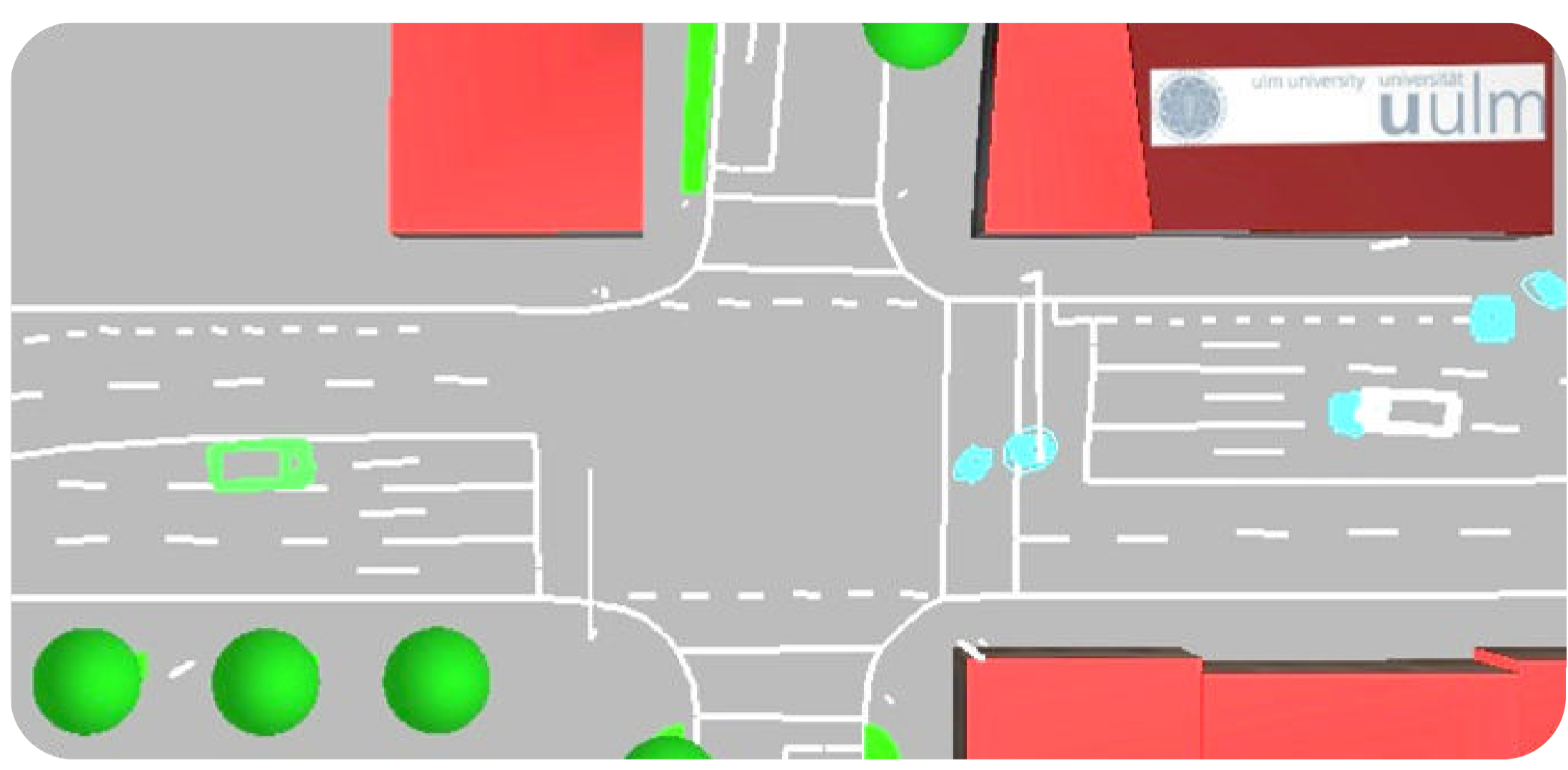
