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DS Hackathon 2022

Image Segmentation

Team C Members:
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Image segmentation as a critical inspection technology

Digital Solutions is one of the 4 market-leading product companies in **Baker Hughes** that together with **Oilfield Services**, **Oilfield Equipment**, and **Turbomachinery & Process**, forms parts of an unparalleled portfolio.

Main activities distributed in:
-Sensing & measurement technology
-Differentiated software offerings
-Leader in **critical inspection technology**

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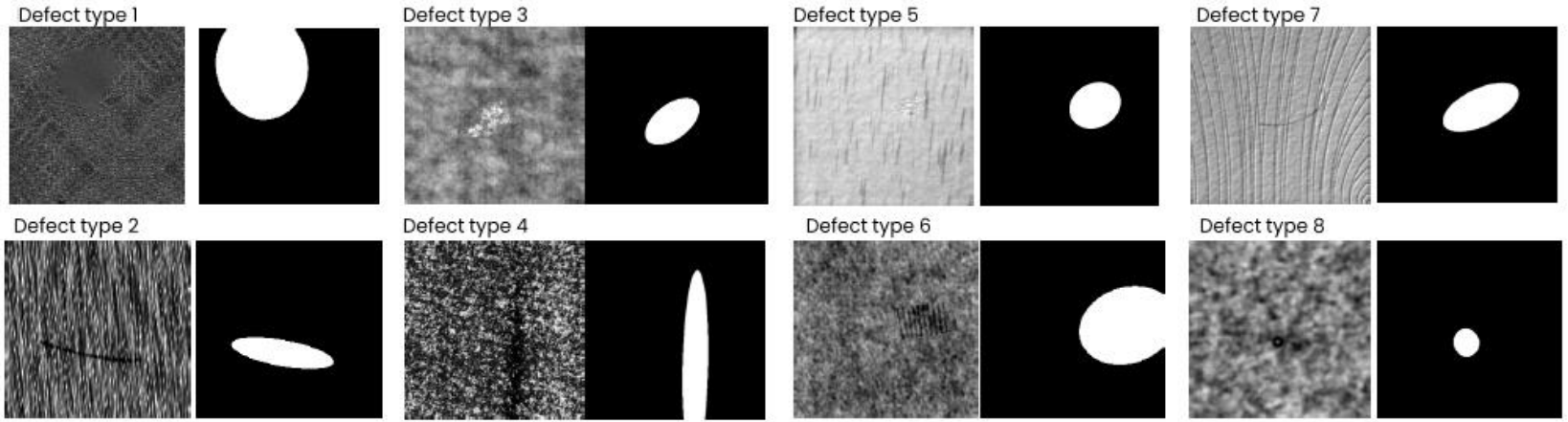
Defining the problem

One of the most important task in **visual inspection** is to detect defects in the industry. For this case, we need to address a solution for different types of anomalies on different surfaces.



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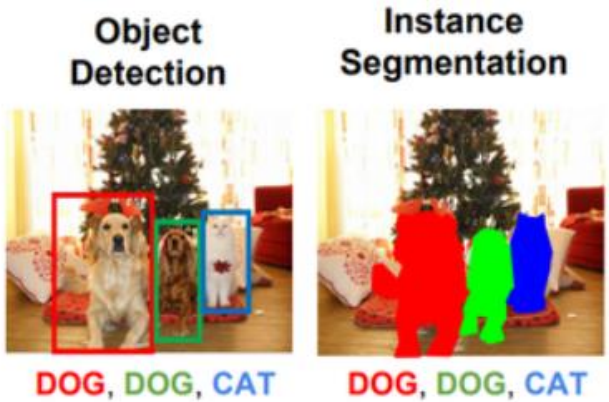
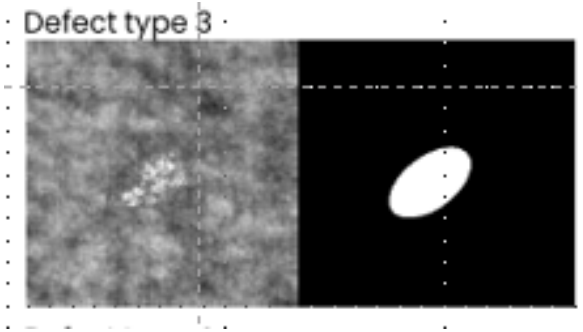
Instance Segmentation Approach

Instance segmentation is an extension of object detection where we denote the presence of an object through pixel-wise masks generated for each object in the image.





