detection Using SatNet**

**Overview**

This project focuses on detecting damage and damage types in wind turbines using the **SatNet** deep learning model. The implementation includes all necessary application files and was developed as part of a research study.

**Dataset**

The dataset used in this project is publicly available and can be accessed at the following link:  
<https://universe.roboflow.com/gtek/zeliha-t04>

**Model**

The deep learning model, **SatNet**, was developed as part of a doctoral thesis. It has been specifically designed and optimized for damage detection tasks in wind turbines.

**Dependencies**

This project was implemented using the following software and hardware:

* **Operating System:** Windows 11 Pro
* **Processor:** Intel Core i9-14900
* **RAM:** 48 GB
* **Storage:** 3 TB SSD
* **Graphics Card:** NVIDIA RTX 4080 (16 GB VRAM)
* **Software:** MATLAB 2024a with Deep Learning Toolbox

**Installation**

To run this project, follow these steps:

1. Clone the repository:
2. git clone https://github.com/doganferdi/windturbinedefectdetection.git

cd windturbinedefectdetection

1. Install the required dependencies:
   * Ensure you have MATLAB 2024a installed with the Deep Learning Toolbox.
   * Additional dependencies can be installed as needed.

**Usage**

To use the model for detecting damage in wind turbines, run the appropriate MATLAB scripts. For example:

run('z\_5\_sinifli\_FasterRCNN\_alexnet\_02102024.m')

Replace 'z\_5\_sinifli\_FasterRCNN\_alexnet\_02102024.m' with the script corresponding to the model you want to use.

**Files information**

1. z\_5\_sinifli\_FasterRCNN\_alexnet\_02102024.m: Matlab code for training and testing processes for detecting objects in the dataset with the Faster RCNN object detection model using the trained AlexNet deep learning model.
2. z\_5\_sinifli\_FasterRCNN\_GoogleNet\_02102024.m: Matlab code for training and testing processes for detecting objects in the dataset with the Faster RCNN object detection model using the trained GoogleNet deep learning model.
3. z\_5\_sinifli\_FasterRCNN\_inceptionResnetV2\_02102024.m: Matlab code for training and testing processes for detecting objects in the dataset with the Faster RCNN object detection model using the trained InceptionResnetV2 deep learning model.
4. z\_5\_sinifli\_FasterRCNN\_inceptionV3\_02102024.m: Matlab code for training and testing processes for detecting objects in the dataset with the Faster RCNN object detection model using the trained InceptionV3 deep learning model.
5. z\_5\_sinifli\_FasterRCNN\_MobilNetV2\_02102024.m: Matlab code for training and testing processes for detecting objects in the dataset with the Faster RCNN object detection model using the trained MobilNetV2 deep learning model.
6. z\_5\_sinifli\_FasterRCNN\_ResNet18\_02102024.m: Matlab code for training and testing processes for detecting objects in the dataset with the Faster RCNN object detection model using the trained ResNet18 deep learning model.
7. z\_5\_sinifli\_FasterRCNN\_ResNet101\_02102024.m: Matlab code for training and testing processes for detecting objects in the dataset with the Faster RCNN object detection model using the trained ResNet101 deep learning model.
8. z\_5\_sinifli\_FasterRCNN\_Vgg19\_02102024.m: Matlab code for training and testing processes for detecting objects in the dataset with the Faster RCNN object detection model using the trained vgg19 deep learning model.
9. z\_5\_sinifli\_FasterRCNN\_ResNet50\_02102024.m: Matlab code for training and testing processes for detecting objects in the dataset with the Faster RCNN object detection model using the trained ResNet50 deep learning model.
10. z\_5\_sinifli\_FasterRCNN\_SqueezeNet\_02102024.m: Matlab code for training and testing processes for detecting objects in the dataset with the Faster RCNN object detection model using the trained SequeezeNet deep learning model.
11. z\_5\_sinifli\_FasterRCNN\_Vgg16\_02102024.m: Matlab code for training and testing processes for detecting objects in the dataset with the Faster RCNN object detection model using the trained Vgg16 deep learning model.
12. z\_5\_sinifli\_FasterRCNN\_SatNET\_3v1.m: Matlab code for the training and testing processes of the proposed SatNET deep learning model to detect objects in the dataset with the Faster RCNN object detection model.
13. SatNET\_ruzgarturbini\_icin.mat: Layered structure of the SatNET deep learning model.
14. z\_data\_augmention\_v1.m: This file contains the data augmentation algorithm applied to increase the image size by 4 times.
15. z\_image\_resize.m: This file contains the codes used to automatically resize the image.

**Contributing**

Contributions are welcome! Please read the [CONTRIBUTING.md](https://github.com/doganferdi/windturbinedefectdetection/blob/main/CONTRIBUTING.md) document for guidelines on how to contribute to this project.

**License**

This project is licensed for research and educational purposes only. See the [LICENSE](https://github.com/doganferdi/windturbinedefectdetection/blob/main/LICENSE) file for details.

**Author**

This project was created and published by **Ferdi DOĞAN** as part of a research study on wind turbine damage detection.

**Contact**

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**Screenshots**

Include some screenshots of your application here.

**GitHub Repository**

The files have been added to GitHub and can be accessed at: [GitHub Repository](https://github.com/doganferdi/windturbinedefectdetection)