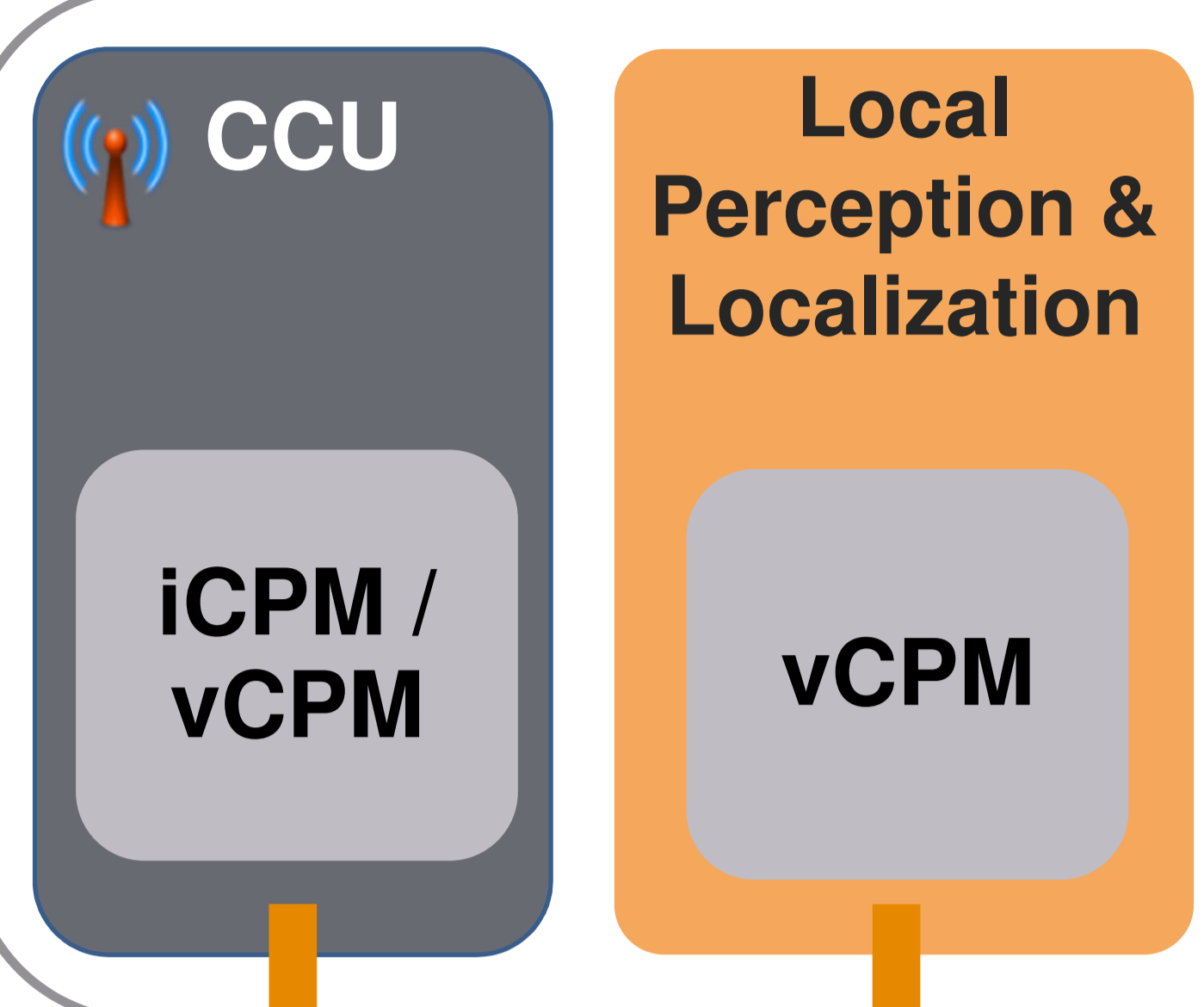
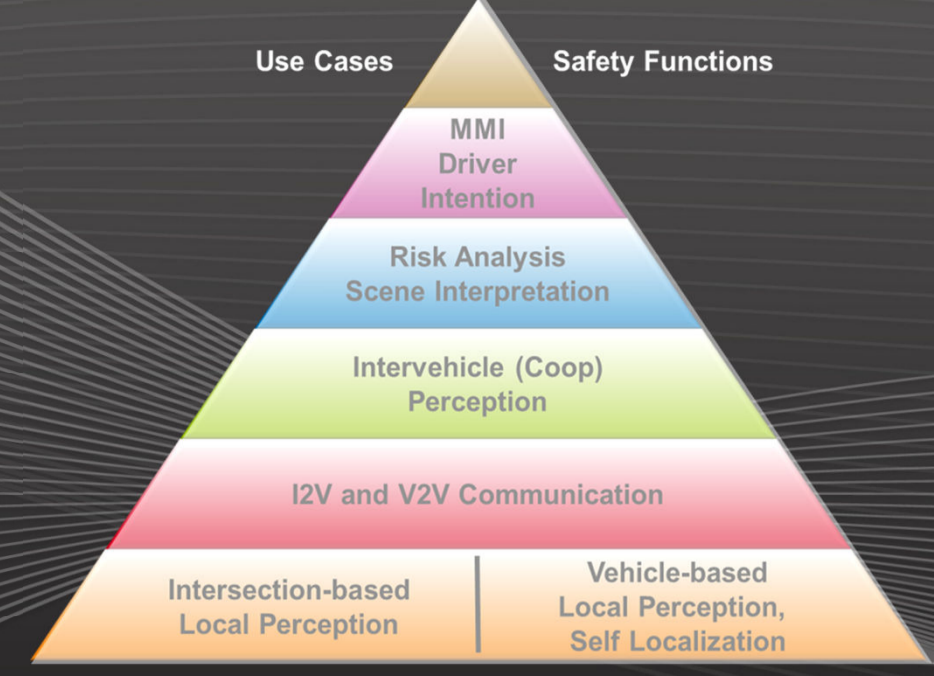
