

Work and time schedule

[illegible]

Log book:

As outlined in assignment 1, quantifying speckle removal is challenging. In addition to removing the noise, preserving edges and borders of different landcovers is very important. Therefore, the visual inspection is very important when analyzing despeckling approaches. In order to still provide a quantitative comparison, difference images between the noise free reference and the different despeckled images are calculated. The goal is as follows:

The goal is to reach a lower difference between all SAR image test patches despeckled with the own developed model and the same patches of the noise free reference compared to the difference between the same patches despeckled with a state-of-the-art lee filter and the noise free reference.

Current status:

- The workflow including the model is running
- Currently the above outlined goal is not reached yet: **Difference U-Net Model and reference: 452000 dB. Difference Lee filter and reference: 3781400 dB**
- (hyper-)parameter tuning is ongoing



Figure 1: Example for a prediction (left), noise free reference (middle), and noisy training data (right) for a single patch.

Open issues:

- Model is not running at GPU project machine anymore.
- Smoothing effect in predictions is too strong (compare figure 1)
- Value range of predicted patches is slightly off, the range is too small (compare figure 2)
- Edges are not preserved, details are missing

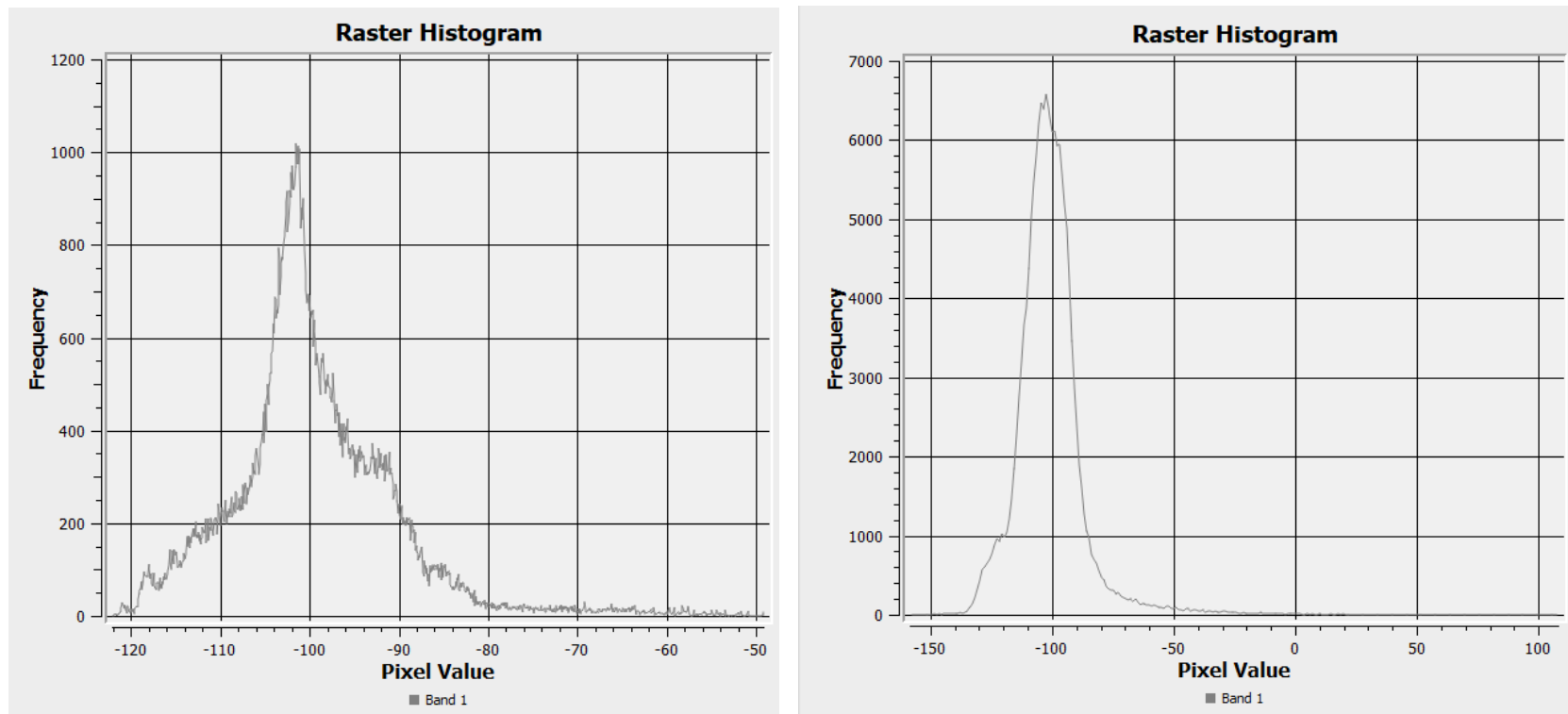


Figure 2: Comparison of the frequency histogram of a predicted patch (left) and the noise free reference patch (right)

Next steps:

- Fix issue with GPU project machine or move to different hardware
- Try different scaling/normalization
- Try different activations
- Try smaller kernel size
- Implement edge preserving blocks (e.g. HED U-Net <https://arxiv.org/abs/2103.01849>)
- Create application