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U-Net

U-Net is an architecture for semantic segmentation. It consists of a contracting path and an expansive path.

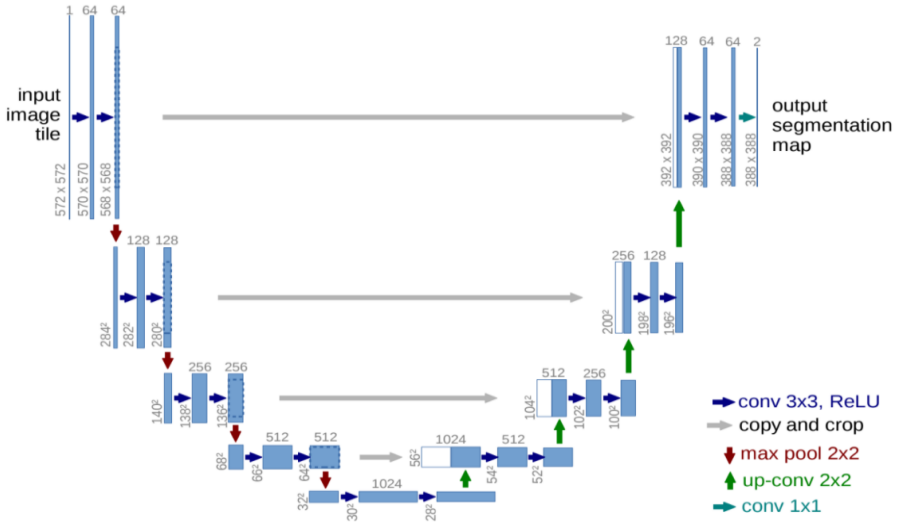

Fig. 1. U-net architecture

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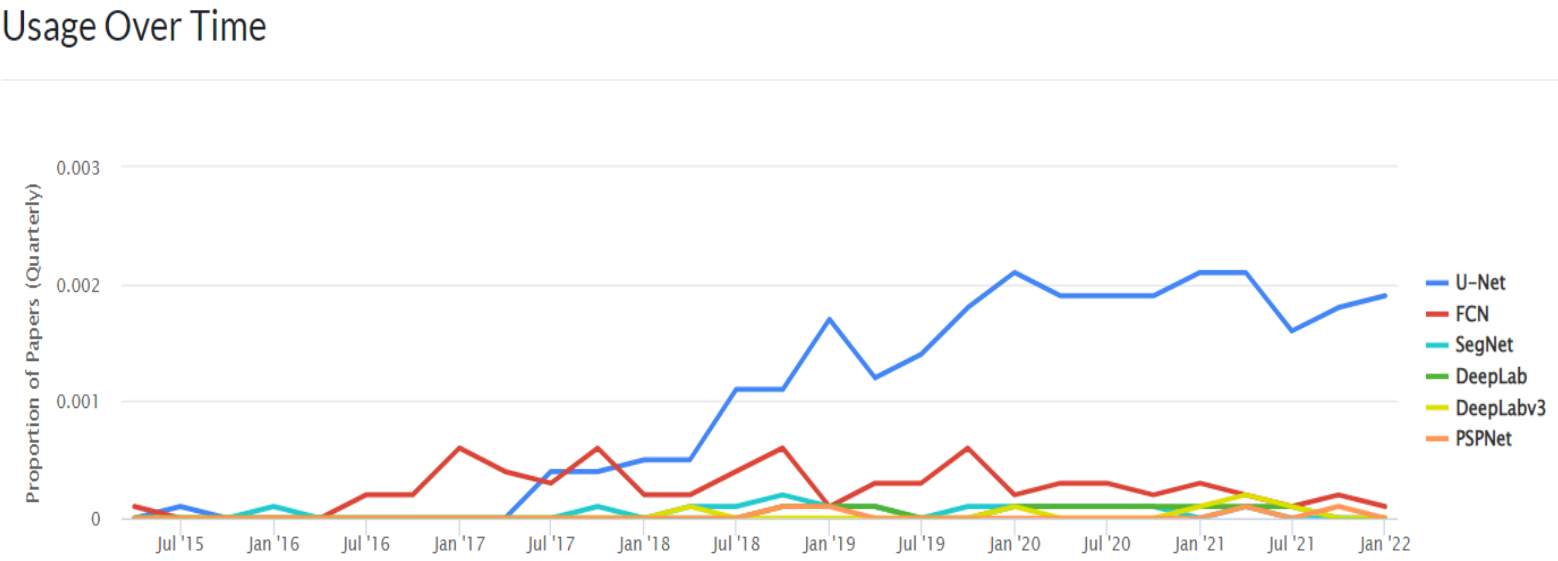
U-Net Usage over time