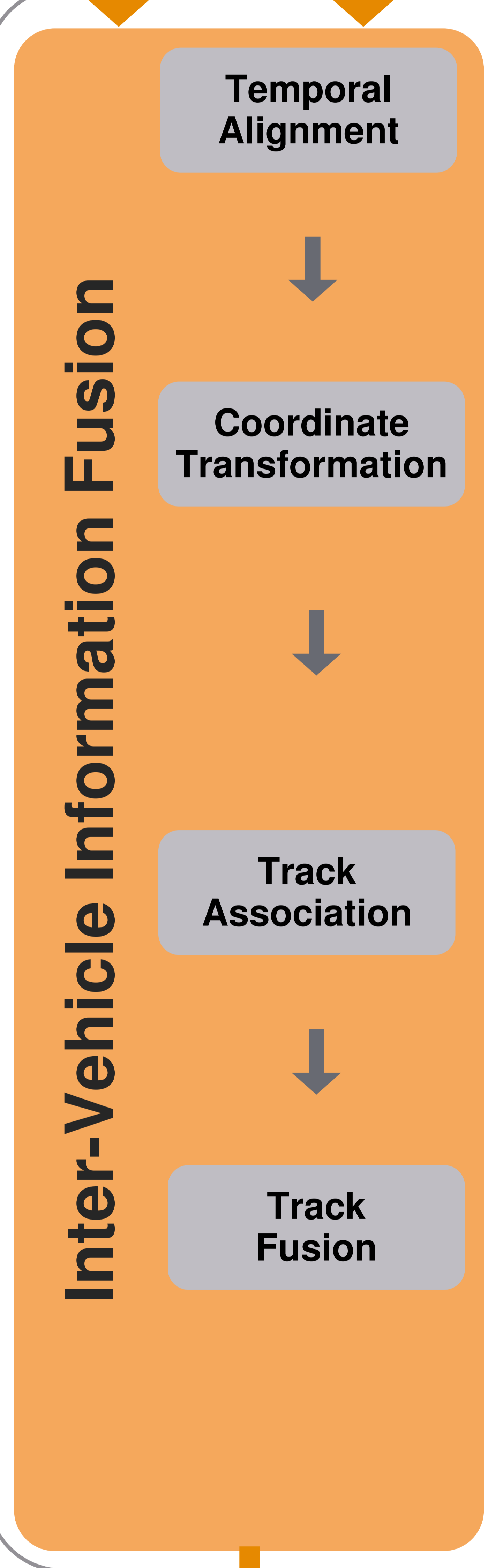


