

# Corrosion / Rust Detection in image

This algorithm is finding the rust pixel in an image then classify into category (Poor, Average, Good and Invaild)

Tools used open source:-

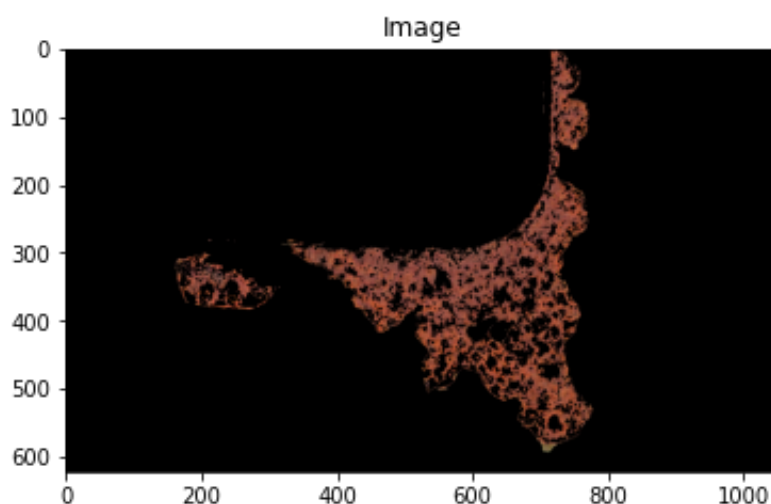
- Python
- OpenCV
- Models can be used SVG or Logistics Regression

Results of this model are as follows:

## Original Image



## Rust Image



## Result

**Rust pixels: 157656**

**Total pixels: 1963032**

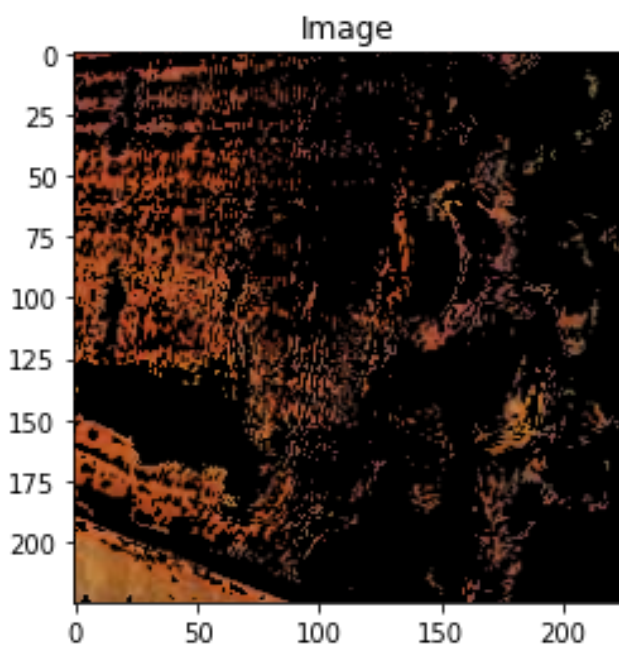
**Percentage of rust: 8.03%**

**Medium Risk -> Classification – Average**

### **Original Image**



### **Rust Image**



### **Result**

**Rust pixels: 33252**

**Total pixels: 151875**

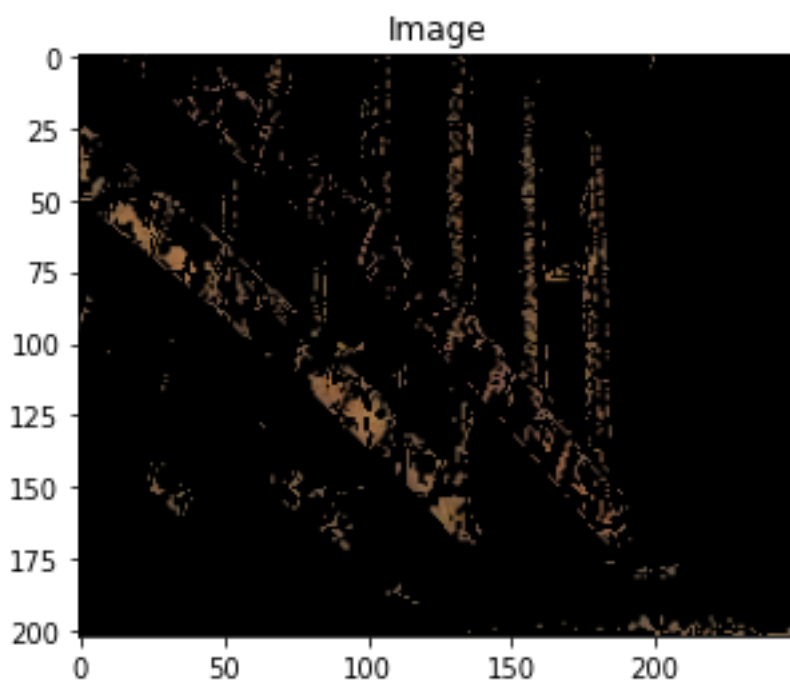
**Percentage of rust: 21.89%**

**High Risk -> Classification - POOR**

## Original Image



## Rust Image



## Result

**Rust pixels: 8052**  
**Total pixels: 151500**  
**Percentage of rust: 5.31%**  
**Medium Risk -> Classification – Average**

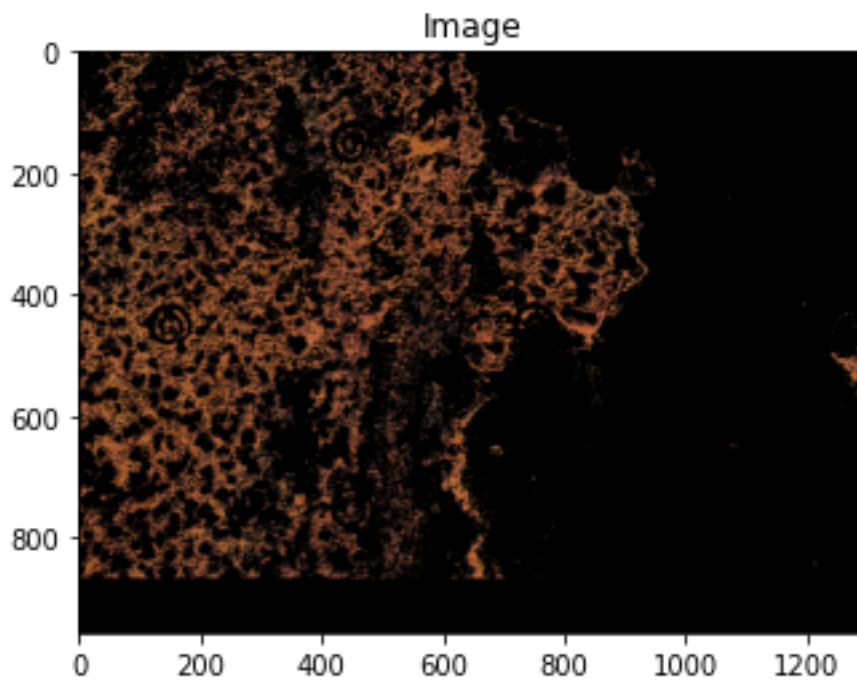
## Original Image



Download from  
Dreamstime.com  
This watermarked comp image is for previewing purposes only.

