

Automatische Detectie Hoge Lijnelementen voor D-HYDRO

HYDROLIB Voortgangsoverleg – 13 November 2021

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Begeleiders: Bertus de Graaff (HKV) & Ruud van
der Ent (TU Delft)

Introductie

- Hoge lijnelementen
- Verhogen accurateid overstromingsmodel
- Rekenen met grote grids → verlaagt rekestijd

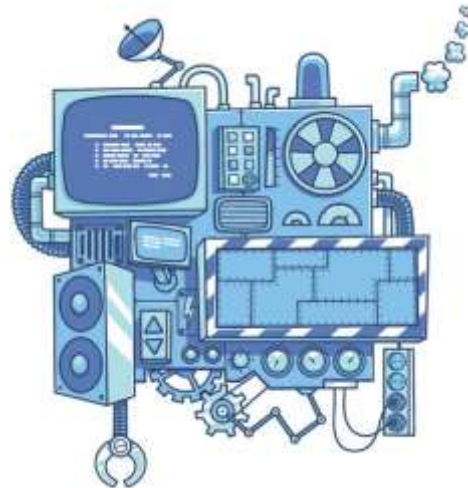


Hoge Lijnelementen



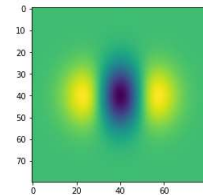
Doel Onderzoek

Digital Elevation Model (DEM)



Shapefile met hoge lijnelementen

Convolutie met:



Second Order Gaussian Kernels



Convolutie met kernel?

| | | | | |
|---|---|---|---|---|
| 3 | 4 | 8 | 2 | 4 |
| 2 | 2 | 5 | 1 | 3 |
| 2 | 1 | 4 | 2 | 3 |
| 3 | 1 | 4 | 7 | 2 |
| 6 | 2 | 5 | 4 | 1 |

Input image

x

| | | |
|----|---|----|
| -1 | 0 | +1 |
| -2 | 0 | +2 |
| -1 | 0 | +1 |

Kernel

=

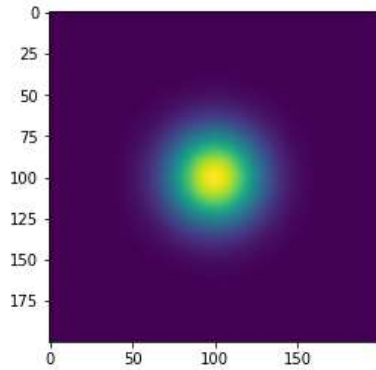
| | | | |
|----|--|--|--|
| 13 | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Output image

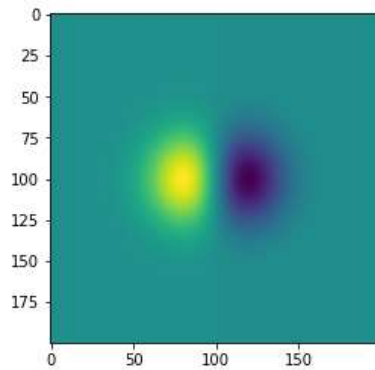


Gaussian Kernel

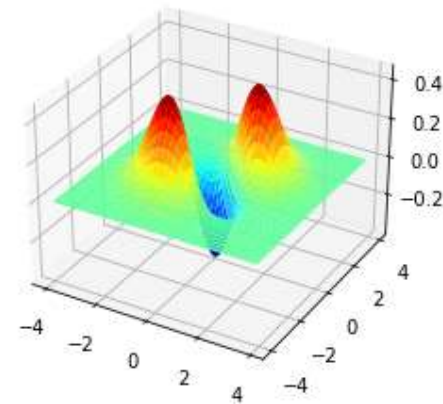
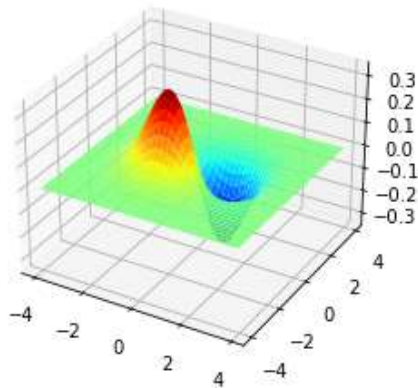
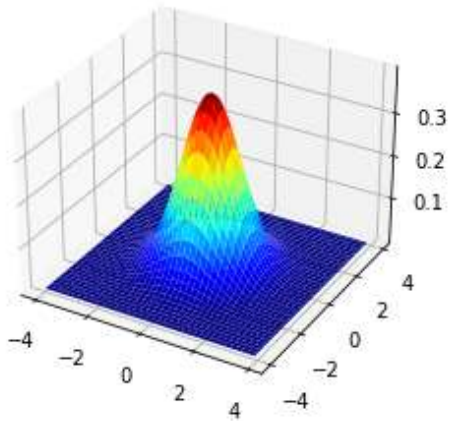
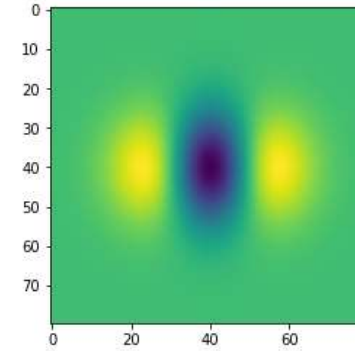
| | | | | | | |
|---|----|----|-----|----|----|---|
| 0 | 0 | 1 | 2 | 1 | 0 | 0 |
| 0 | 3 | 13 | 22 | 13 | 3 | 0 |
| 1 | 13 | 59 | 97 | 59 | 13 | 1 |
| 2 | 22 | 97 | 159 | 97 | 22 | 2 |
| 1 | 13 | 59 | 97 | 59 | 13 | 1 |
| 0 | 3 | 13 | 22 | 13 | 3 | 0 |
| 0 | 0 | 1 | 2 | 1 | 0 | 0 |