Inter-Vehicle Information Fusion: Algorithms and Implementation

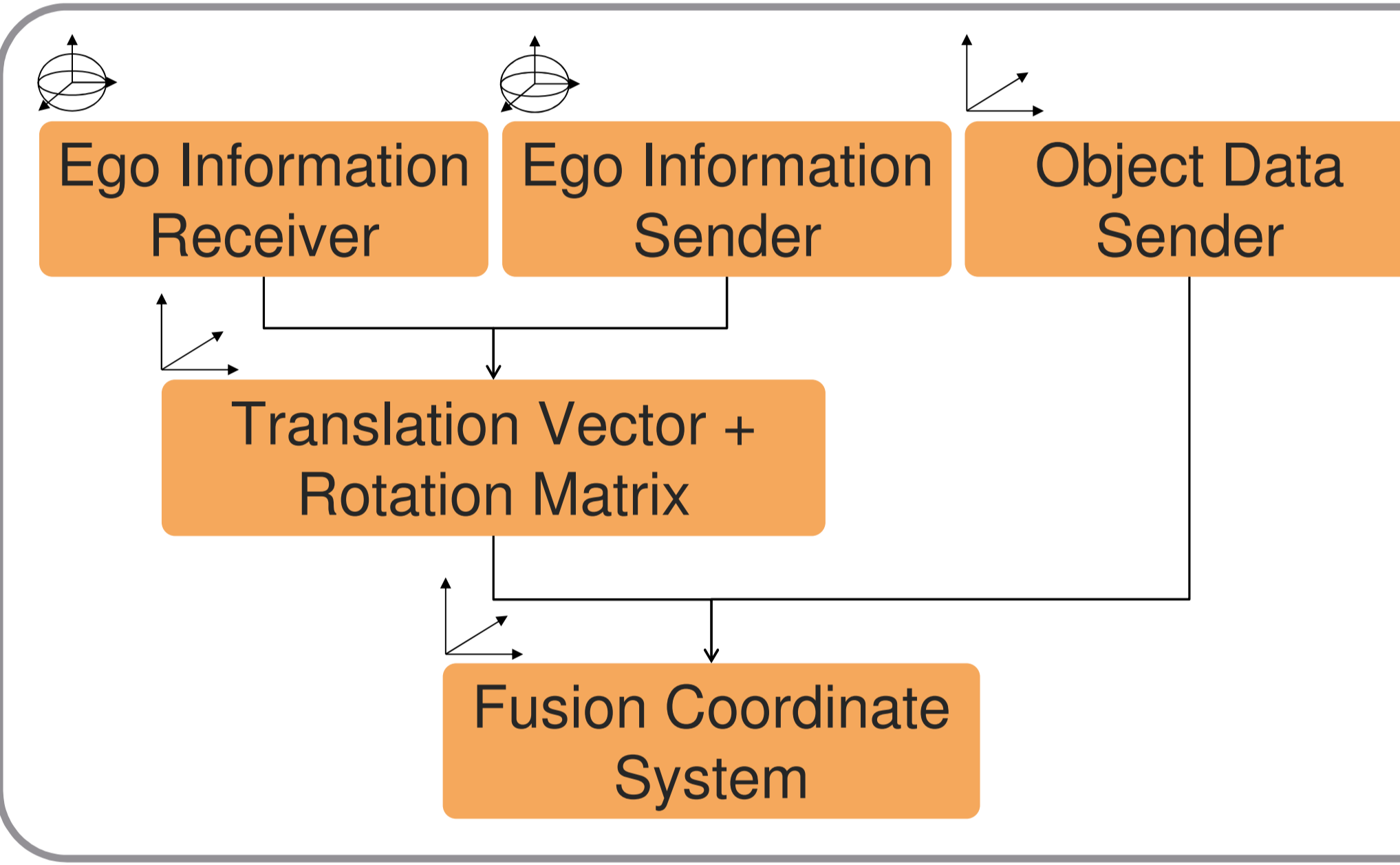
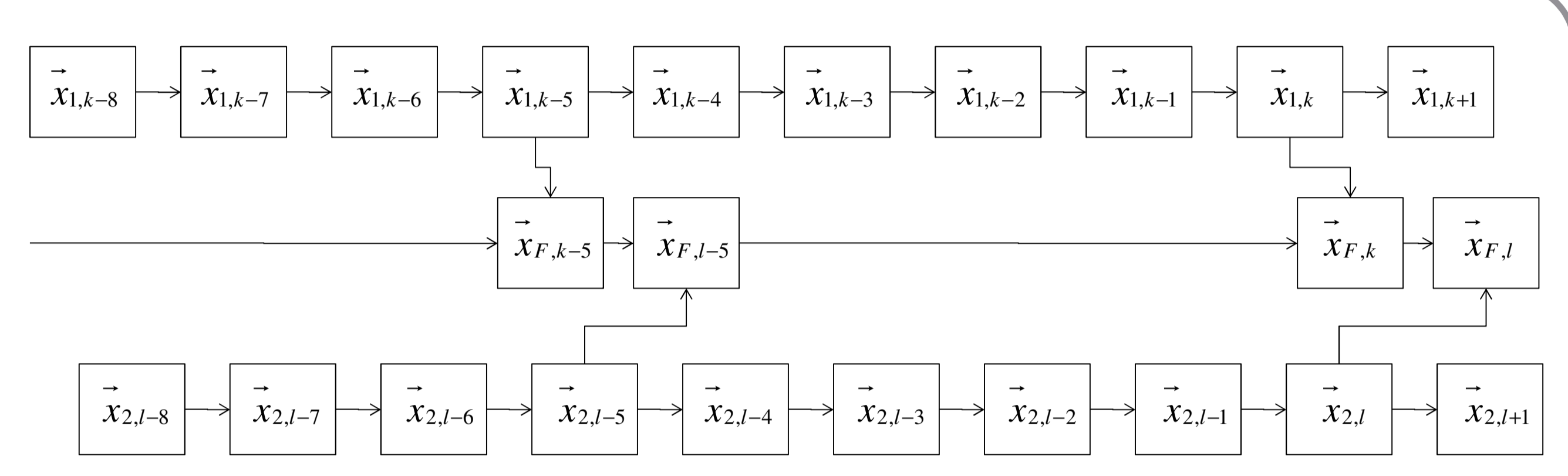