202696  
Timhope | Dreamstime.com

## Rust Image



## Result

**Rust pixels: 623682**  
**Total pixels: 3732300**  
**Percentage of rust: 16.71%**  
**High Risk -> Classification – POOR**

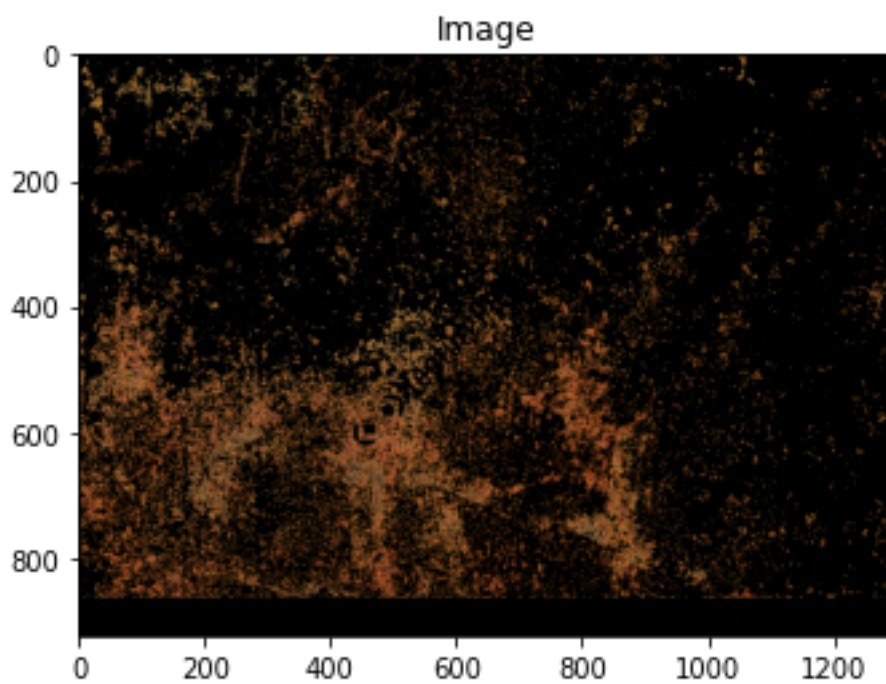


## Original Image



FeaturePics.com - I1917774

## Rust Image



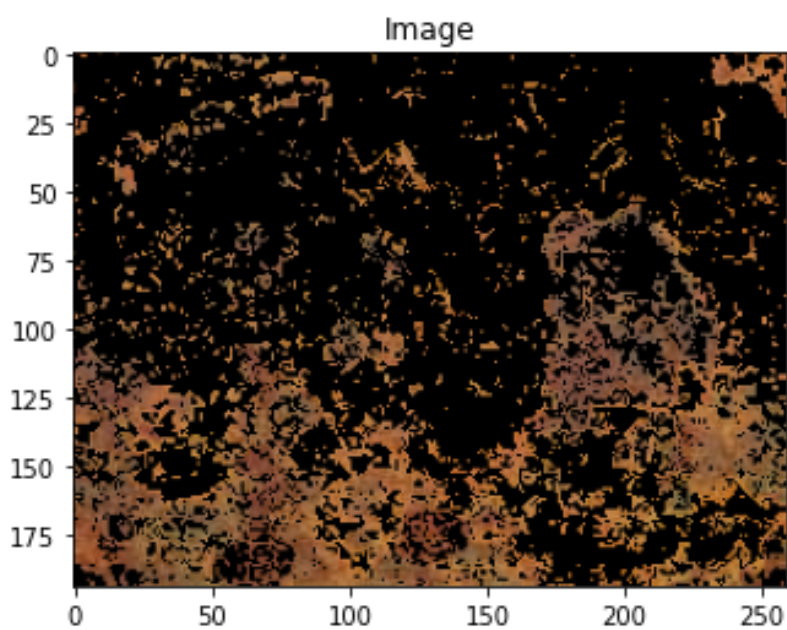
## Result

**Rust pixels: 471396**  
**Total pixels: 3603600**  
**Percentage of rust: 13.08%**  
**High Risk -> Classification – POOR**