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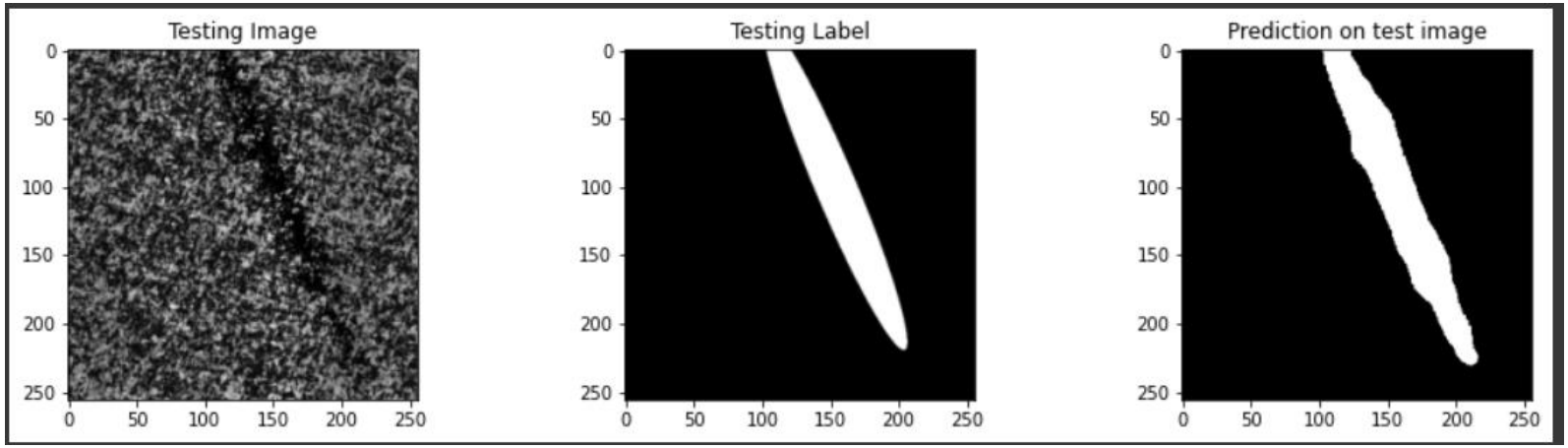
U-Net for this challenge

- Google Colab Notebook used
- Keras deep learning framework
- Image reduction for faster computation
- Develop individual models for every anomaly class, 8 in total.
- There was no use of hyperparameter tuning and overfitting avoiding techniques.
- Used less training data size to optimize time (mine)

Testing

A visual show of the use of the U-Net Algorithm through this challenge.



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Future Improvement

- -Create a classifier to detect the type of texture associated with each type of anomaly.
- -Hyperparameter tuning testing
- -Build a general model to address every anomaly
- -Avoid Overfitting
- -Cost analysis of different implementations of the algorithm

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Learned Lessons

- -A correct initial strategy gives a better time performance
- -Environments to run code are tricky, a container should work fine.
- -Team Feedback is always important to check for details.

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