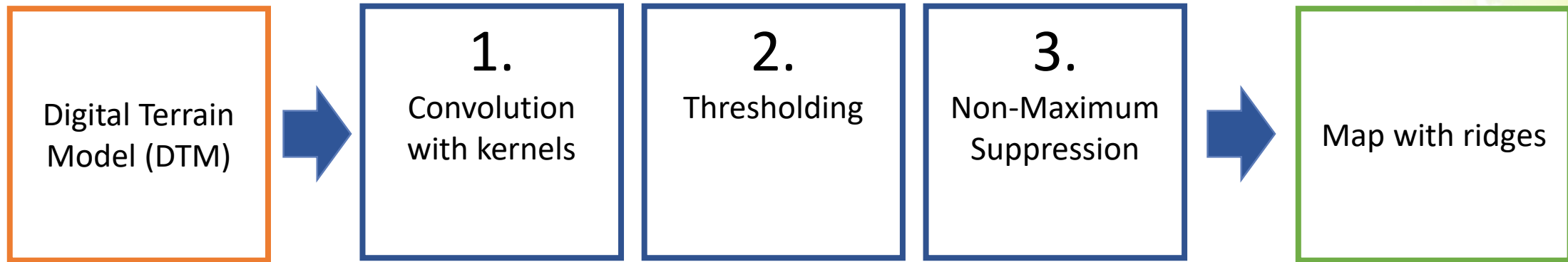
First Order
derivate



Second Order
derivate



Algorithme



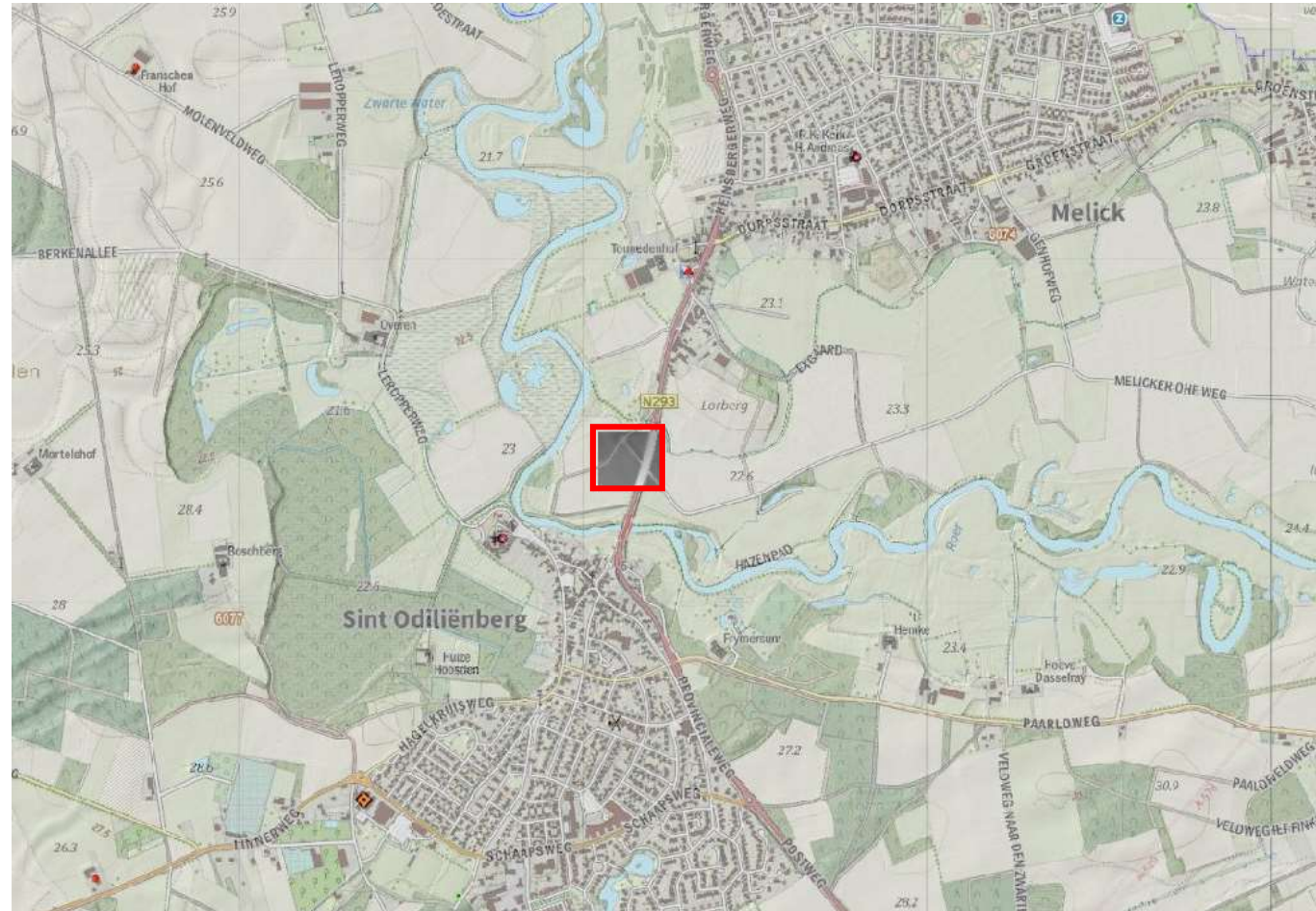
DTM

AHN [DTM]

