

Real-Time Mesh Utilities

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Outline

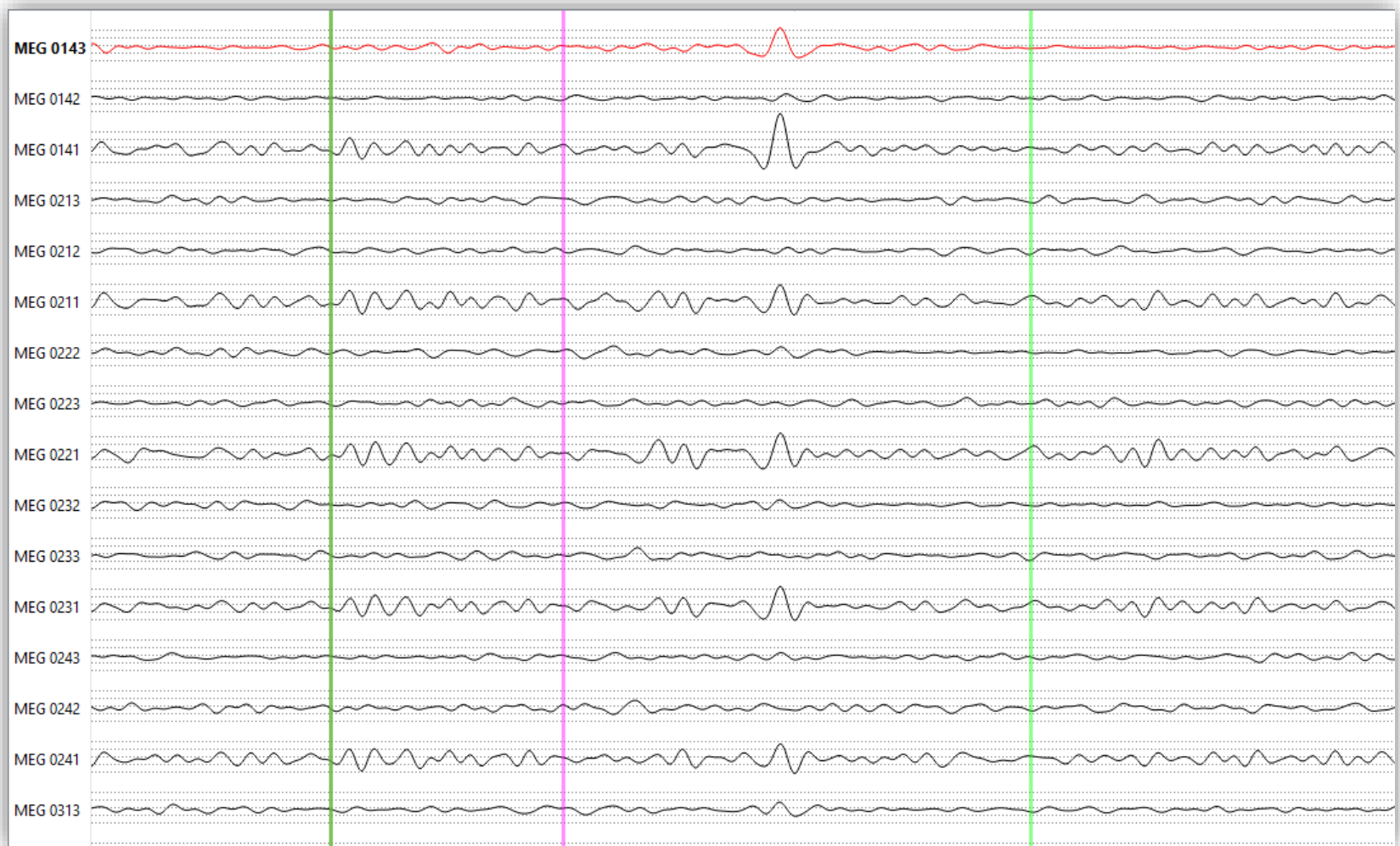
- Assignment / Task
- Features
- Software Demonstration
- Status
- Outlook

Assignment/Task



Goal: Utilities for real-time capable interpolation and visualization of MEG/EEG sensor data

Standard Visualization



3D Visualization

Todo insert screenshot of disp3D

Input/Output

MNE-CPP

Input:

- vertices (x, y, z)
- Neighbour-relationships
- Sensor points (x, y, z)
- Sensordata (1000hz)

