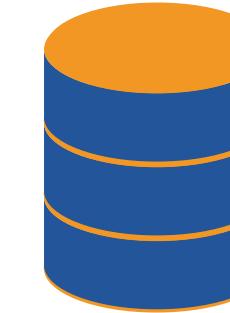




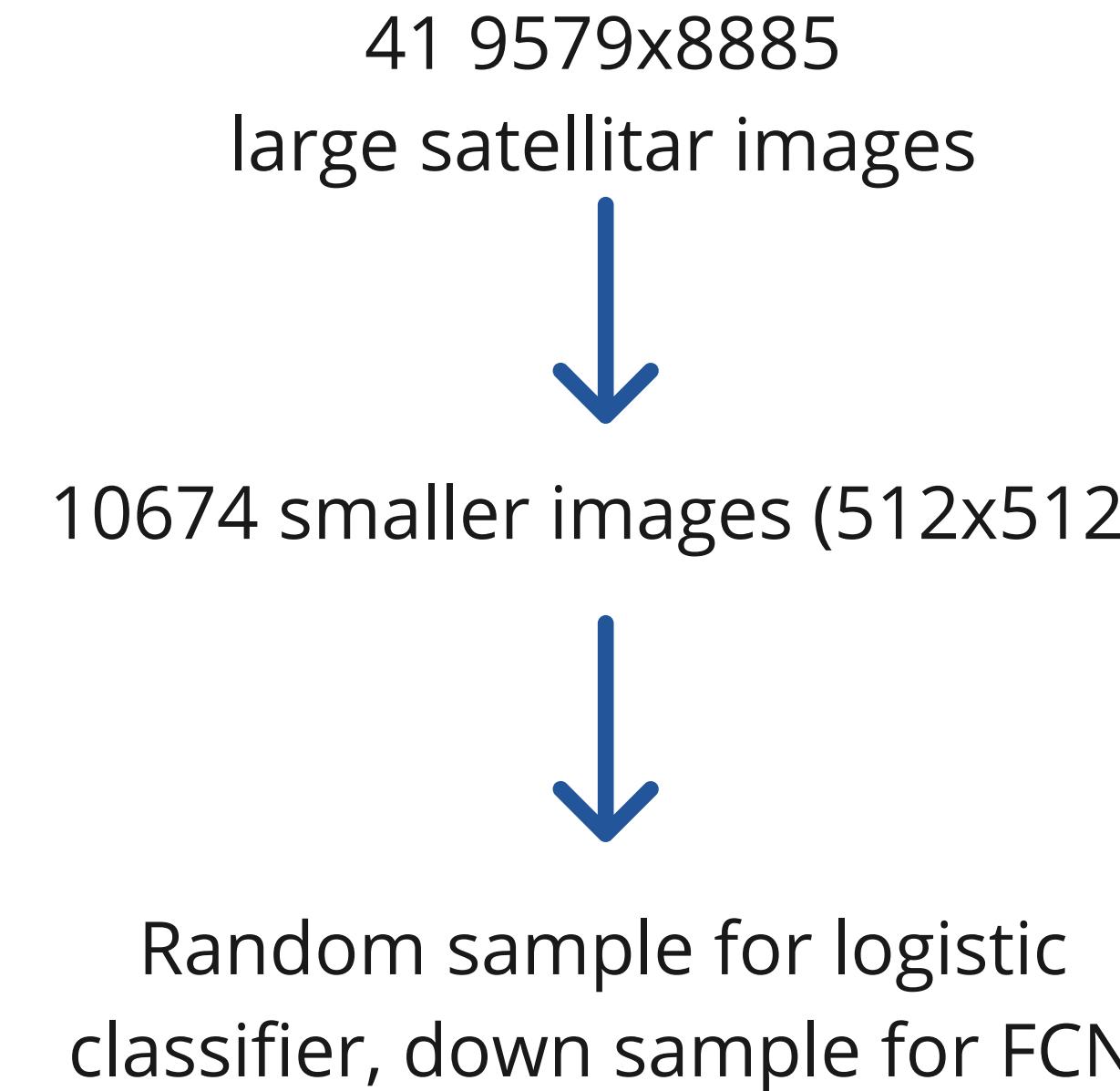
# Computer vision Woodland detection on satellitar images

