

PROJEKTPLAN

Ziel der Arbeit

- Klassifizierung von Oberflächen (Eis, Schnee/Firn, Fels/Debris)
- Vergleich von Klassifikationsmethoden

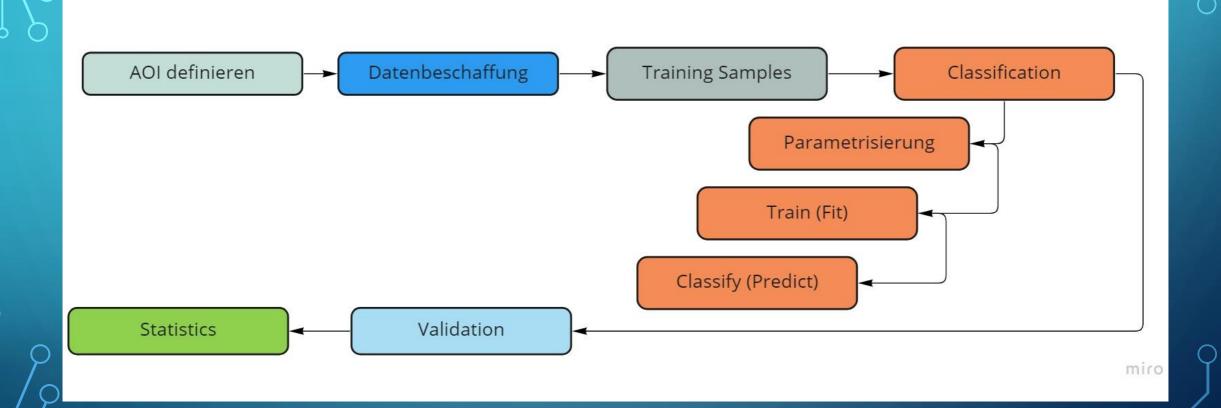
Datenbeschaffung

• Sentinel-2

Software/Packages

- sklearn.neural_network.MLPClassifier
- sklearn.ensemble.RandomForestClassifier

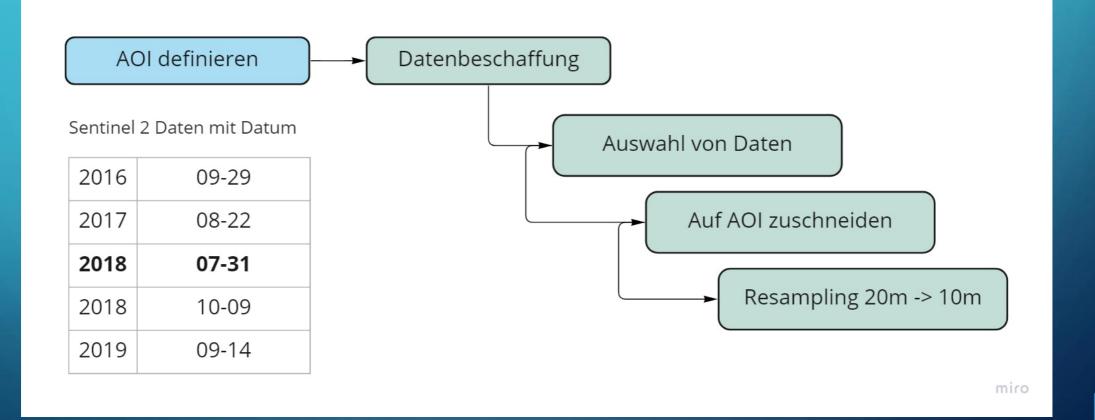
WORKFLOW



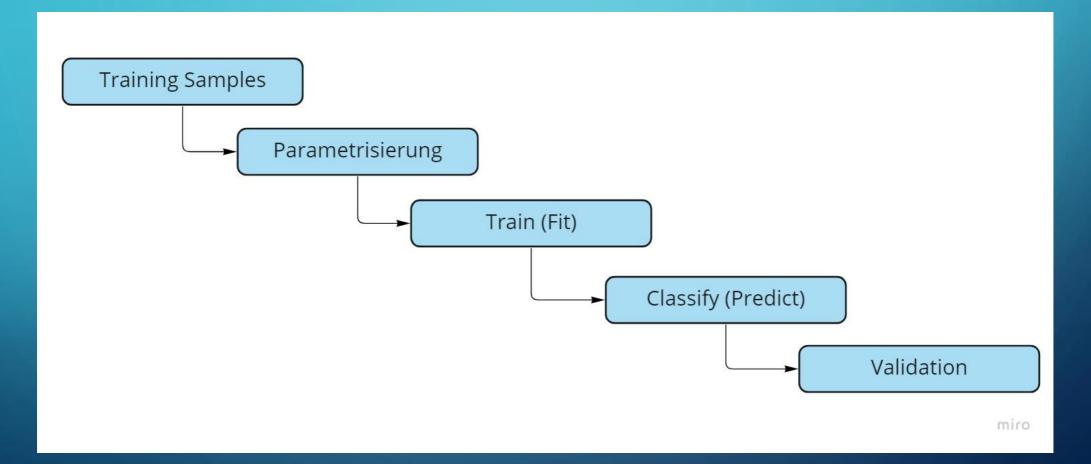
SENTINEL 2 DATEN

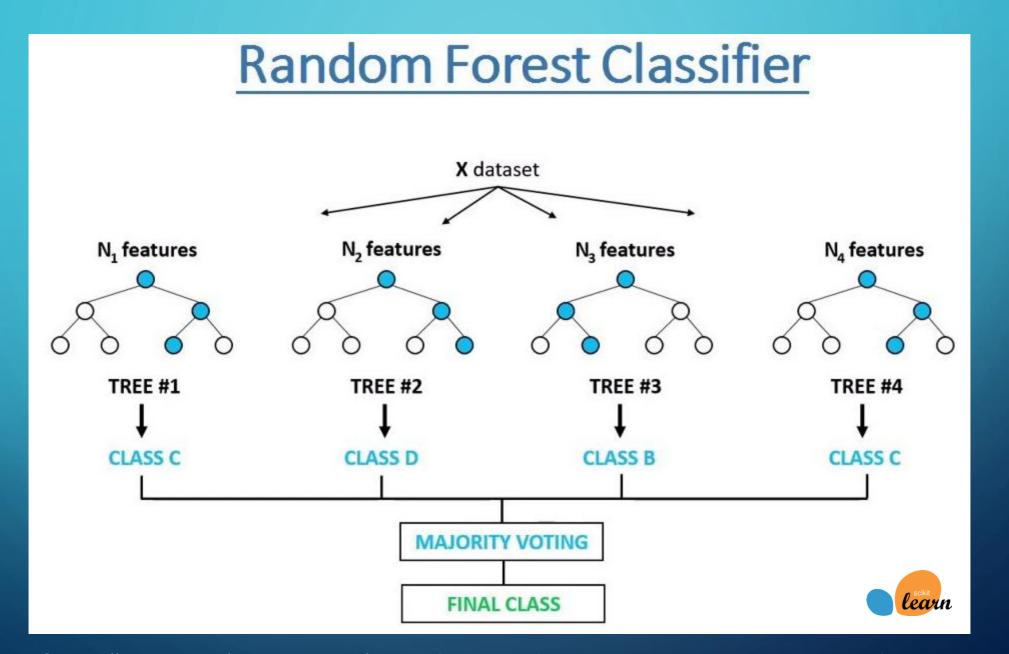
Band	Sentinel-2A		Sentinel-2B		Disconlinks Auditions (m)	
	Mittlere Wellenlänge(nm)	Bandbreite (nm)	Mittlere Wellenlänge(nm)	Bandbreite (nm)	Räumliche Auflösung (m)	Verwendung
1	442,7	21	442,2	21	60	Aerosole
2	Blau 492,4	66	492,1	66	10	Aerosole, Landnutzung, Vegetation
3	Grün 559.8	36	559	36	10	Landnutzung, Vegetation
4	Rot 664,6	31	664,9	31	10	
5	704,1	15	703,8	16	20	
6	NIR 740,5	15	739,1	15	20	
7	782,8	20	779,7	20	20	
8	832,8	106	832,9	106	10	 Wasserdampf Landnutzung Vegetation
8a	864,7	21	864	22	20	
9	945,1	20	943,2	21	60	Wasserdampf
10	1373,5	31	1376,9	30	60	Cirruswolken
11	SWIR 1613,7	91	1610,4	94	20	Landnutzung, Vegetation
12	SWIR 2202,4	175	2185,7	185	20	Aerosole, Landnutzung, Vegetation