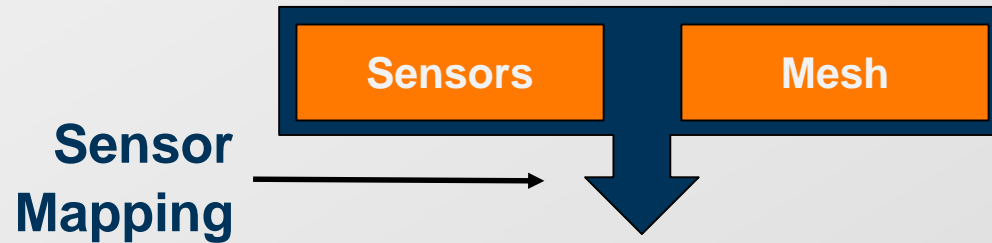
Features

Output:

- Matrix containing intensities for every vertex

MNE-CPP

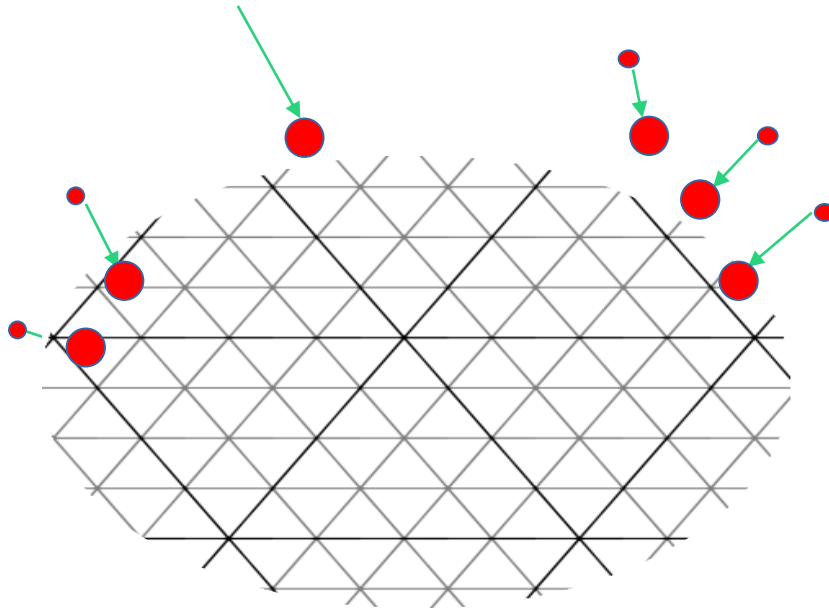
Features



MNE-CPP

Sensor Mapping

Feature 1

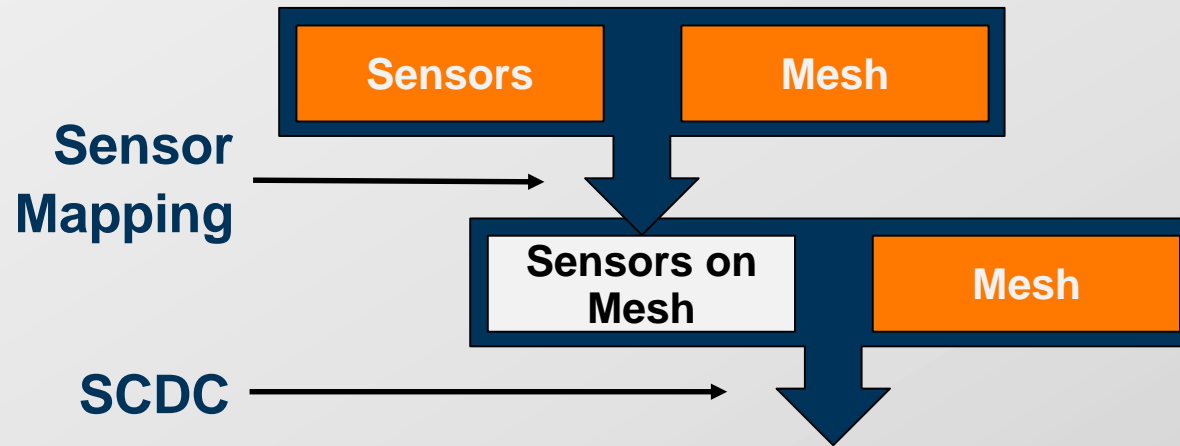


TODO: Julius macht nen kopf als mesh