D3A SUPSI  
Bulloni Dyuman , Margni Nathan

22.12.2022

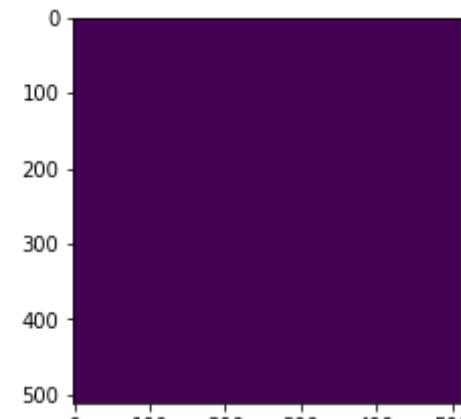
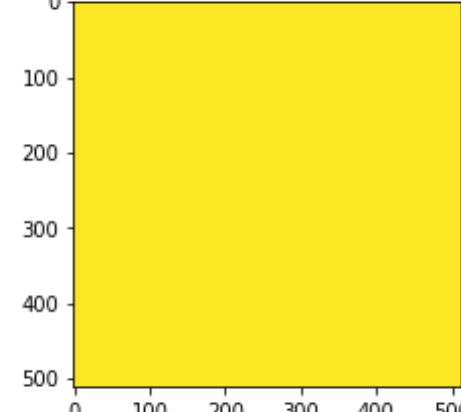
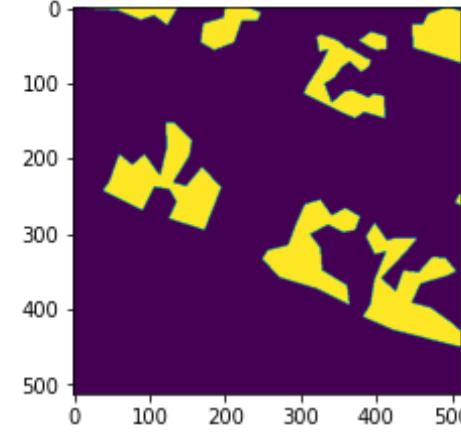
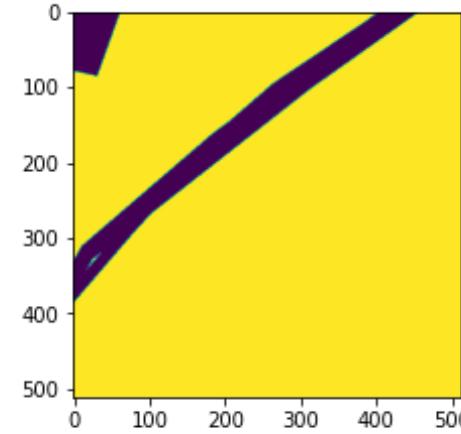
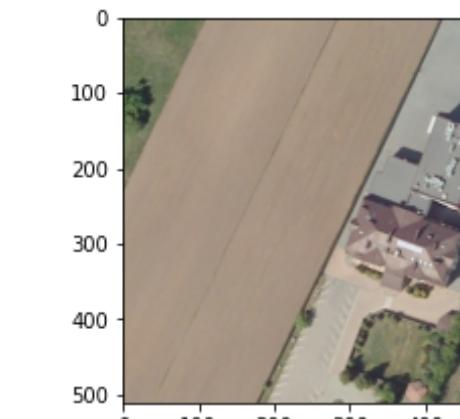
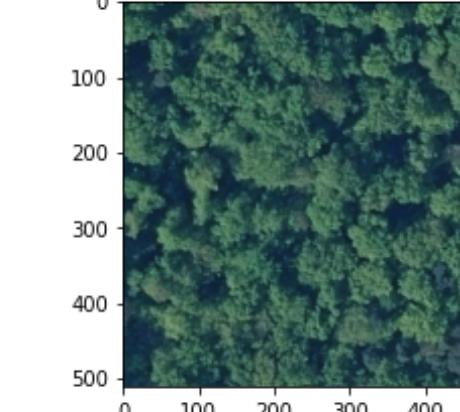
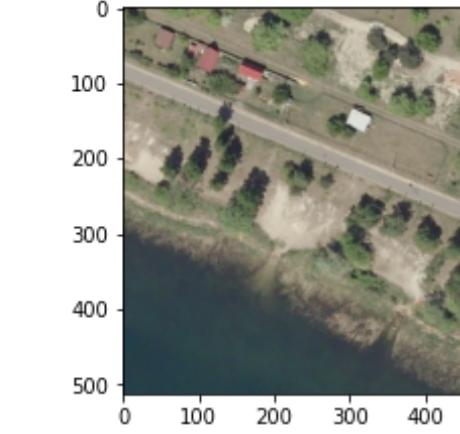
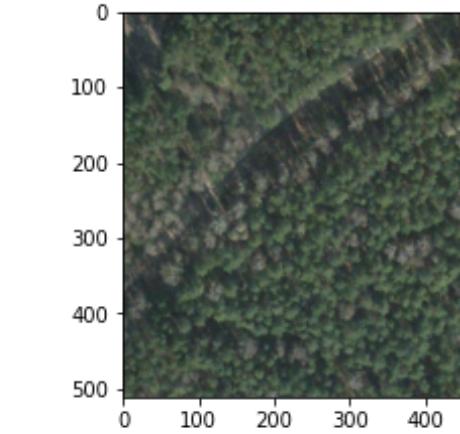
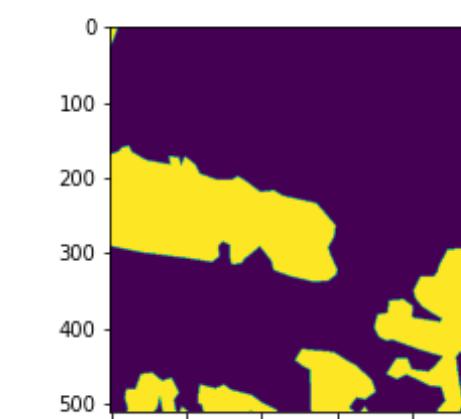
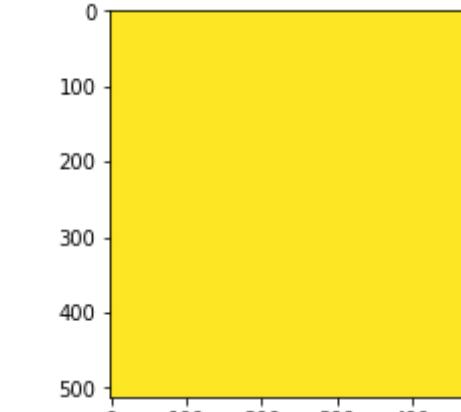