## Original Image



## Rust Image



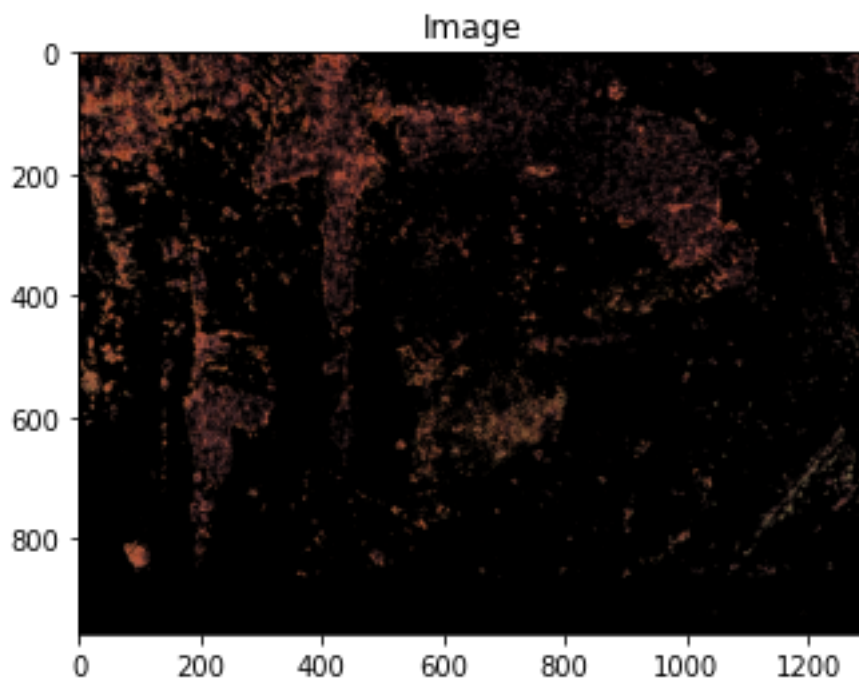
## Result

**Rust pixels: 44166**  
**Total pixels: 150738**  
**Percentage of rust: 29.3%**  
**High Risk -> Classification – POOR**

## Original Image



## Rust Image



## Result

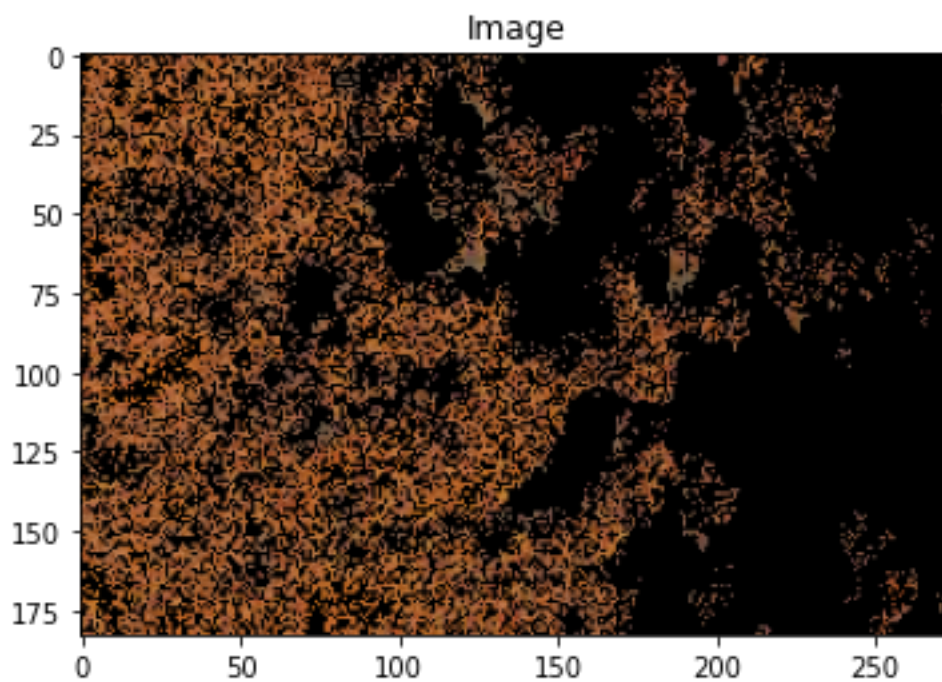
**Rust pixels: 312249**  
**Total pixels: 3728400**  
**Percentage of rust: 8.37%**  
**Medium Risk -> Classification – Average**



