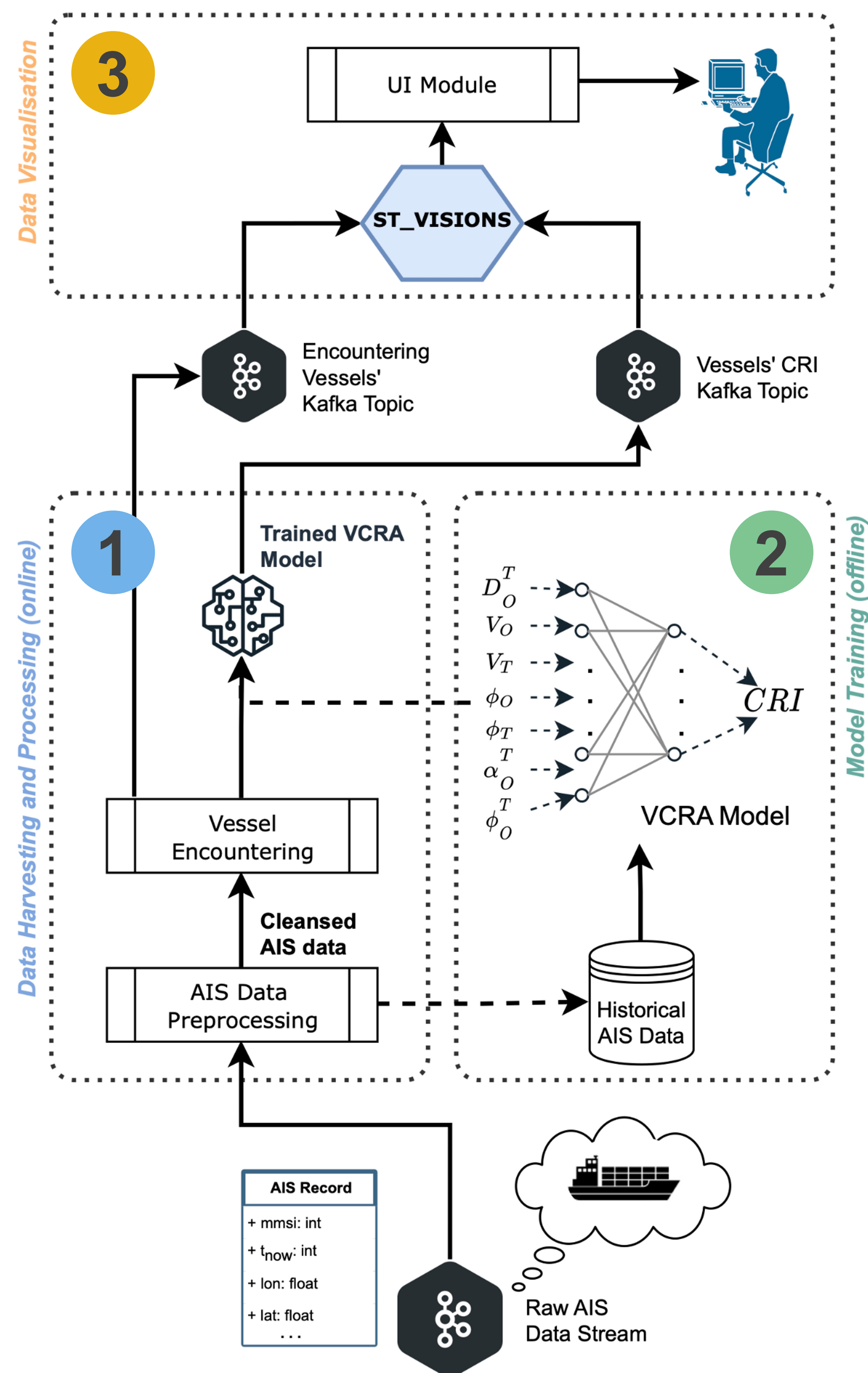


D01: VESSELVISION – FLEET SAFETY AWARENESS OVER STREAMING VESSEL TRAJECTORIES

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Aiming at assisting real-time maritime surveillance and safety, VesselVision is an online Mobility Data Analytics (MDA) framework monitoring Vessel Collision Risk Assessment (VCRA) over vessels detected to be in an encountering process.