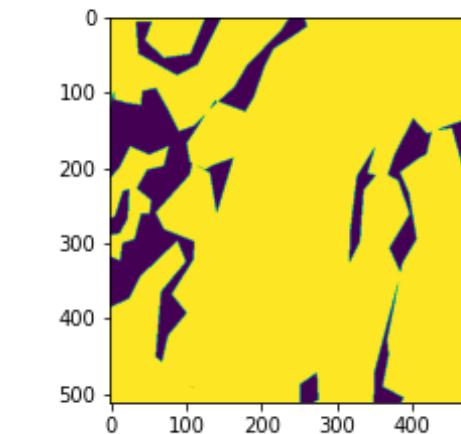
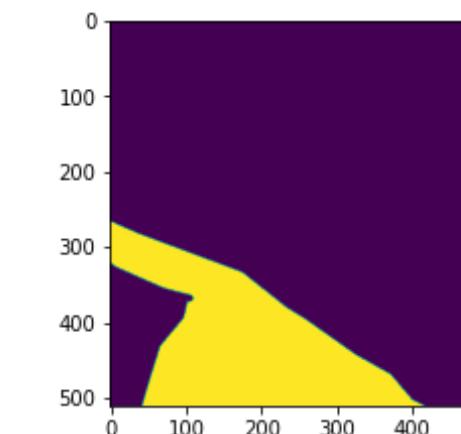
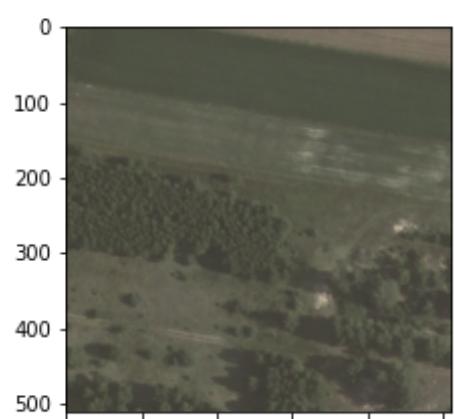
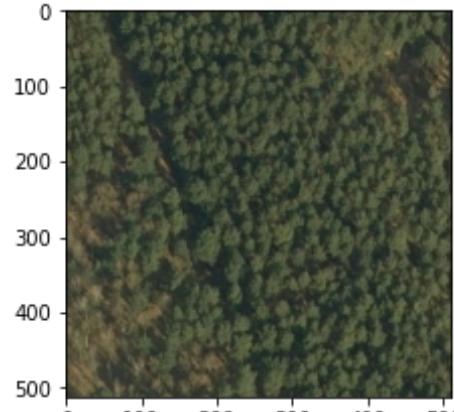
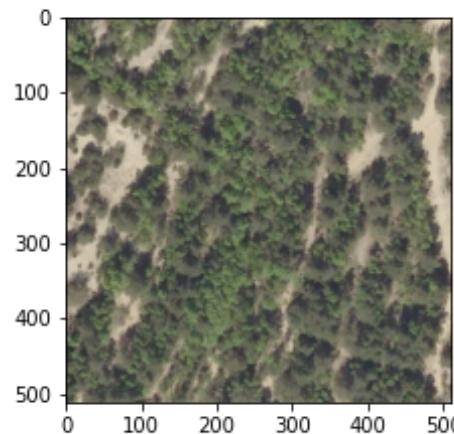
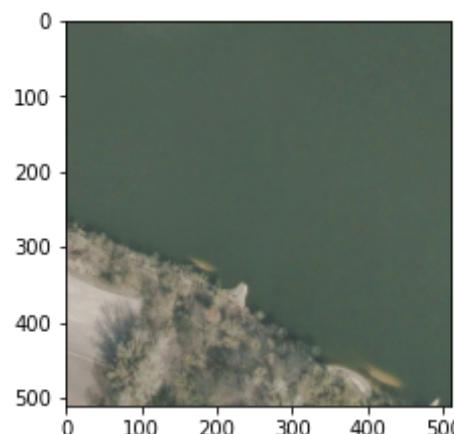
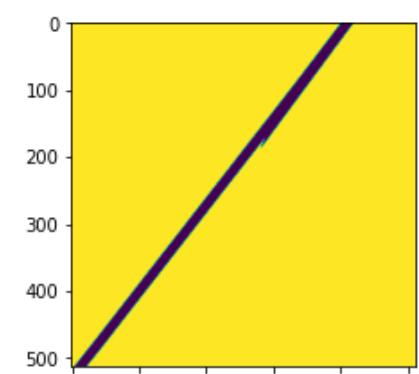
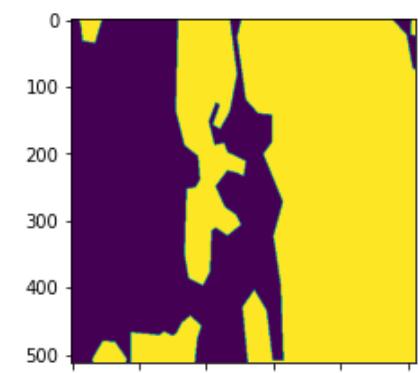
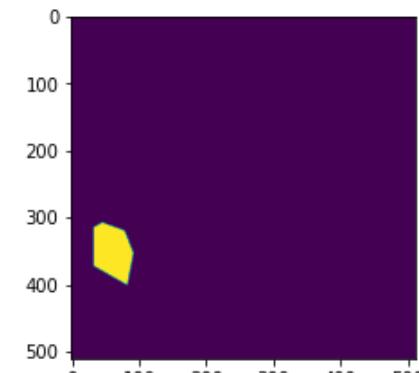
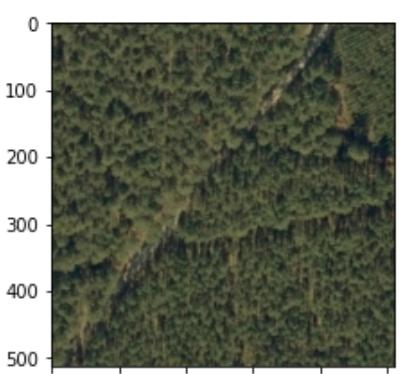
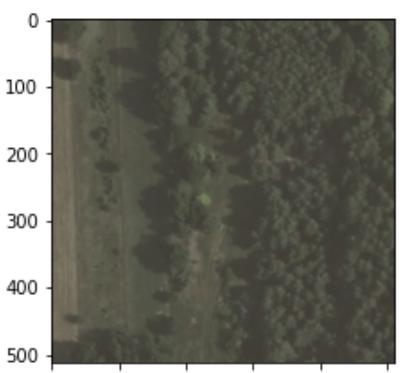
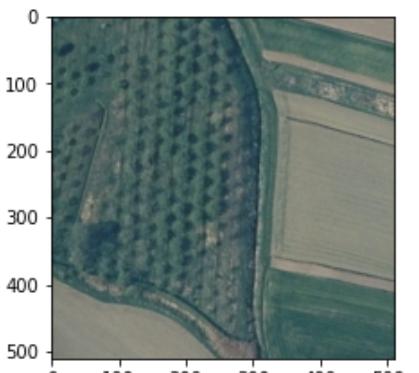