## Original Image



## Rust Image



## Result

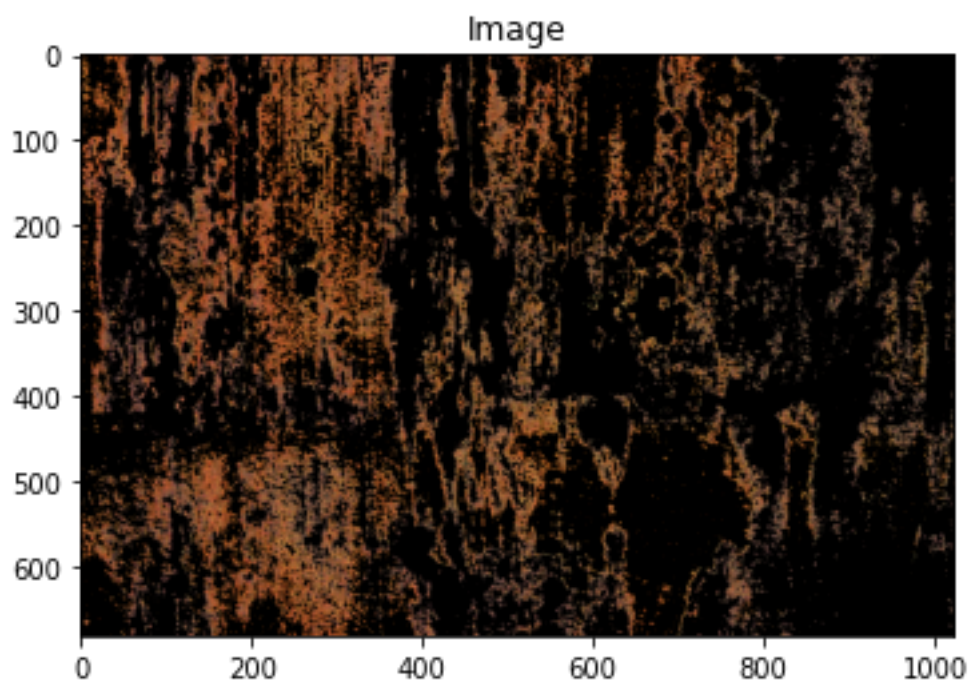
**Rust pixels: 46884**  
**Total pixels: 150975**  
**Percentage of rust: 31.05%**  
**High Risk -> Classification - POOR**