Received Information:

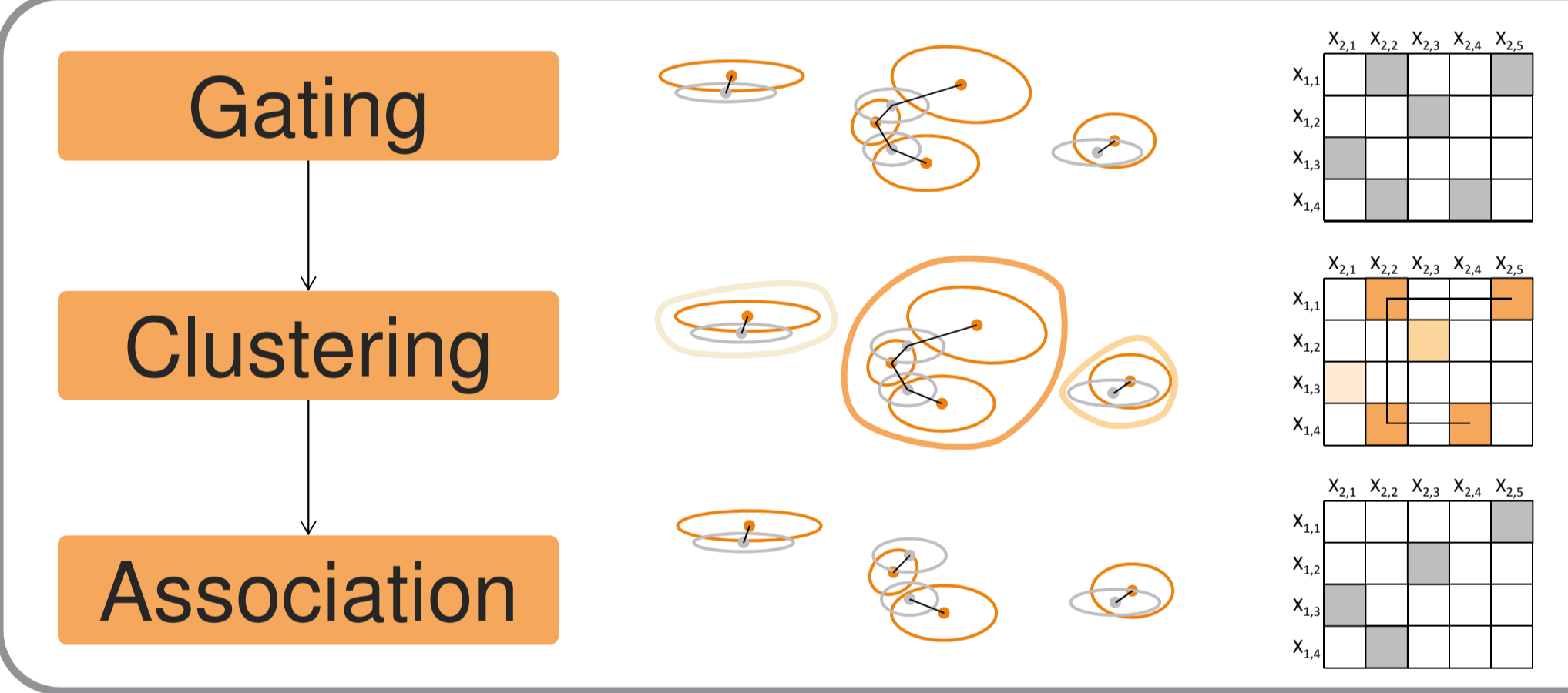
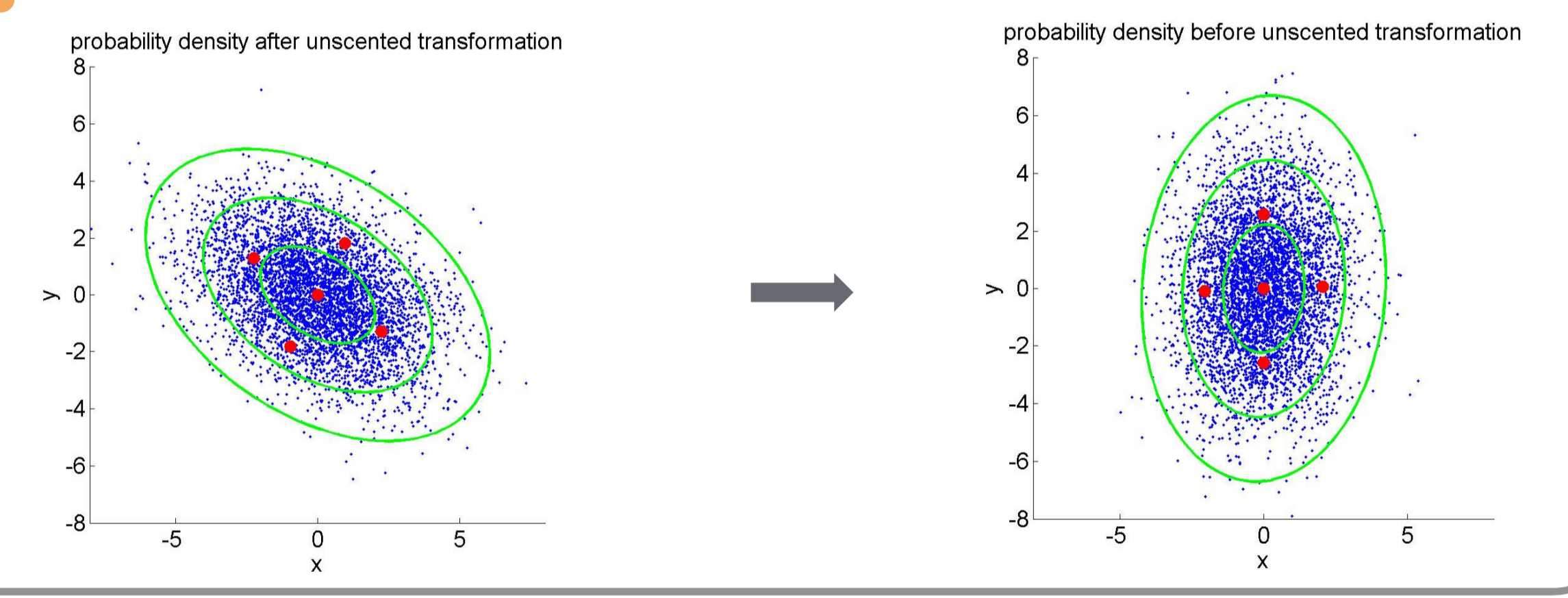
- vCPM: navigation solution + perceived objects from Ko-PER-vehicles
- iCPM: global position + perceived objects from Ko-PER-Intersection