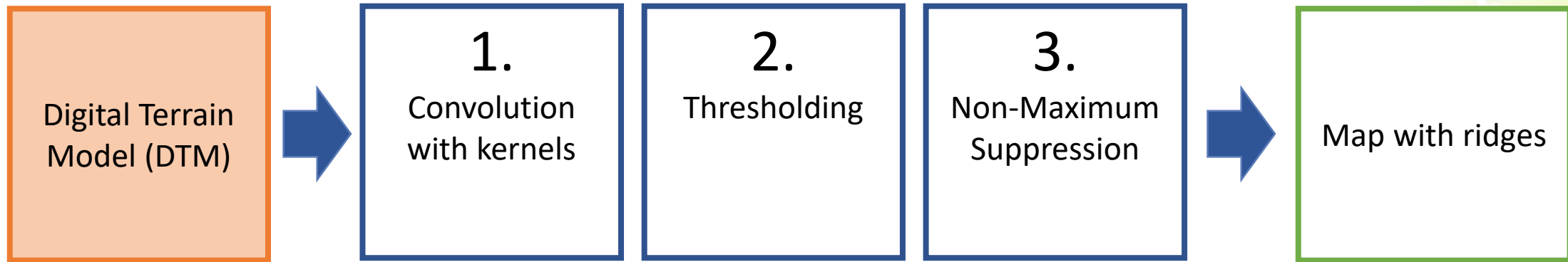
0.5m x 0.5m

Clip:

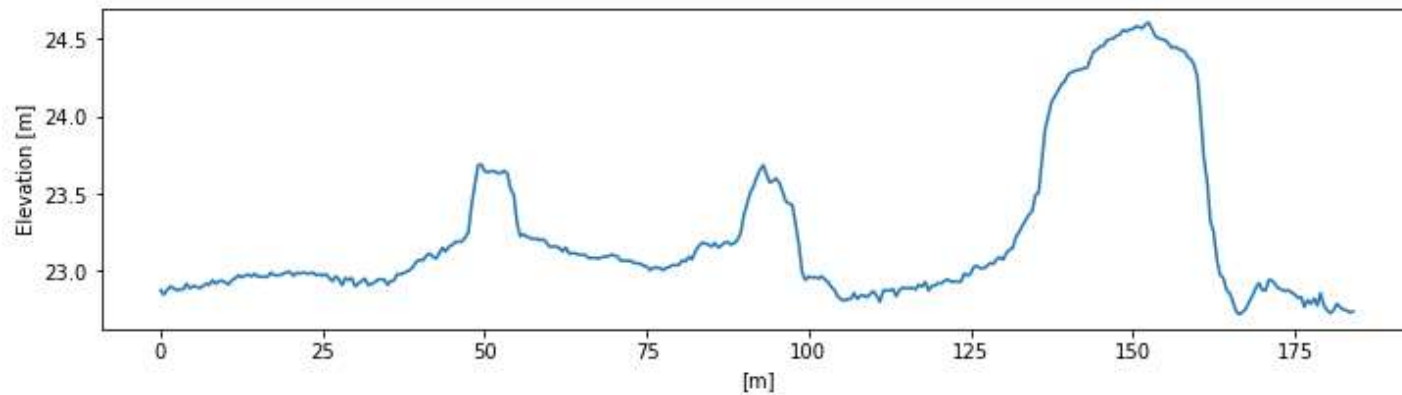
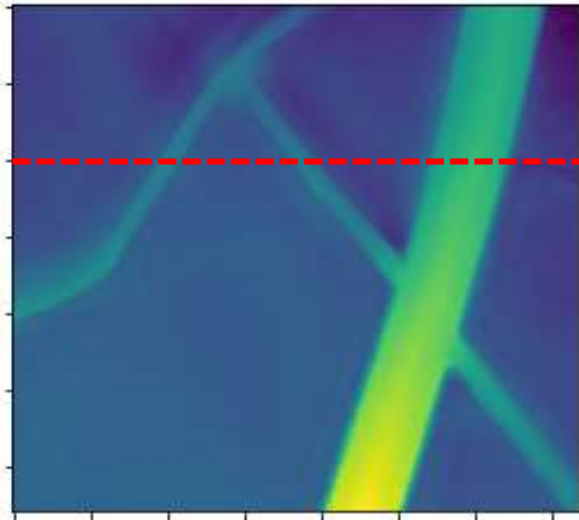
185m x 165m