# Data



Source: <https://landcover.ai.linuxpolska.com/>

# Images

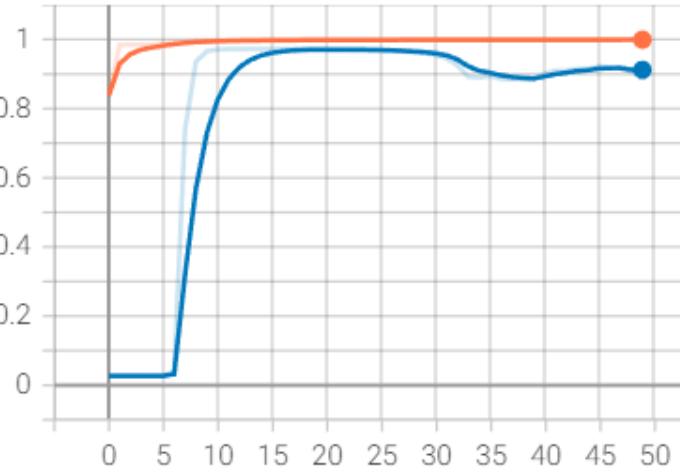


Model	Description	Scores
Logistic regression	Single pixel rgb classifier	<b>accuracy:</b> 0.68 <b>f1 score:</b> 0.69 <b>roc score:</b> 0.68
CNN	Fully connected layers ( kernel sizes= 1) , 2 layers	<b>accuracy:</b> 0.75 <b>f1 score:</b> 0.50 <b>roc score:</b> 0.65
Advanced CNN	Traditional CNN (kernel sizes > 1) , 4 layers	<b>accuracy:</b> 0.71 <b>f1 score:</b> 0.53 <b>roc score:</b> 0.65
Complete U-net	CNN with 20 layers, batchnormalization, maxpooling, upsampling etc.	<b>accuracy:</b> 0.83 <b>f1 score:</b> 0.77 <b>roc score:</b> 0.83
Small U-net	Like complete U-net but with half of n filters	<b>accuracy:</b> 0.83 <b>f1 score:</b> 0.76 <b>roc score:</b> 0.81