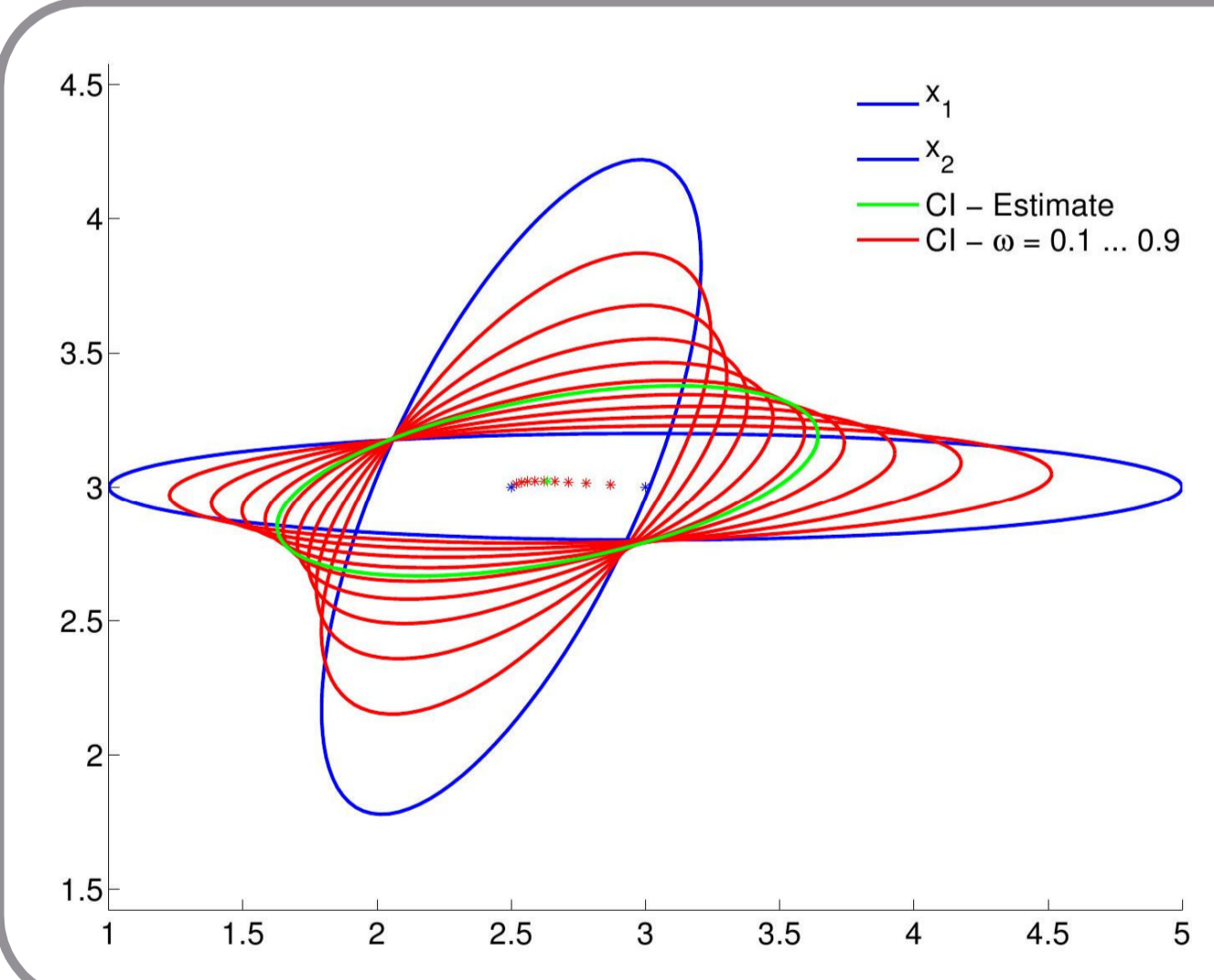
- N information sources with 10Hz update rate
- Temporal alignment for asynchronous track-2-track-fusion with global track
- Prediction models: CV, CA, CTRV, CTRA



- Two-step transformation of received data
- Unscented transformation for covariance transformation



- Gating to reduce computational costs
- Clustering to reduce association hypotheses
- Solving n subtasks via modified auction algorithm