## Original Image



## Rust Image



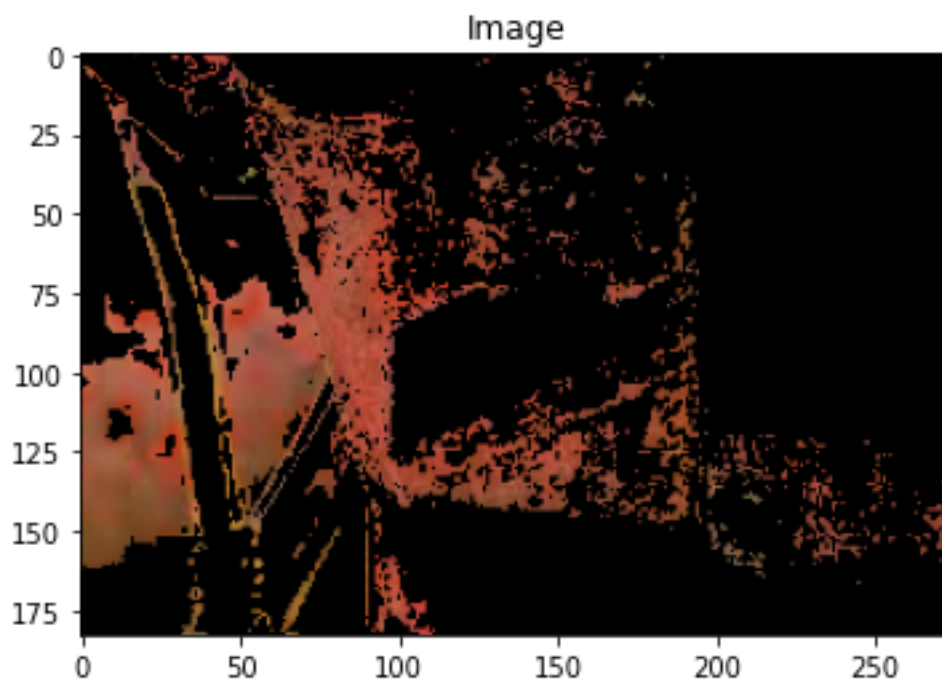
## Result

**Rust pixels: 528942**  
**Total pixels: 2086920**  
**Percentage of rust: 25.35%**  
**High Risk -> Classification - POOR**

## Original Image



## Rust Image



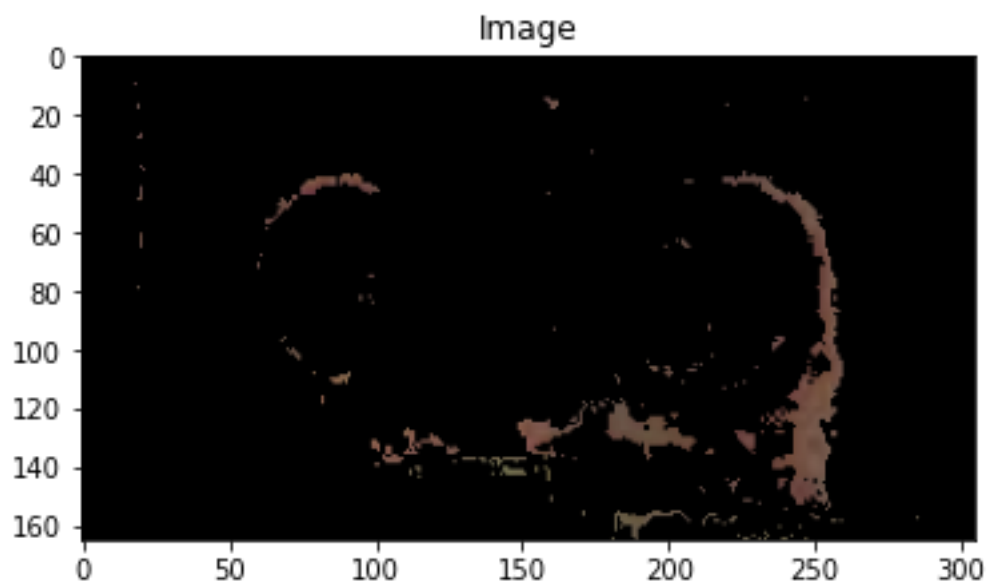
## Result

**Rust pixels: 30609**  
**Total pixels: 150975**  
**Percentage of rust: 20.27%**  
**High Risk -> Classification – POOR**