- Sensorpoints are not part of the mesh
- relative position on surface unknown

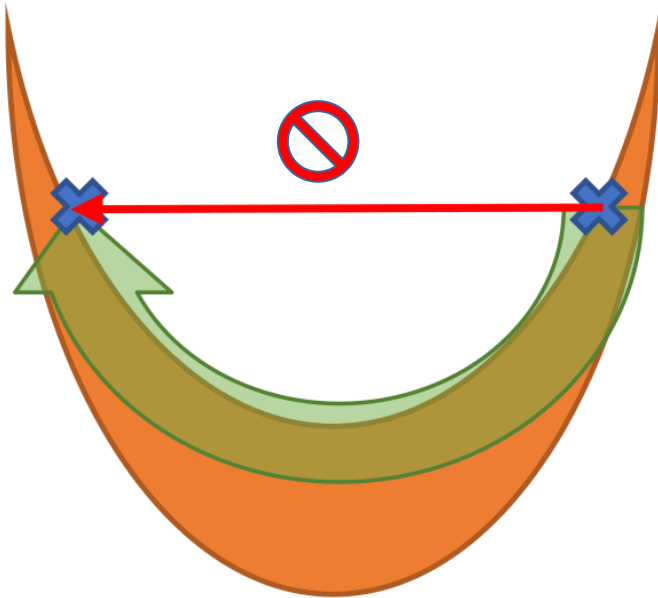
► **Multithreaded linear search**

Features



SCDC

Feature 2

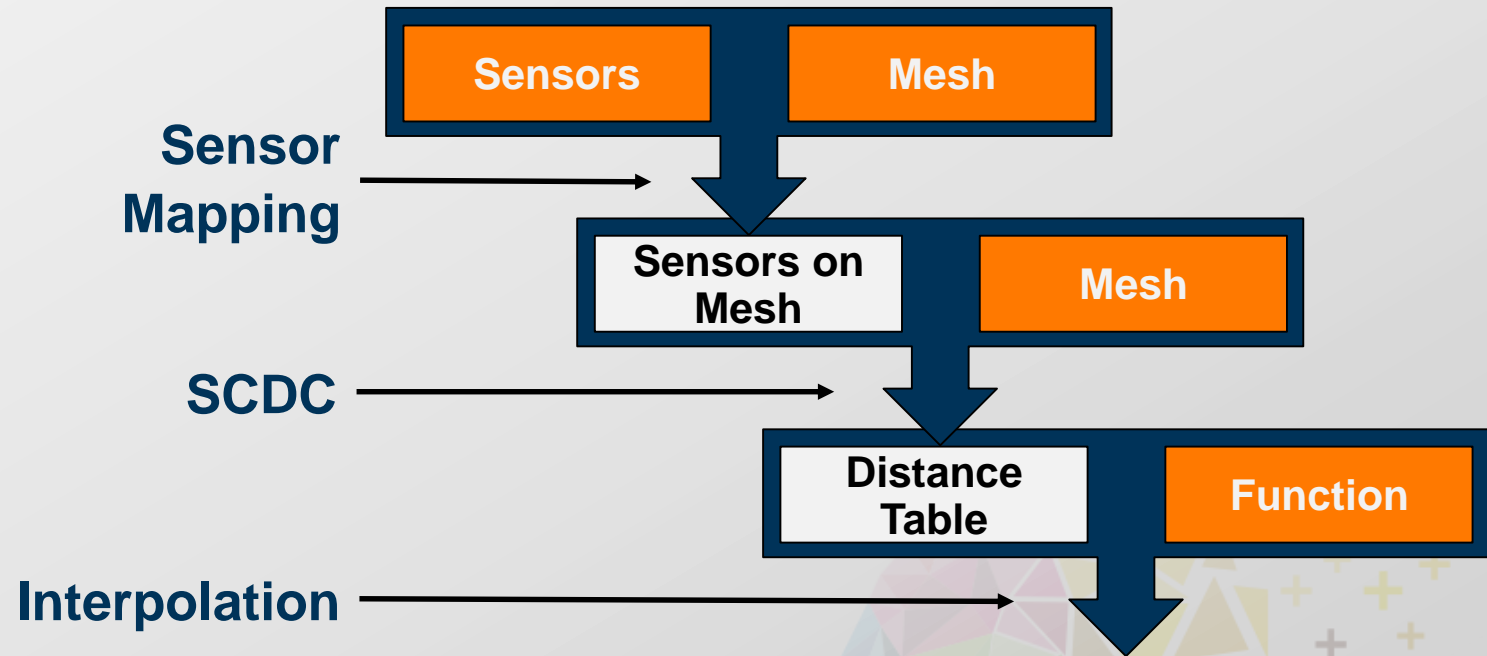


- Folded surface
- Distance between 2 vertices?
- Euclidian distance inaccurate