# Models

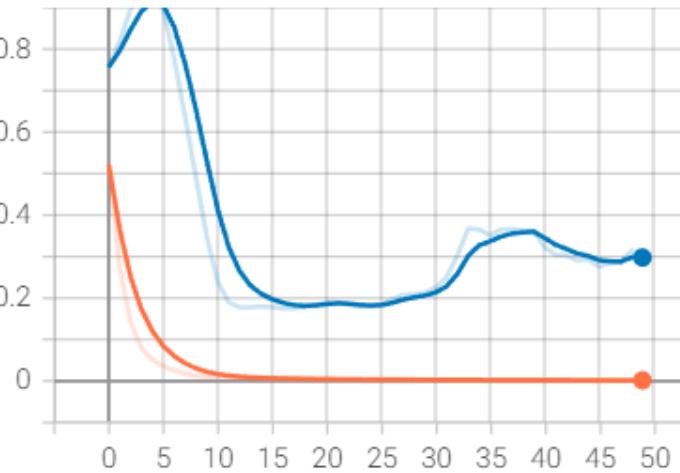
# UNet Scores

epoch\_binary\_accuracy  
tag: epoch\_binary\_accuracy



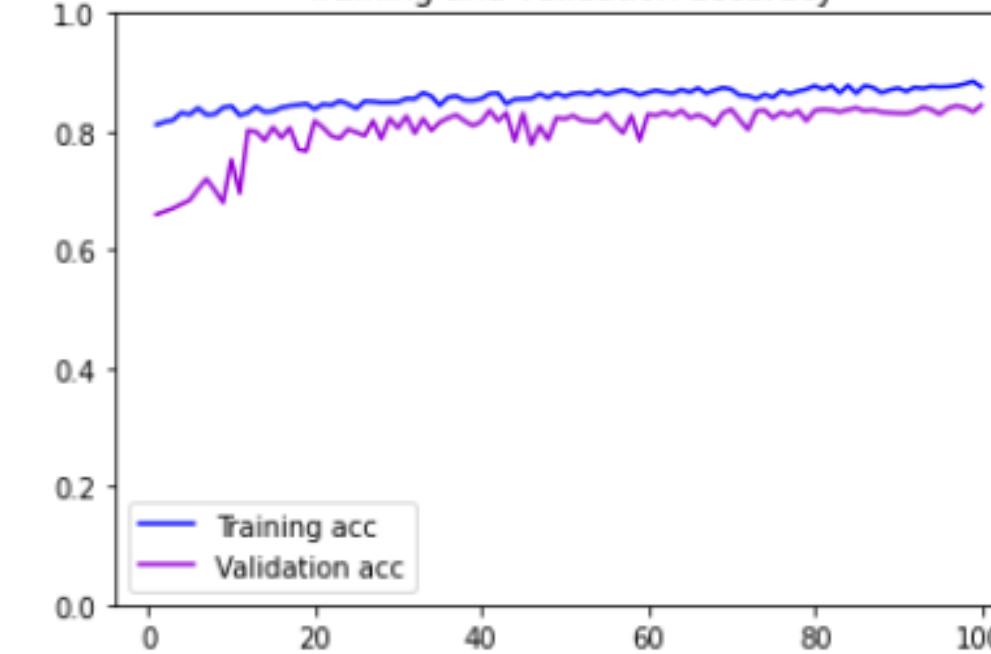
epoch\_loss

epoch\_loss  
tag: epoch\_loss

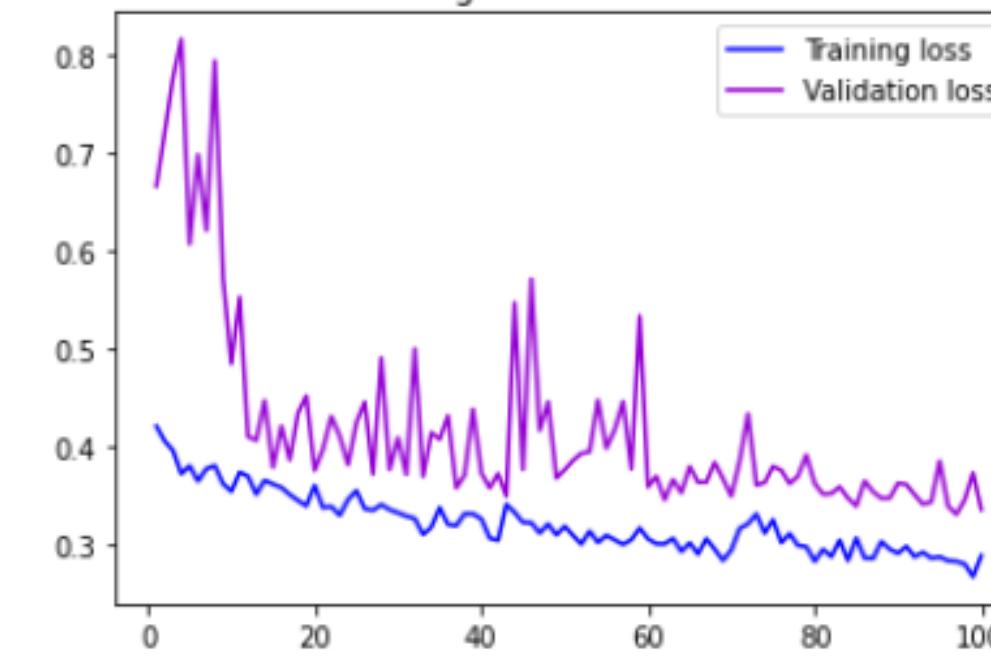


**UNet with few data**  
orange: train, blue:val

Training and validation accuracy

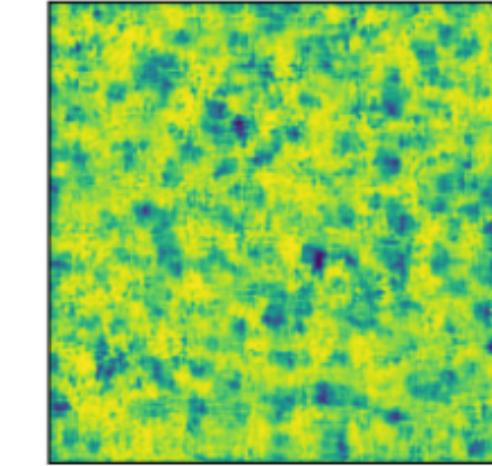
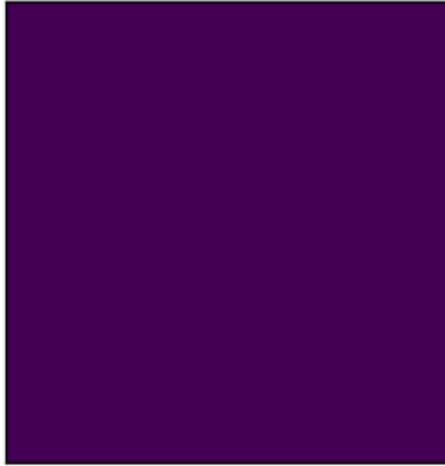
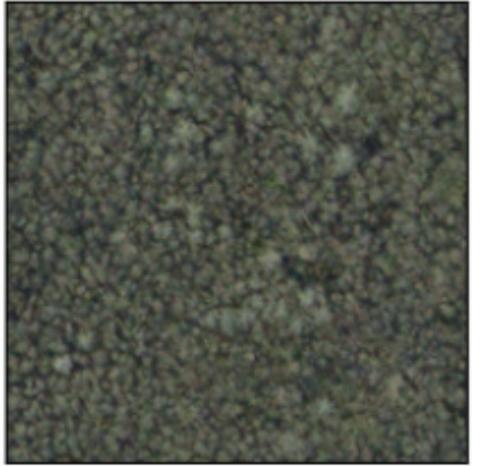
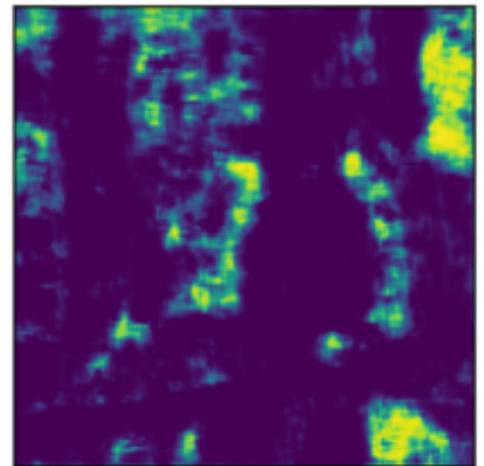
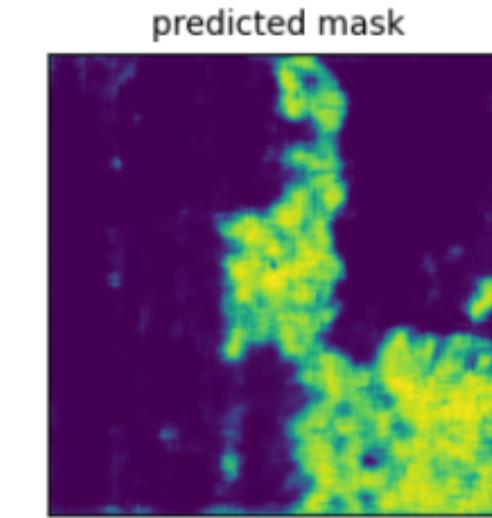
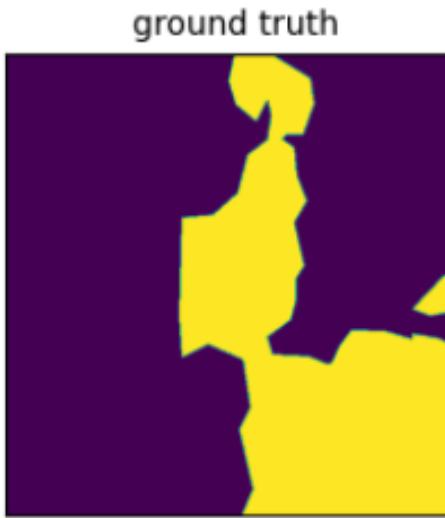
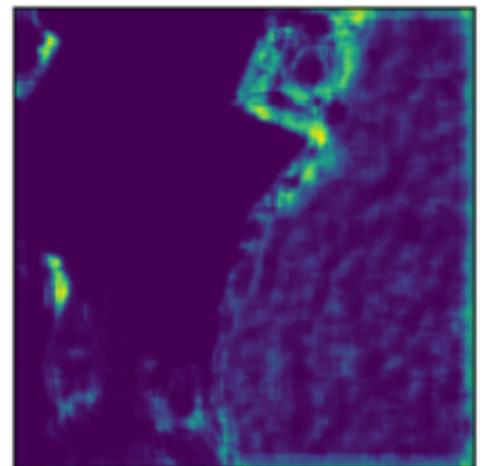
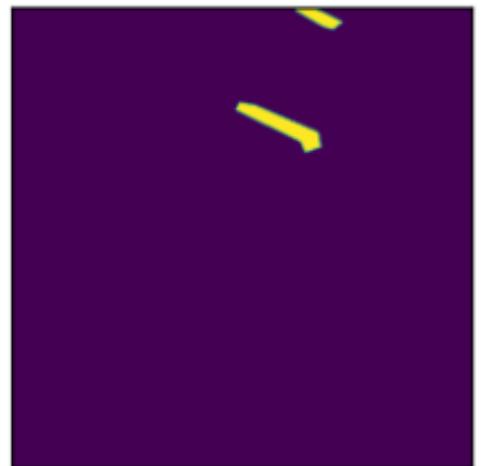