## Original Image



## Rust Image



## Result

**Rust pixels: 5706**

**Total pixels: 150975**

**Percentage of rust: 3.78%**

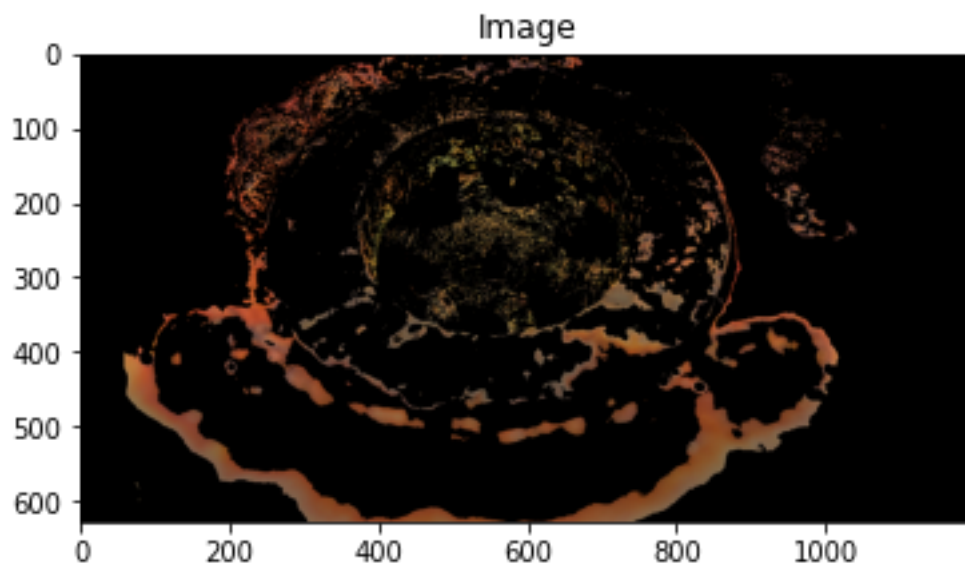
**Low Risk -> Classification – Good**



**Original Image**



**Rust Image**



**Result**

**Rust pixels: 250206**  
**Total pixels: 2260800**  
**Percentage of rust: 11.07%**

High Risk -> Classification – POOR

Original Image



Result

Rust pixels: 0

**Total pixels: 6220800**  
**Percentage of rust: 0.0%**  
**Invalid Image**

## **Original Image**



## **Result**

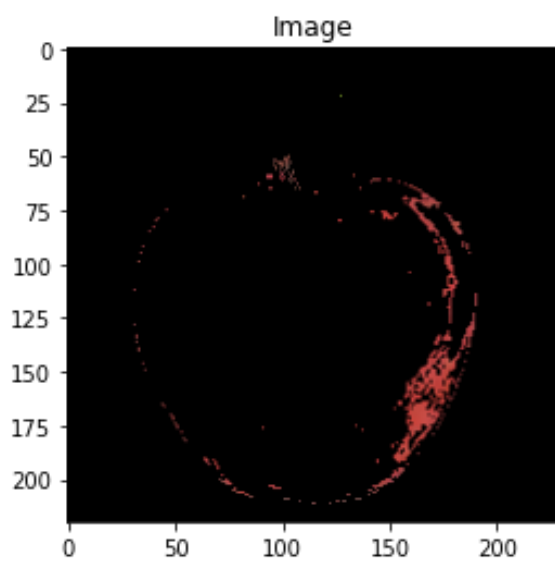
**Rust pixels: 771**  
**Total pixels: 151875**  
**Percentage of rust: 0.51%**  
**Invalid Image**