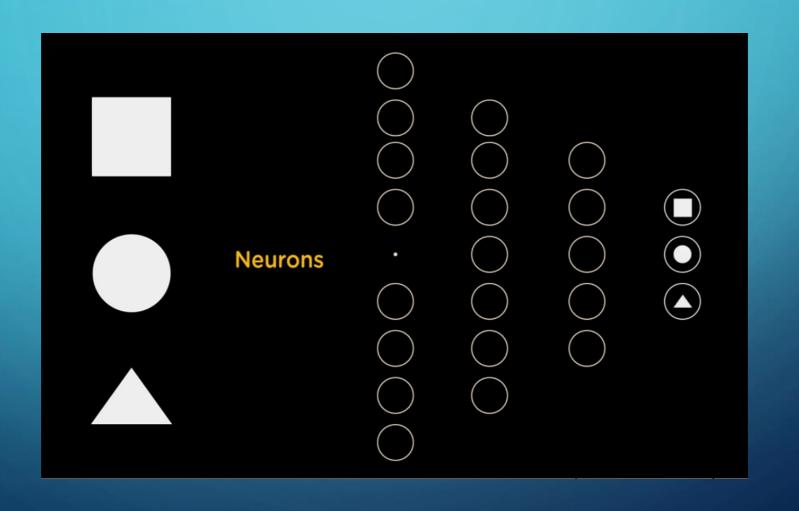
DATENBESCHAFFUNG

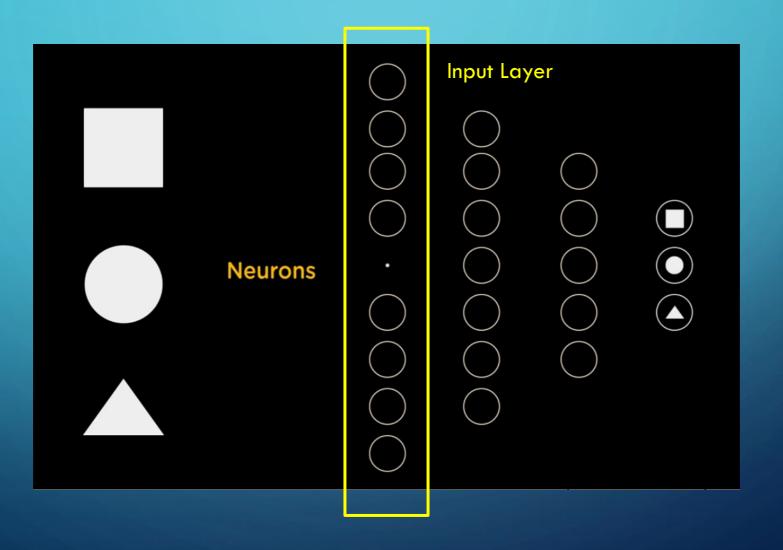


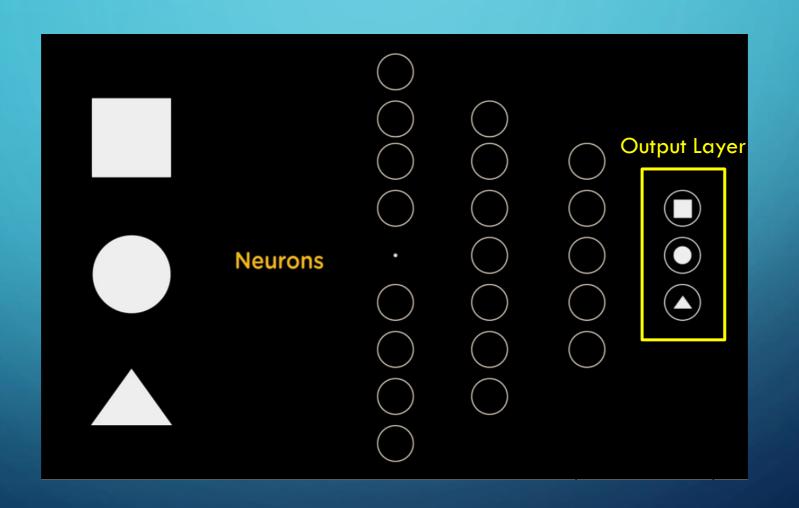
CLASSIFICATION

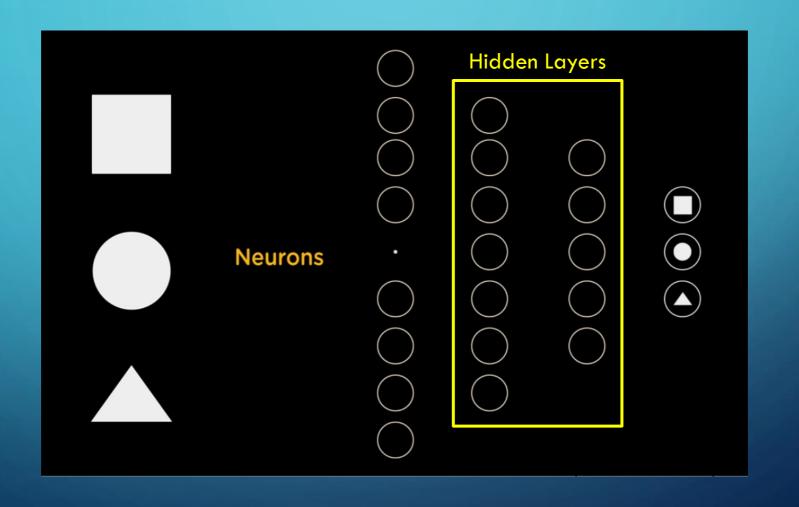


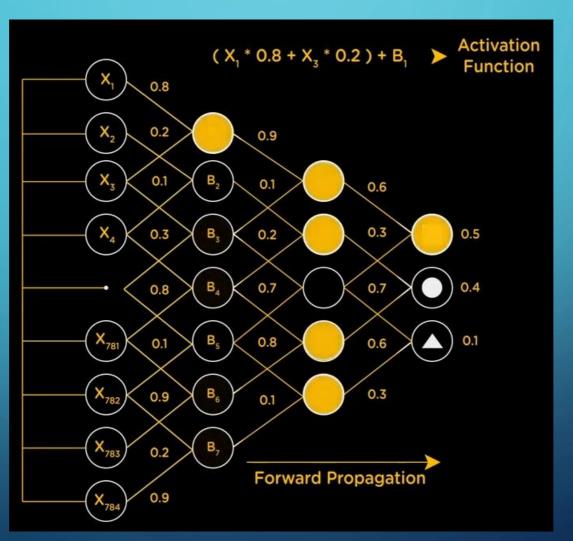












CLASSES (LABELS)

Training Samples

Classes

Ice

Snow

Rock/Debris





Random Forest

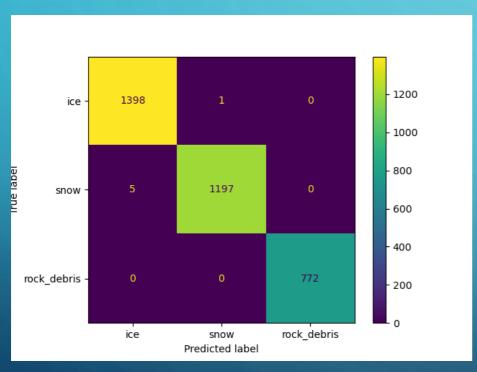
```
rf = RF(
    n_estimators=50,
    n_jobs=-1,
    oob_score=True)
```

Multi Layer Perceptron (MLP)