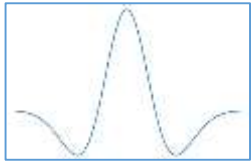
Algorithme



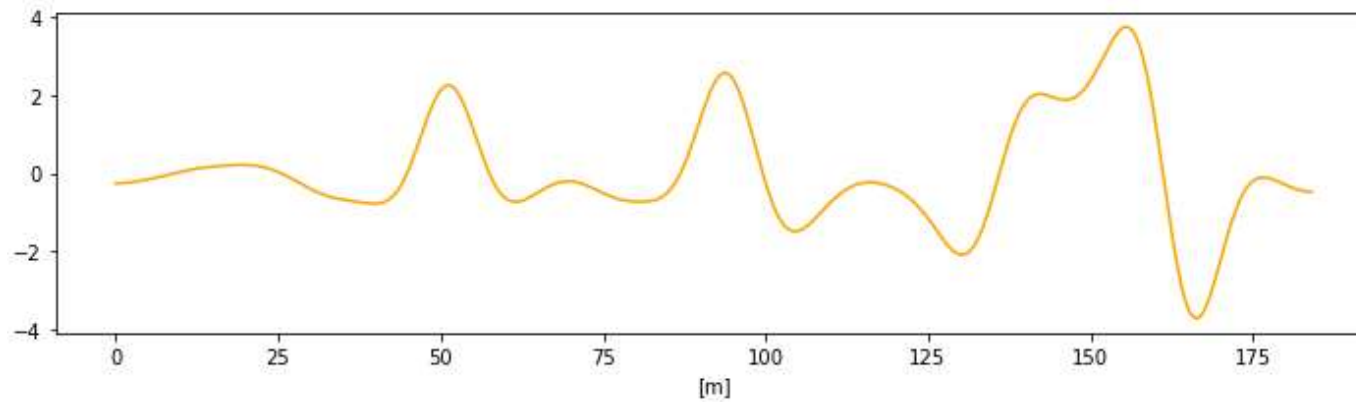
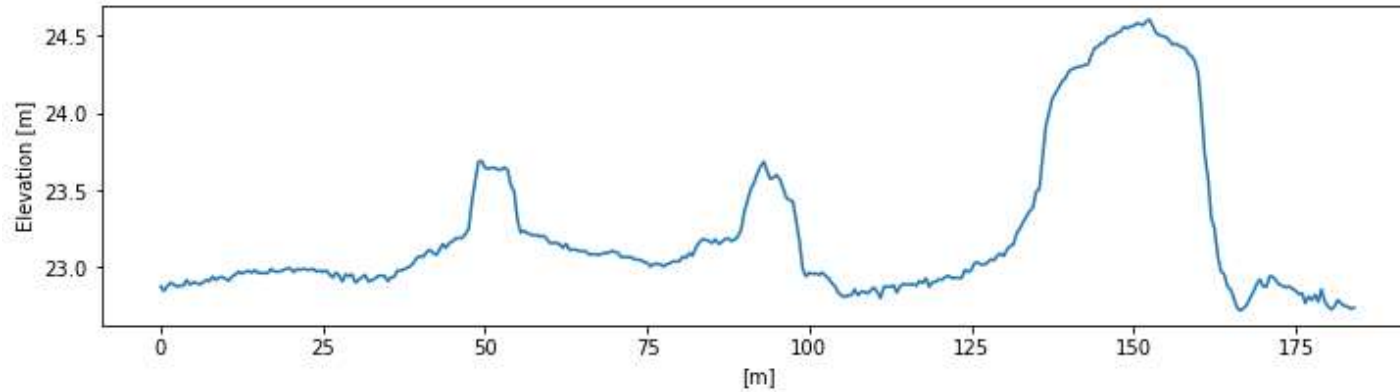
Convolution with kernels