Module I: Data Harvesting and Processing (online)

Input: raw AIS data stream

- ✓ AIS Data Preprocessing
 - Record deduplication ($\Delta t < 1$ sec.)
 - Noise elimination ($speed_{max} > 50$ knots)
 - Temporal alignment (sampling rate = 30 sec.)
- ✓ Vessel Encountering
 - Discovery of encountering vessels wrt. Collision Risk Index (CRI)

Module II: Model Training (offline)

Input: historical AIS database

- ✓ VCRA Model training $\rightarrow$ MLP-VCRA (Tritsarolis et al. 2022)
- ✓ For the demo
 - Pretrained variant of MLP-VCRA
 - Features: $V_O, V_T, \phi_O, \phi_T, \alpha_O^T, \phi_O^T$

Module III: Data Visualisation

Input: AIS feed; Encountering Vessels (with CRI) feed

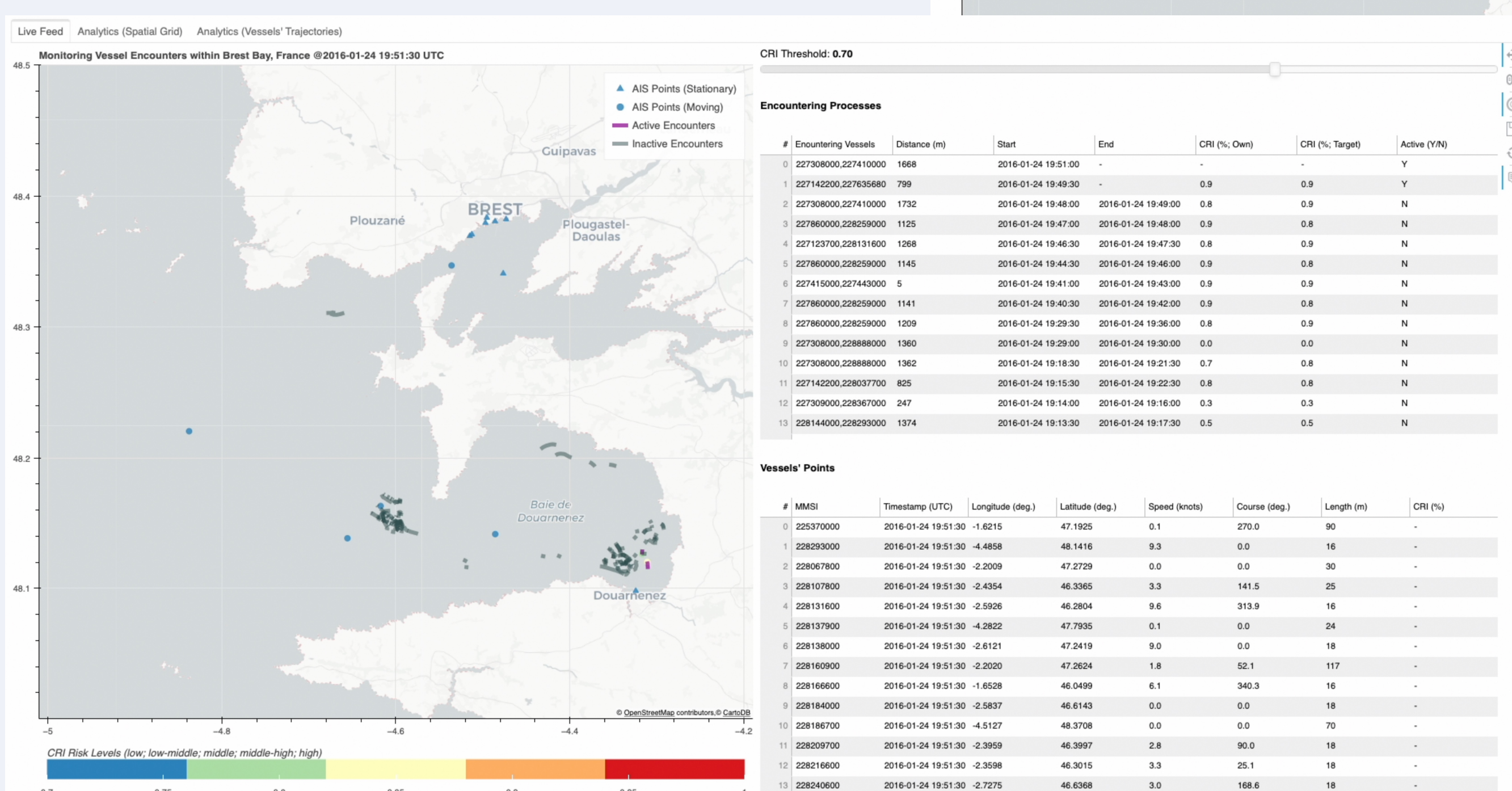
- ✓ VA-oriented $\rightarrow$ ST_Visions (Tritsarolis et al. 2021)

Case Study: Brest Dataset

Vessel Encountering

- Max. distance $d_{max} = 1$ n.m.
- Min. duration $t_{min} = 60$ sec

VesselVision Panel #2 Analytics (Spatial Grid)



VesselVision Panel #3 Analytics (Vessels' Trajectories)

References

- Tritsarolis A., et al. (2021) ST_Visions: A Python library for interactive visualization of spatio-temporal data. In Proceedings of MDM.
- Tritsarolis A., et al. (2022) Vessel collision risk assessment using AIS data: A machine learning approach. In Proceedings of MDM.



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