Covariance Intersection:

$$P^{-1} = \omega P_1^{-1} + (1 - \omega) P_2^{-1}$$

$$\hat{x} = P (\omega P_1^{-1} \hat{x}_1 + (1 - \omega) P_2^{-1} \hat{x}_2)$$

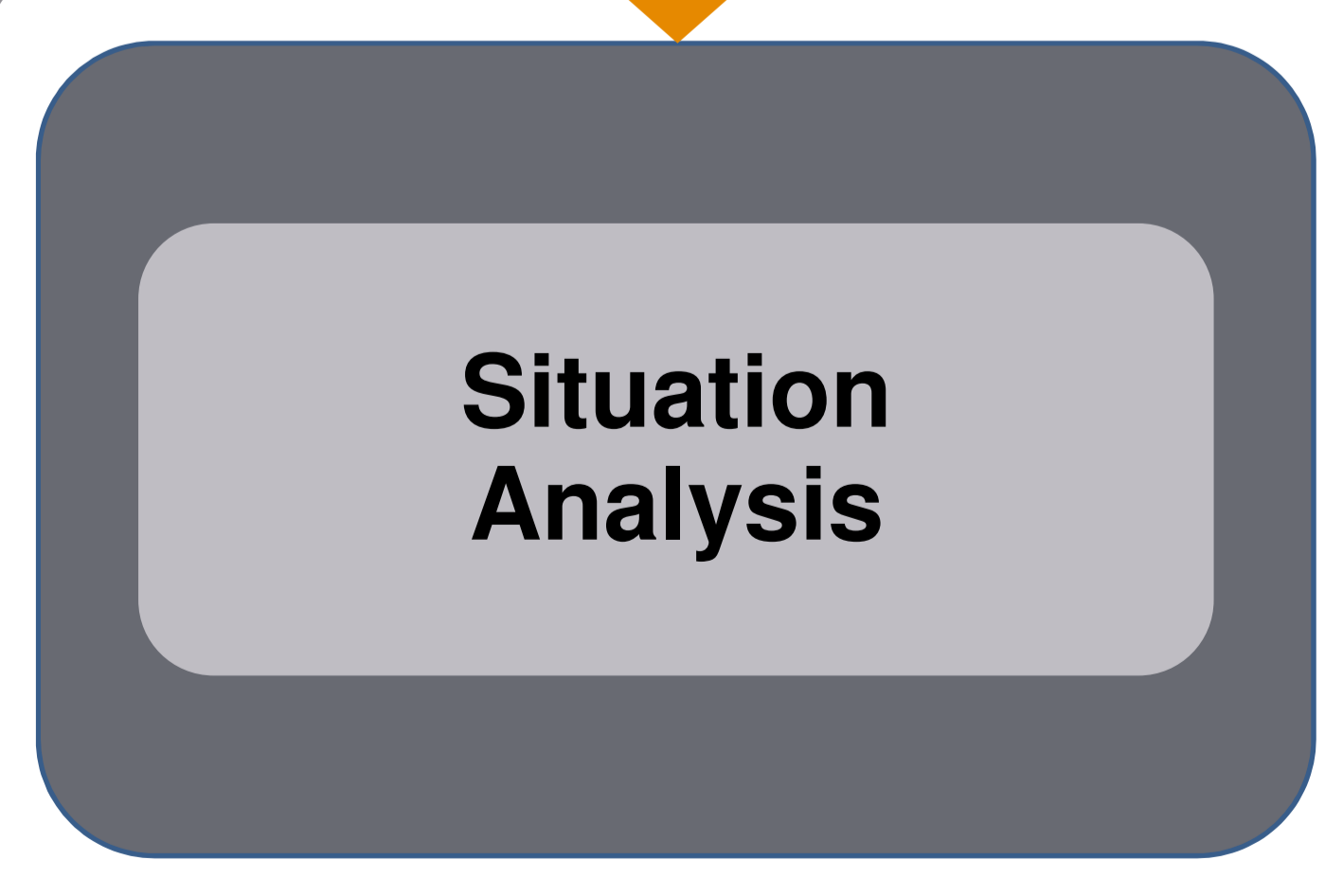
$$\omega = \arg \min(\det(P))$$

Alternatives for calculating ω :

$$\omega_{trace} = \frac{\text{trace}(P_2)}{\text{trace}(P_1) + \text{trace}(P_2)}$$

$$\omega_{det} = \frac{\det(P_2)}{\det(P_1) + \det(P_2)}$$

$$\omega_{Improved} = \frac{\det(I_1 + I_2) - \det(I_2) + \det(I_1)}{2 \det(I_1 + I_2)}$$



Output:

- fCPM as resulting data structure with 10Hz update rate
- Delivers input for map-based prediction and scene interpretation