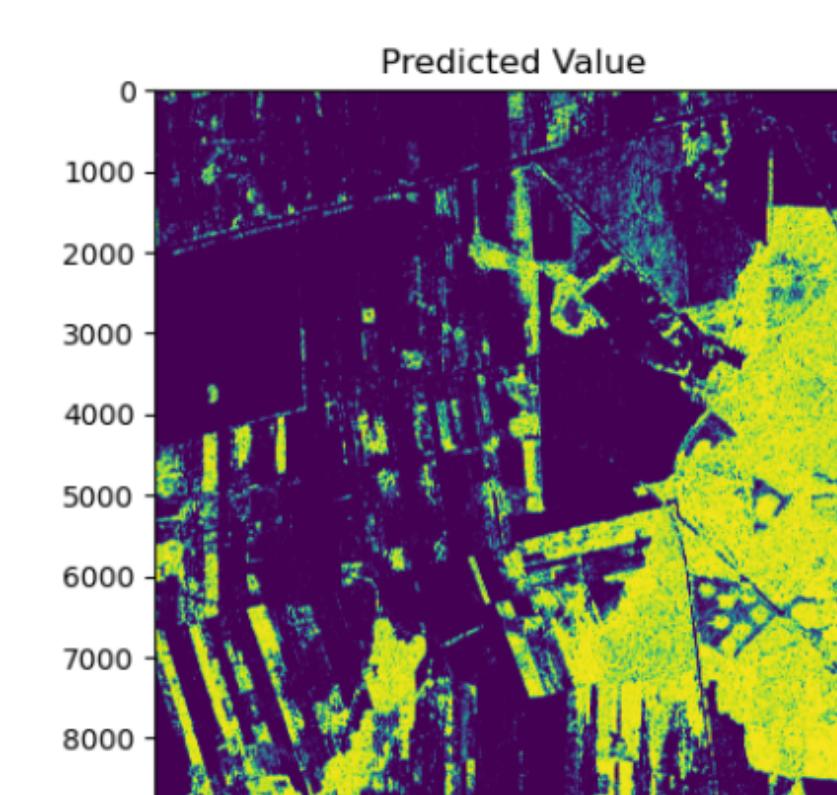
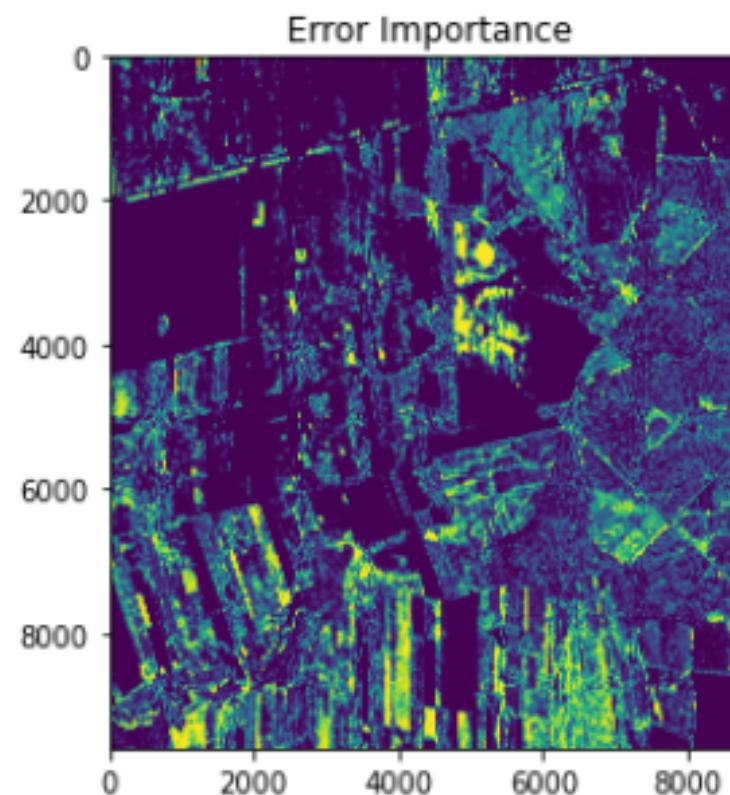
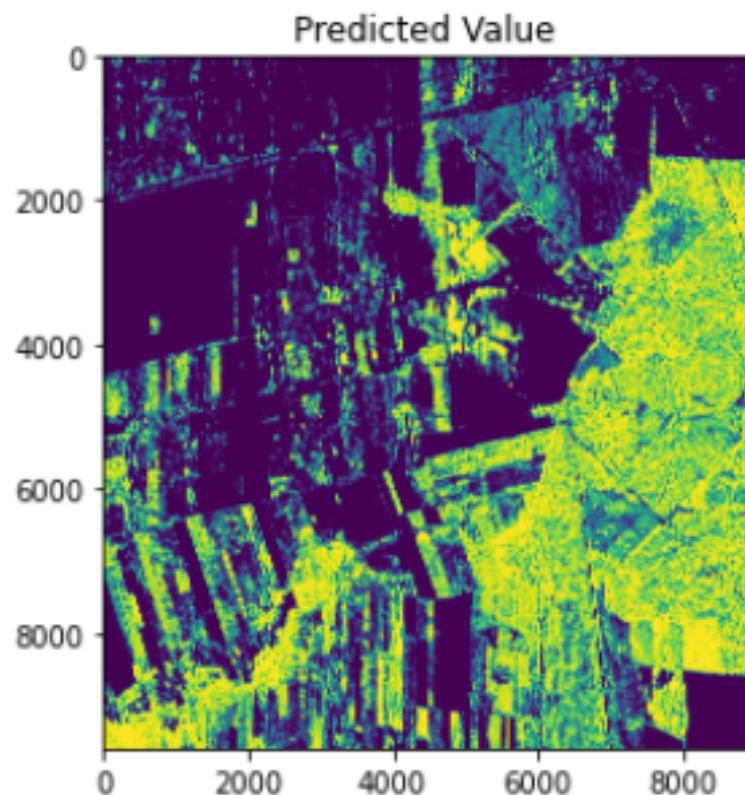
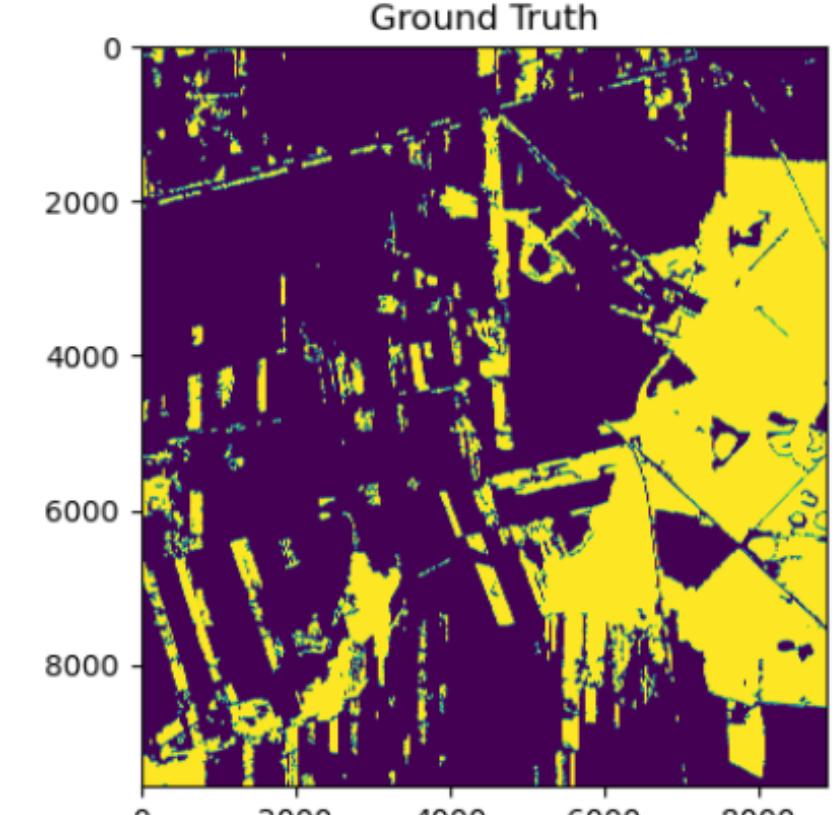