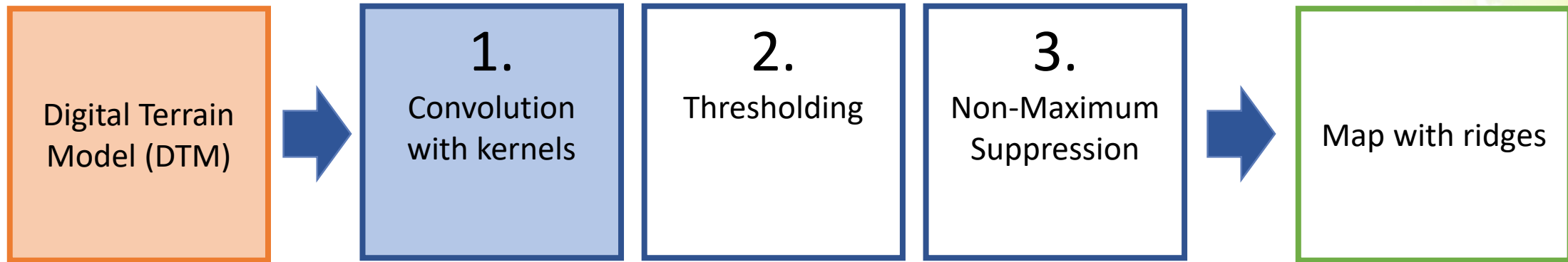
Convolution with kernels



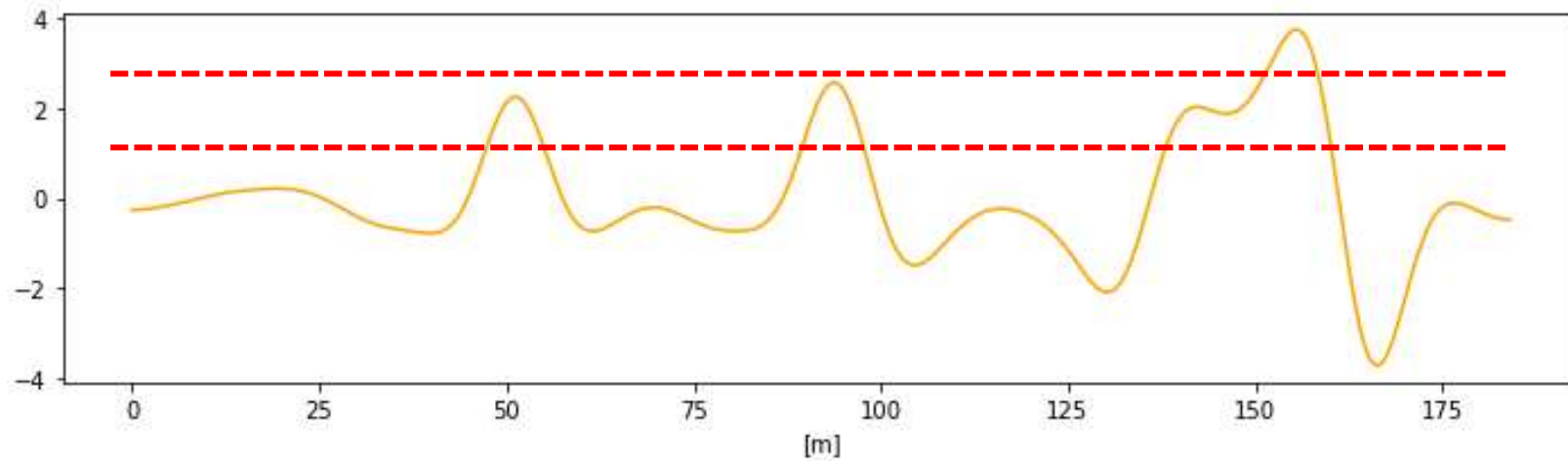
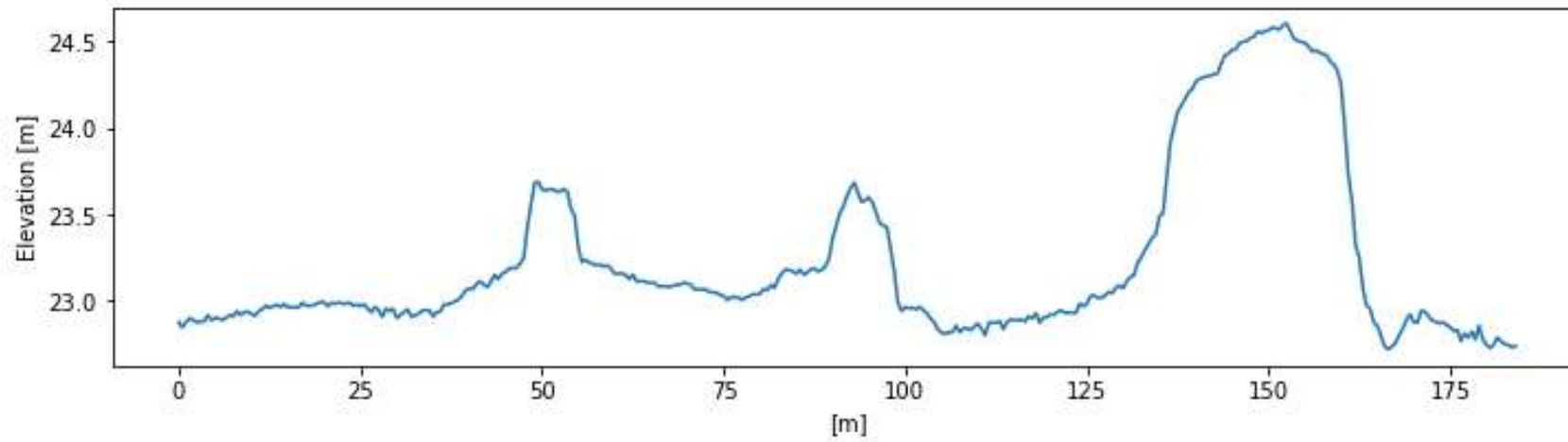