► **Multithreaded iterative
Dijkstra**

Todo insert cool images

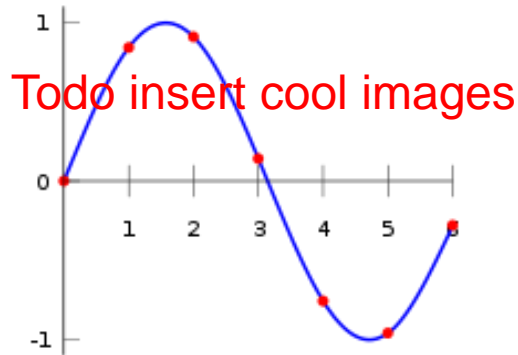
Features



MNE-CPP

Interpolation

Feature 3

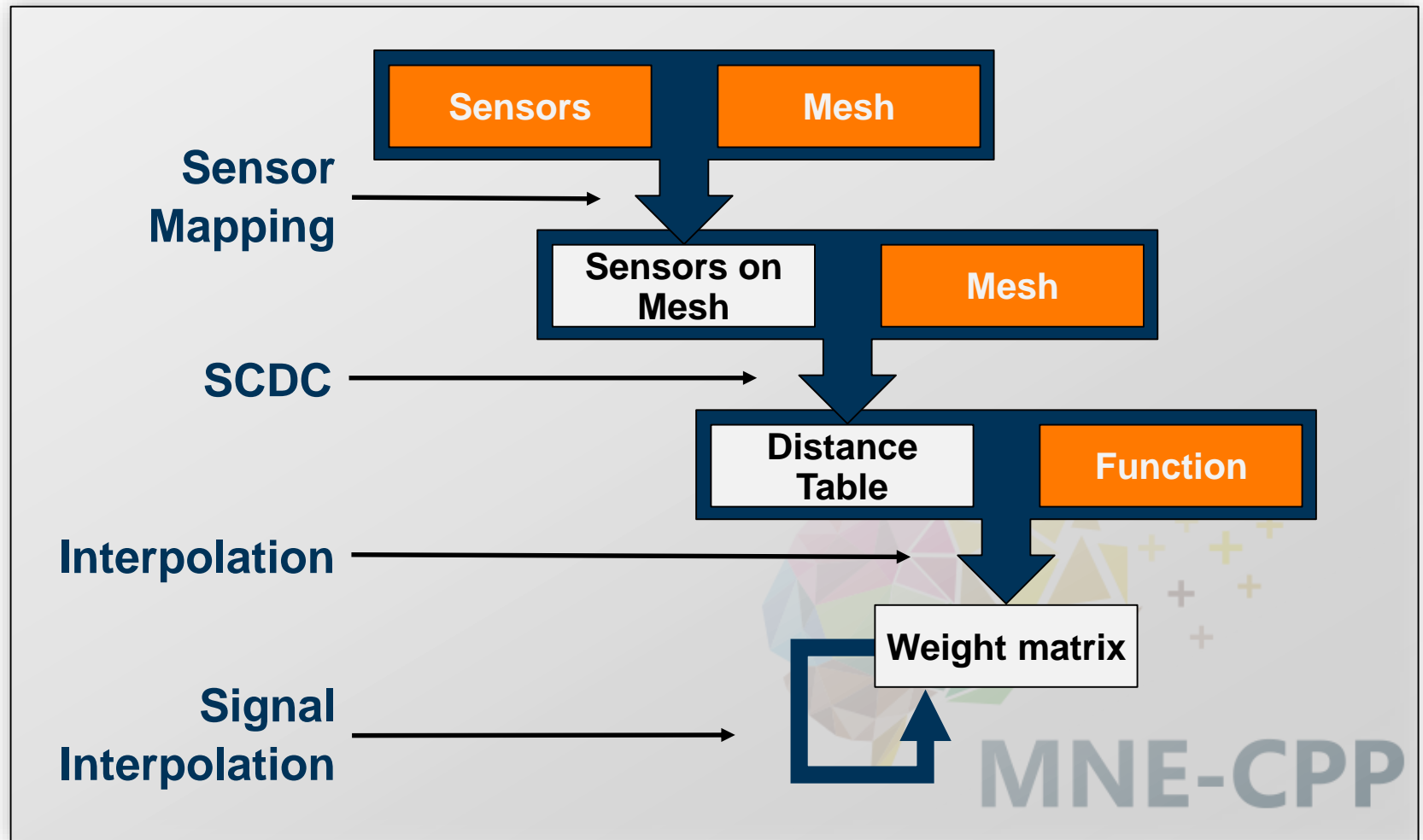


- Activity at certain points given (y_{sub})
- Activity at all points wanted (y_{full})