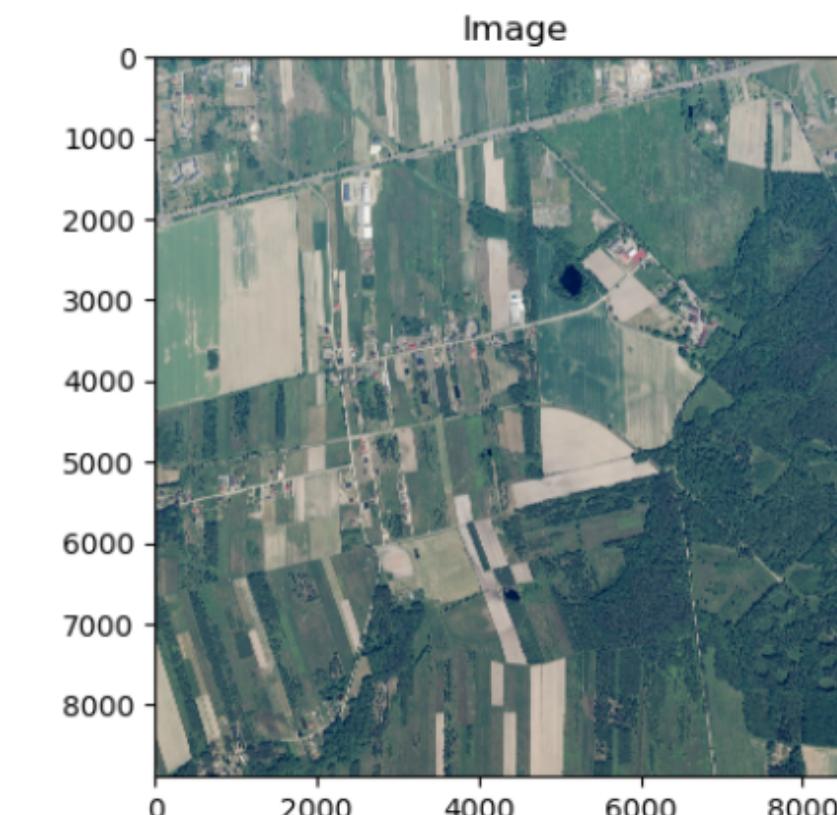
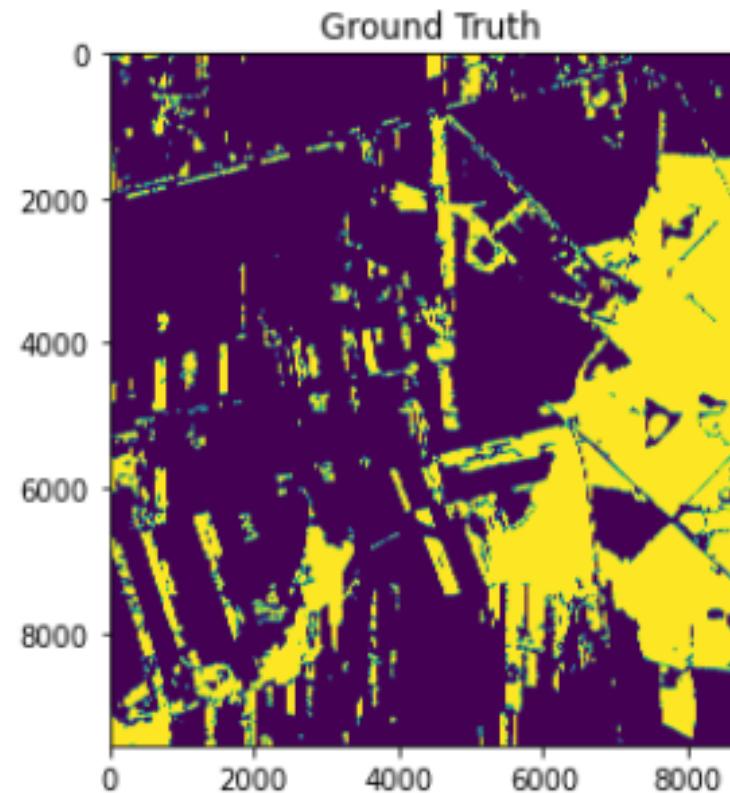
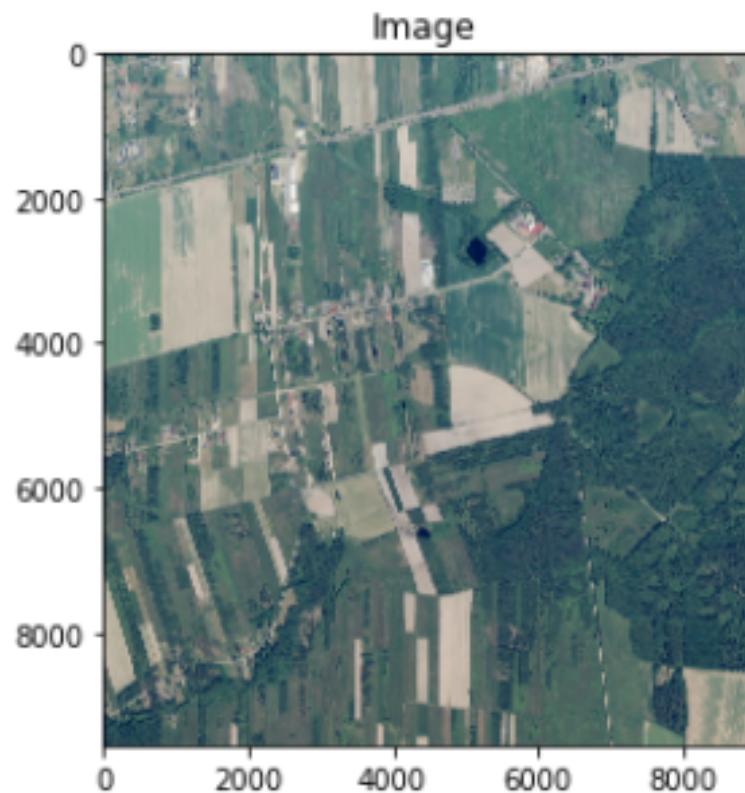
Training and validation loss