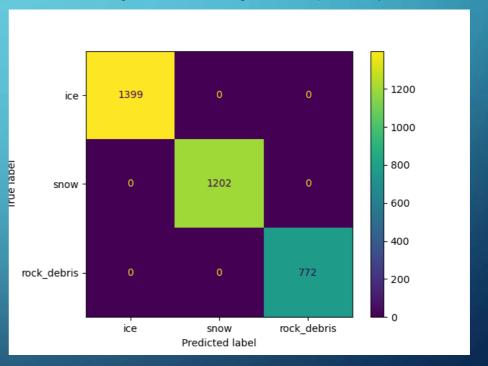
```
mlp = MLP(
   hidden_layer_sizes=(80, 80, 80),
   max_iter=300,
   activation='relu',
   solver ='adam',
   random_state=0,
   alpha=0.99,
   beta_1=0.42,
   beta_2=0.999)
```

VALIDATION: CONFUSION MATRIX

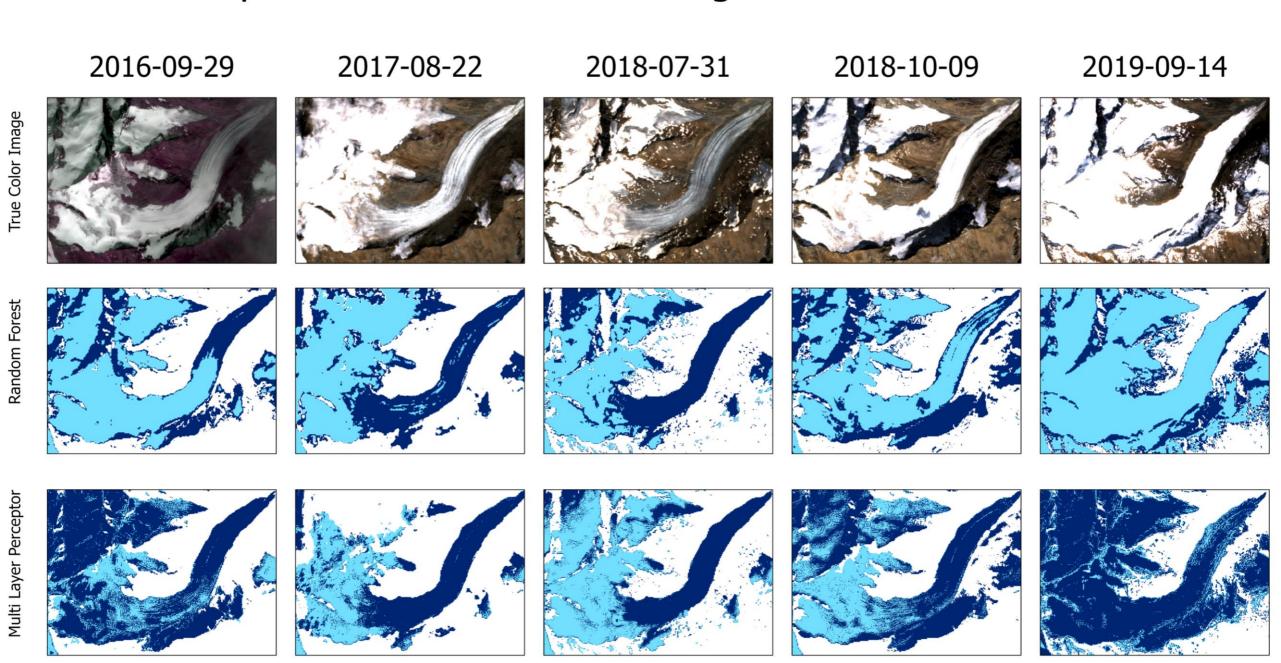
Random Forest

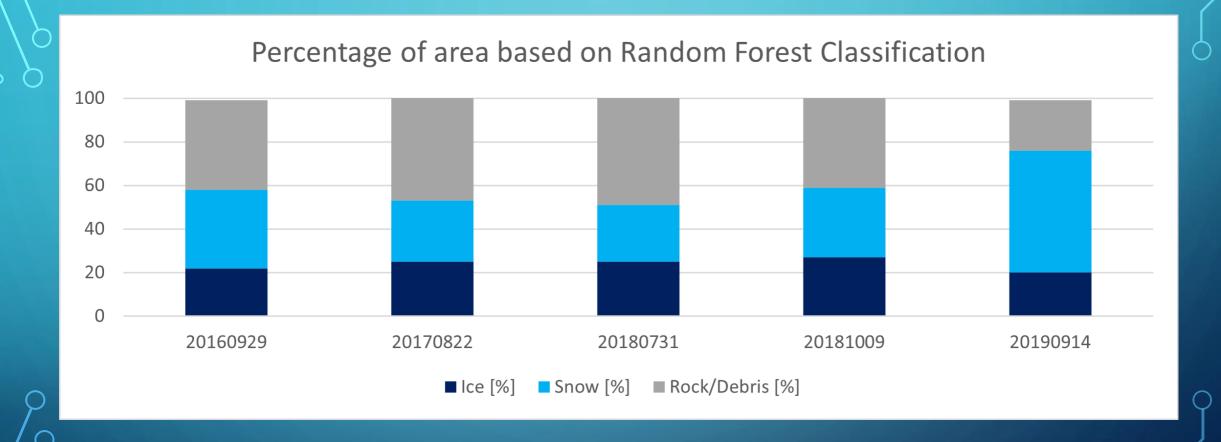


Multi Layer Perceptron (MLP)



Comparison of Machine Learning Classification Results





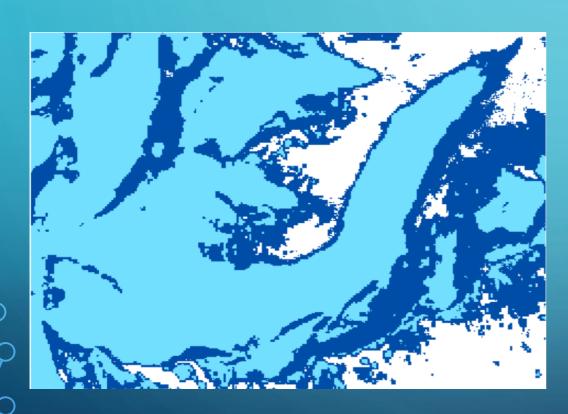
NACH ABSCHLUSS: EIN BISSCHEN VERSTANDEN.

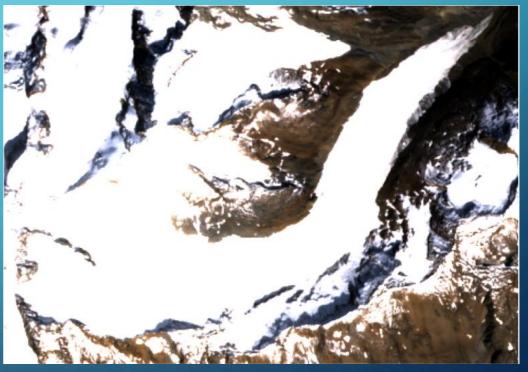
2 Dimensionen á 10 Layer?

Aber nur 3 Dimensionen als Hidden Layer?

```
mlp = MLP(
   hidden_layer_sizes=(80, 80, 80),
   max_iter=300,
   activation='relu',
   solver ='adam',
   random_state=0,
   alpha=0.99,
   beta_1=0.42,
   beta_2=0.999)
```

NACH ABSCHLUSS: EIN BISSCHEN VERSTANDEN.





LITERATUR

Scikit Random Forest Classifier:

https://scikit-learn.org/stable/modules/generated/sklearn.ensemble.RandomForestClassifier.html

Scikit MLP Neural Network:

https://scikit-learn.org/stable/modules/generated/sklearn.neural_network.MLPClassifier.html#sklearn.neural_network.MLPClassifier

Vergleichsstudie:

https://scikit-learn.org/stable/auto_examples/classification/plot_classifier_comparison.html#sphx-glr-auto-examples-classification-plot-classifier-comparison-py

Jiang W, He G, Long T, Ni Y, Liu H, Peng Y, Lv K, Wang G. Multilayer Perceptron Neural Network for Surface Water Extraction in Landsat 8 OLI Satellite Images. *Remote Sensing*. 2018; 10(5):755. https://doi.org/10.3390/rs10050755