Second order Gaussian kernel
Sigma = 1



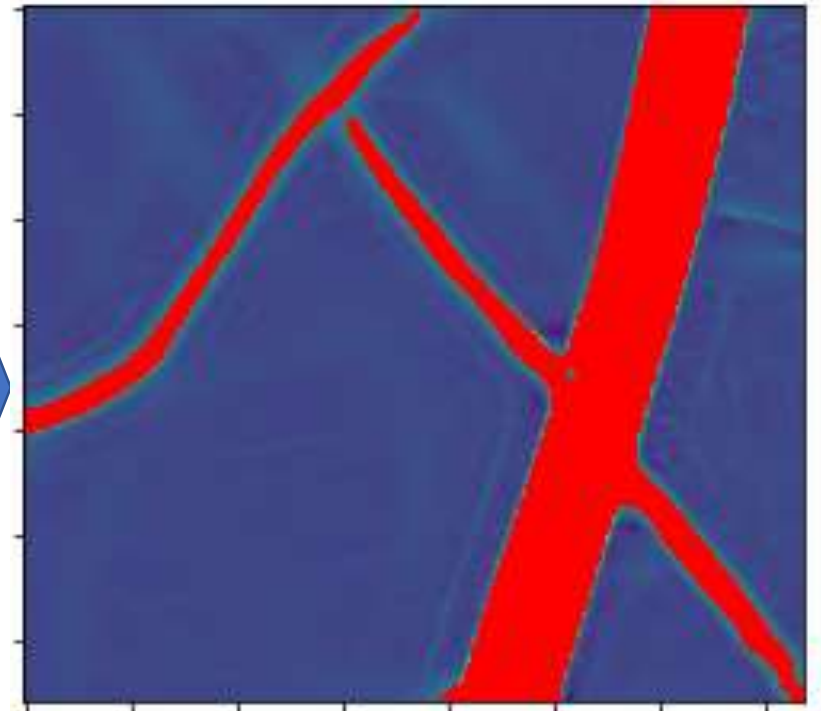
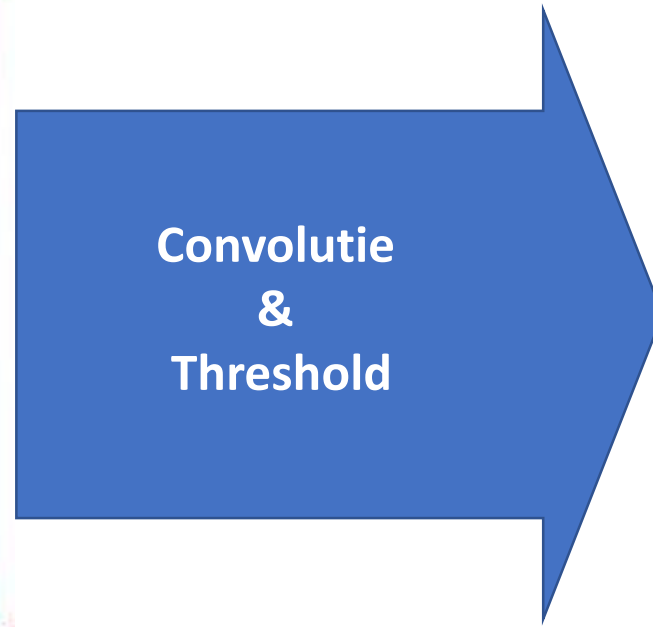
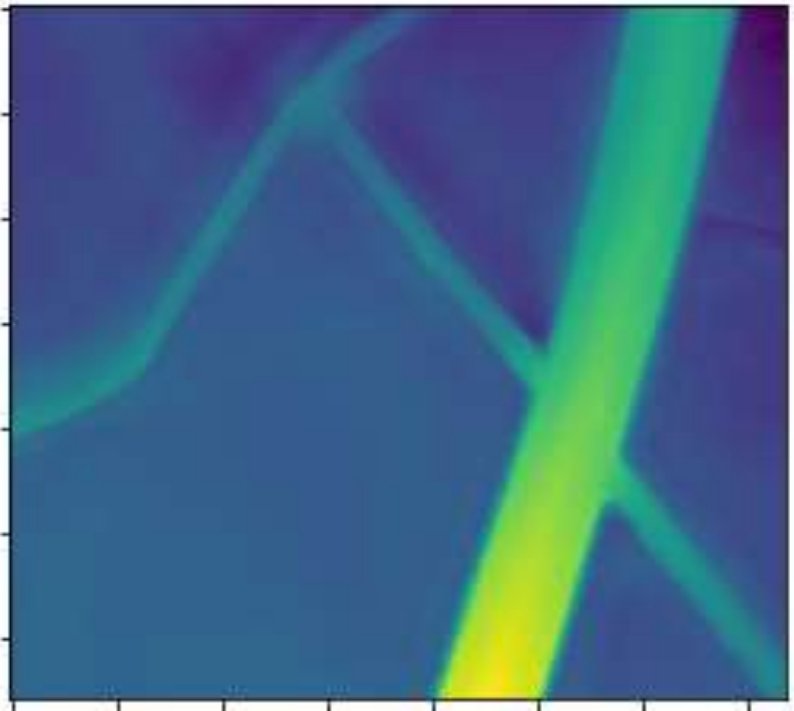
Algorithme