**Original Image**



**Rust Image**



**Result**

**Rust pixels: 3114**  
**Total pixels: 151140**

**Percentage of rust: 2.06%**  
**Low Risk -> Classification - Good**

## Original Image

```

Anaconda Prompt
Using cached https://files.pythonhosted.org/packages/c7/c0/e1f8180d75969ac4b7c026514740f10f5edfd912ef2d6aaa845790ce4095/grpcio-1.20.1-cp36-cp36m-win_amd64.whl
Collecting numpy>=1.13.3 (from tensorflow-gpu)
Using cached https://files.pythonhosted.org/packages/2e/11/f006363050b24fb19a235e5efd219e7ac549398d531110d80b8f2ba3a909/numpy-1.16.3-cp36-cp36m-win_amd64.whl
Collecting protobuf>=3.6.1 (from tensorflow-gpu)
Using cached https://files.pythonhosted.org/packages/c9/58/4cd04c098d19d2327d1e1c94835c82fbf5a7f7c84d7095b70c33f9582acb/protobuf-3.7.1-cp36-cp36m-win_amd64.whl
Collecting tensorboard<1.14.0,>=1.13.0 (from tensorflow-gpu)
Using cached https://files.pythonhosted.org/packages/0f/39/bdd75b08a6fba41f098b6cb091b9e8c7a80e1bd4679a581a0ccd17b10373/tensorboard-1.13.1-py3-none-any.whl
Collecting astor>=0.6.0 (from tensorflow-gpu)
Using cached https://files.pythonhosted.org/packages/35/6b/11530768cac581a12952a2aad00e1526b89d242d0b9f59534ef6e6a1752f/astor-0.7.1-py2.py3-none-any.whl
Collecting termcolor>=1.1.0 (from tensorflow-gpu)
Collecting absl-py>=0.1.6 (from tensorflow-gpu)
Collecting keras-applications>=1.0.0 (from tensorflow-gpu)
Using cached https://files.pythonhosted.org/packages/90/85/64c82949765cfb246bbdaf5aca2d55f400f792655927a01710a78445def/Keras_Applications-1.0.7-py2.py3-none-any.whl
Collecting mock>=2.0.0 (from tensorflow-estimator<1.14.0rc0,>=1.13.0->tensorflow-gpu)
Downloading https://files.pythonhosted.org/packages/24/15/ced6036cb01628f17cb9b8c43426b9d32ae68143221d99cd3f630bfffdae/mock-3.0.3-py2.py3-none-any.whl
Collecting setuptools (from protobuf>=3.6.1->tensorflow-gpu)
Using cached https://files.pythonhosted.org/packages/ec/51/f45cea425fd5cb0b0380f5b0f048ebc1da5b417e48d304838c02d6288a1e/setuputils-41.0.1-py2.py3-none-any.whl
Collecting werkzeug>=0.11.15 (from tensorboard<1.14.0,>=1.13.0->tensorflow-gpu)
Using cached https://files.pythonhosted.org/packages/18/79/84f02539cc181c4bf5f5a41b9f52cae870b6f632767e43ba6ac70132e92/Werkzeug-0.15.2-py2.py3-none-any.whl
Collecting markdown>=2.6.8 (from tensorboard<1.14.0,>=1.13.0->tensorflow-gpu)
Using cached https://files.pythonhosted.org/packages/f5/e4/d8c18f2555add57ff21bf25af36d82714589ea07607486cc79a2aea641af/Markdown-3.1.1-py2.py3-none-any.whl
Collecting h5py (from keras-applications>=1.0.0->tensorflow-gpu)
Using cached https://files.pythonhosted.org/packages/01/1e/115c4403544a91001d9c618748b2e0786db45544e36b8a6fc3525e9b57f/h5py-2.9.0-cp36-cp36m-win_amd64.whl
Installing collected packages: six, wheel, gast, absl-py, numpy, mock, tensorflow-estimator, keras-preprocessing, grpcio, setuptools, protobuf, werkzeug, markdown, tensorboard, astor, termcolor, h5py, keras-applications, tensorflow-gpu
ERROR: Could not install packages due to an EnvironmentError: [WinError 5] Access is denied: 'F:\VS\UIB\site-packages\numpy\libs\libopenblas.IPBC74C7KURV7CB2PKT5Z5FMR3S1BW43.gfortran-win_amd64.dll'
Consider using the --user option or check the permissions.

(base) C:\Users\Admin>pip install --ignore-installed --upgrade tensorflow-gpu

```

**Rust pixels: 11718**  
**Total pixels: 6220800**  
**Percentage of rust: 0.19%**  
**Invalid Image**