**Small UNet**

# Predictions





**Logistic regression**

**Small unet**

# Encountered issues



## Computationally-heavy

Time for CPU approach,  
Out of memory for GPU approach.



## Overfitting

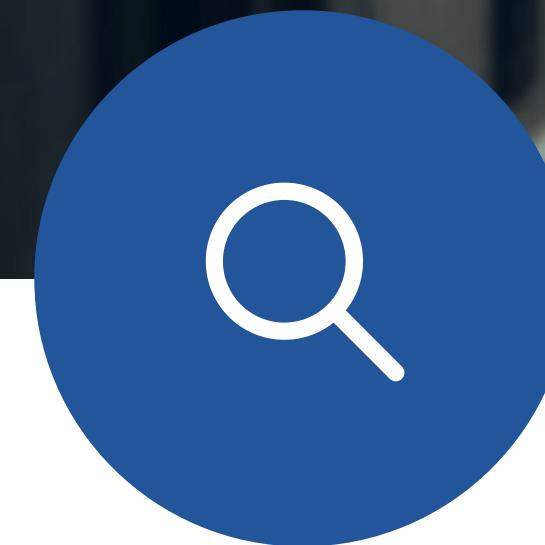
Complex models were too good  
with the limited dataset, but  
increasing led to OOM.



## Precision of Ground Truth

Some given masks seems worse  
than our prediction in some cases.

# Future Improvements



## Tensorflow Dataset

Dataset loaded directly from disk, to use GPU while keeping the data not in memory.



## Limited Approach

No tuning was done over the NNs, as well as other approaches that were not suggested.

# Questions