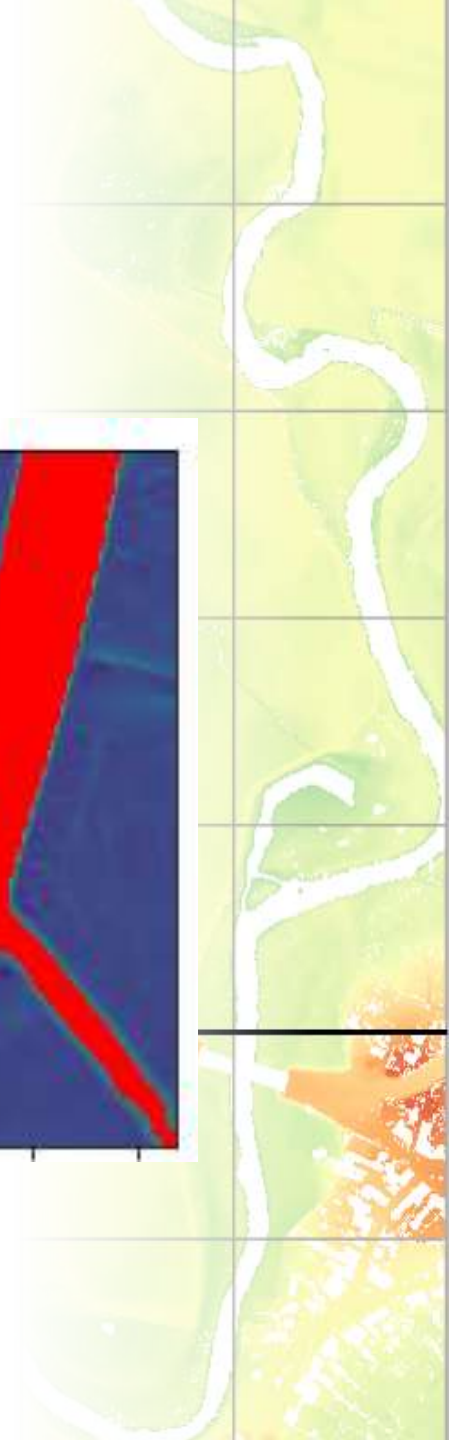
Thresholding



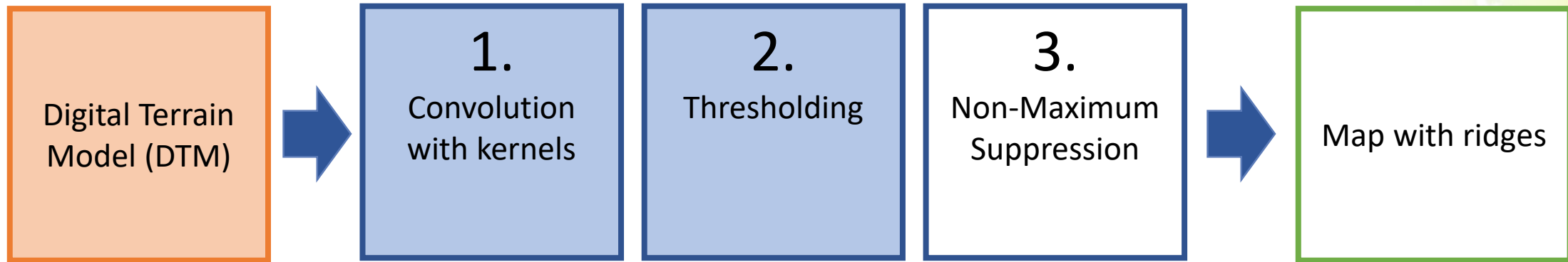
Thresholding



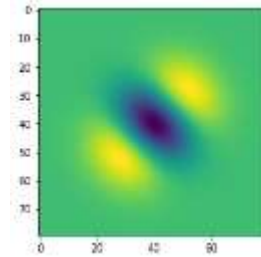
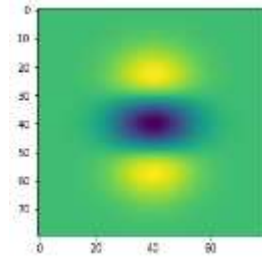
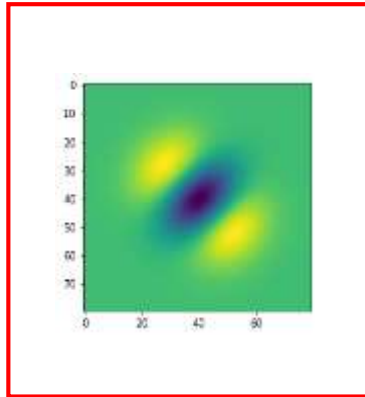
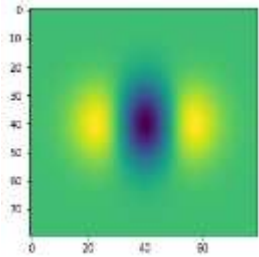
Hoe van gebieden naar lijnen?