- ▶ Weight matrix (W)
- ▶ Multiplication calculate the wanted values

$$(y_{full} = W * y_{sub})$$

Features

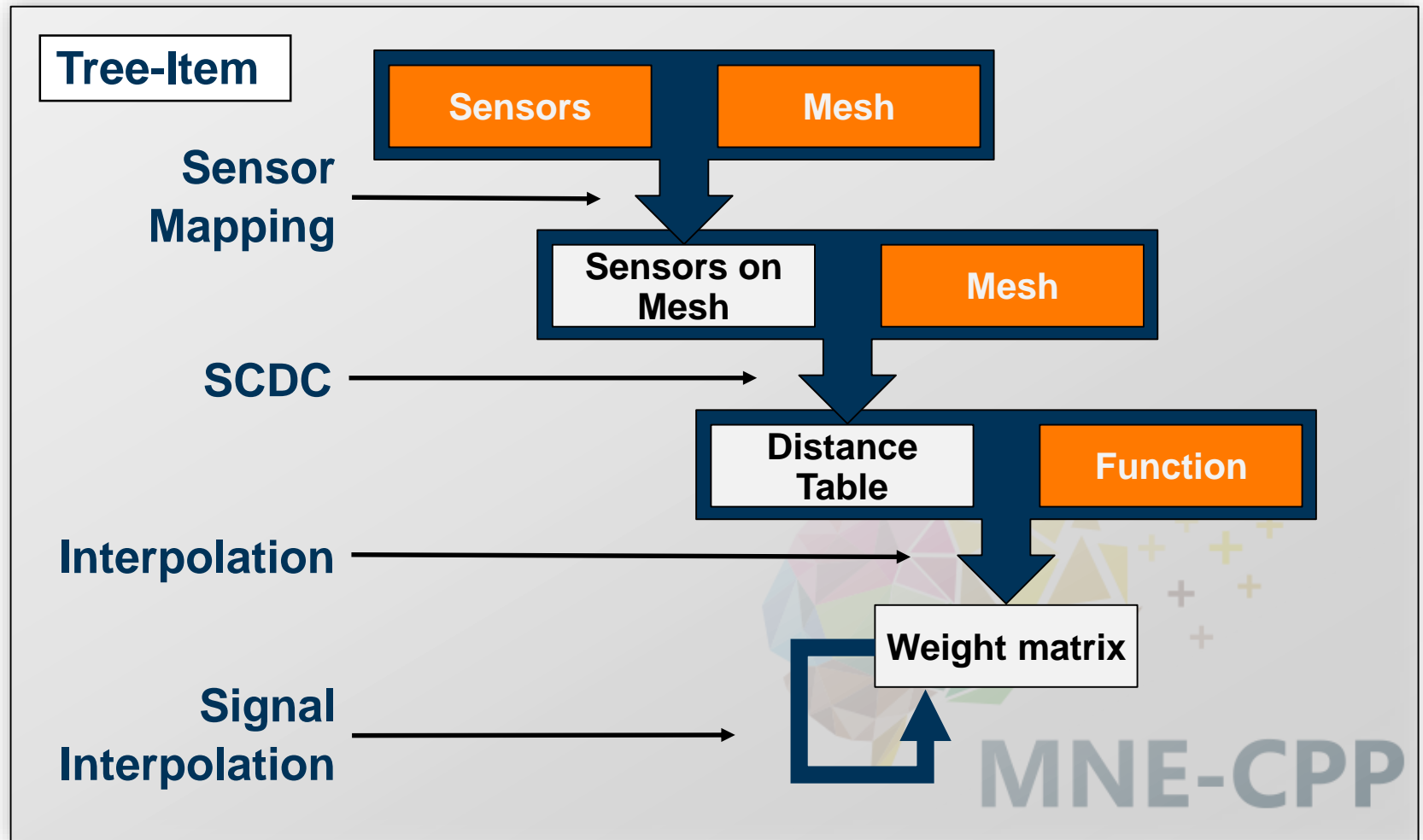


SensorDataTreeItem

Feature 4

Todo insert basic tree
Plus veranschaulichung der Datenströme

Features



Software Demonstration

Status

- ✓ features 1, 2, 3 and 4 implemented and operational
- ✓ computation fast
- ✓ integrated into existing project

Review

Outlook

- MNE-CPP is an Open-Source project
- therefore further development
- the generic features (SCDC, projecting, interpolation) will be used in other functionalities
- the code is documented as required by the project, it fits in seamlessly



Thank you for your attention!

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