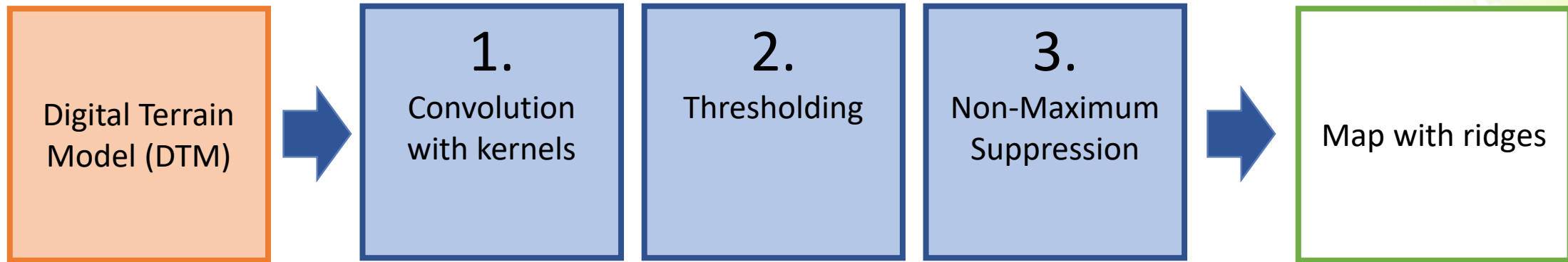
Algorithme



Non-Maximum Suppression



Algorithme

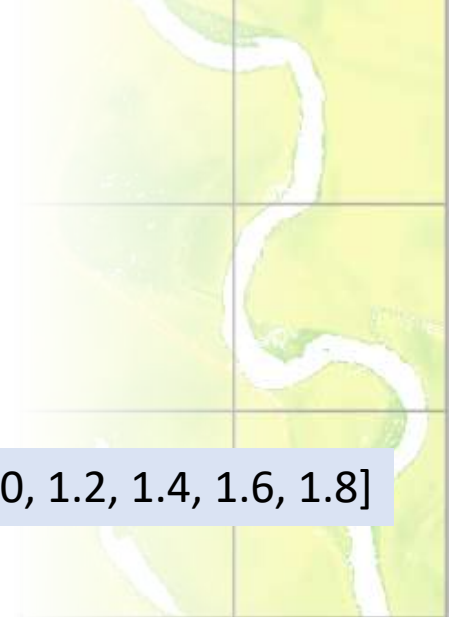
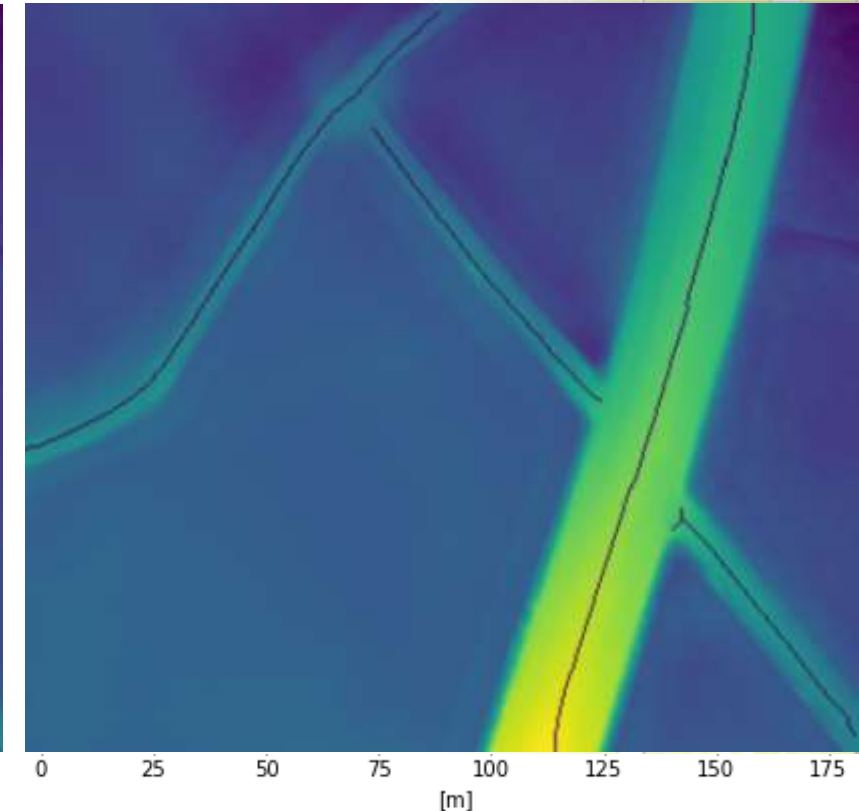
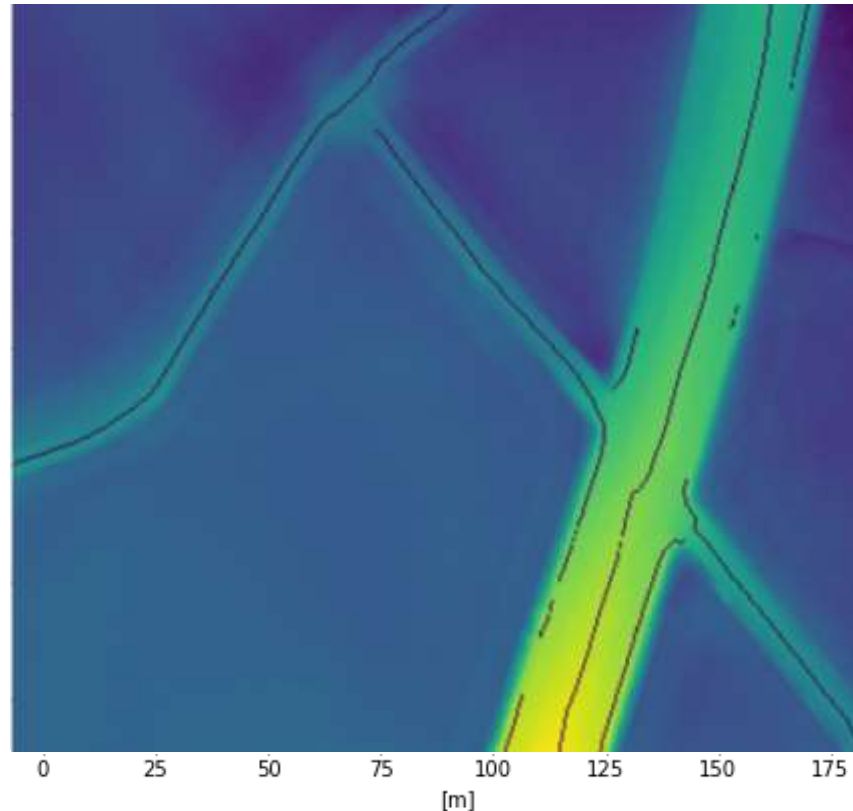
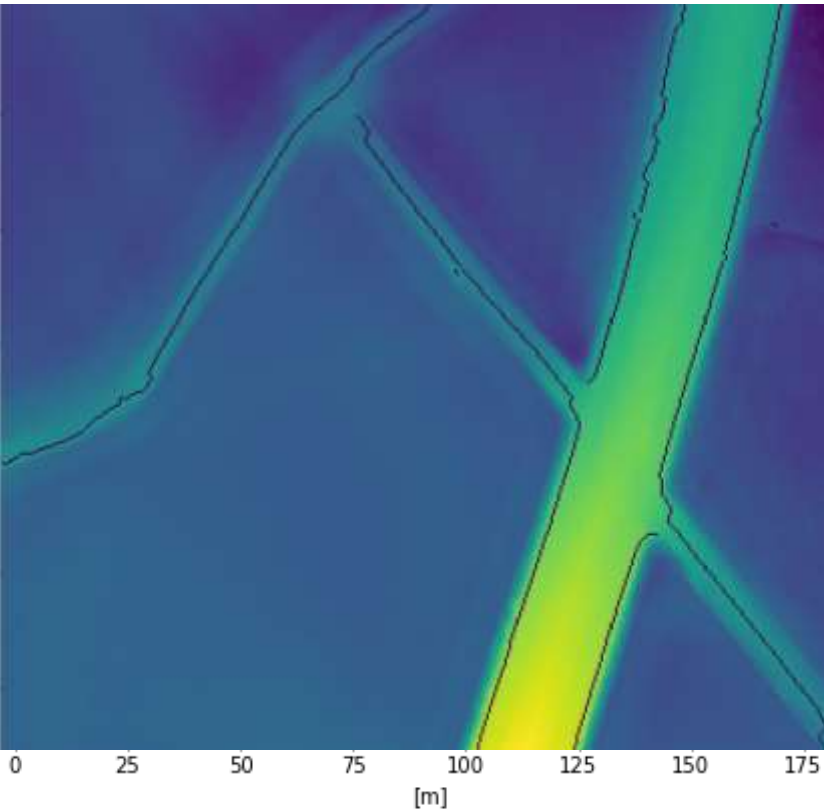


Kaart met hoge lijnelementen

Sigma: [0.2, 0.4, 0.6, 0.8, 1.0]

Sigma: [0.5, 0.7, 0.9, 1.1, 1.3]

Sigma: [1.0, 1.2, 1.4, 1.6, 1.8]



Vragen?

Meer weten?

Afstudeerpresentatie: 17 februari 2021

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