Applied ML for Mobility & Device Location

Signal Processing • Sensor Fusion • Real-Time Inference

System Identification for Mobility & Physical Signals

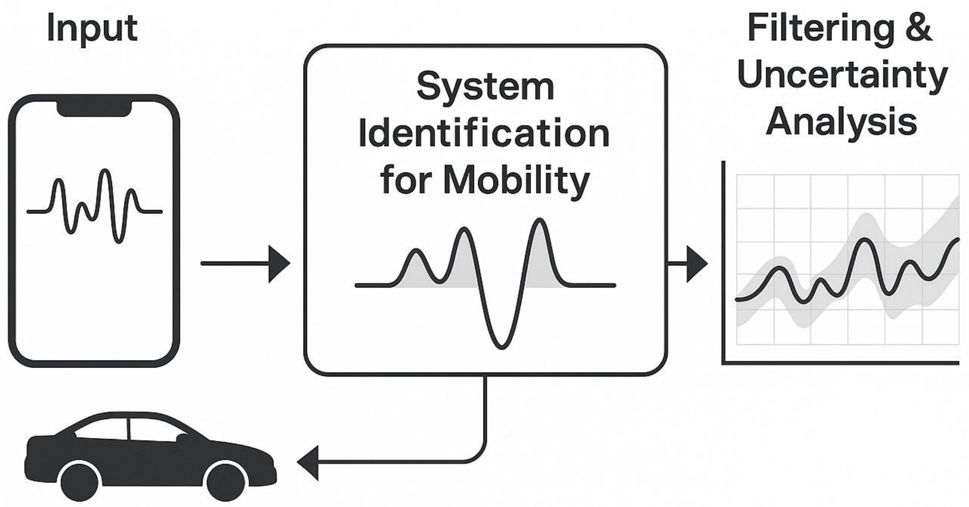
Principle: Understand the physics and signal behavior before modeling — frequency content, dynamics, noise.

Where I applied it:

- Chalmers —device modeling & fitting to large datasets
- Volvo — FFT-based comfort signatures from acceleration data

Impact:

- Well cited publications within manufacturing, modelling, benchmarking and subjective quality
- Comfort inference as accurate as expert drivers
- Enabled automated gearbox tuning & HIL deployment



Kalman-Style Fusion & Confidence Tracking

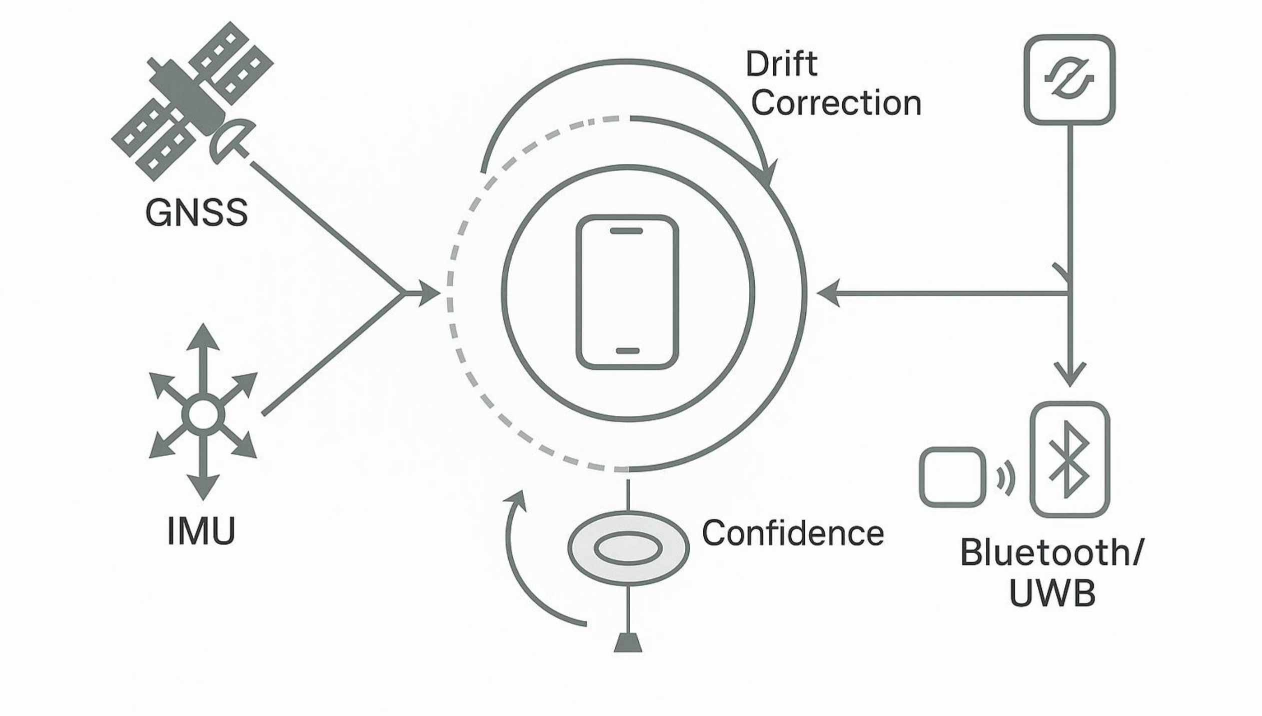
Principle: Predict → measure → correct + track uncertainty. Confidence is a first-class output.

Where I applied it:

- Volvo — uncertainty-triggered retraining in real-time vehicle tests
- Dialysis monitor (soft-sensor) — feed-forward thermal model corrected by temperature anchors

Impact:

- Stable real-time inference in noisy environments
- Replaced costly hardware with inference + sensors (analogy: inertial + GPS fusion)



Motion Detection, Tracking & Mode Classification

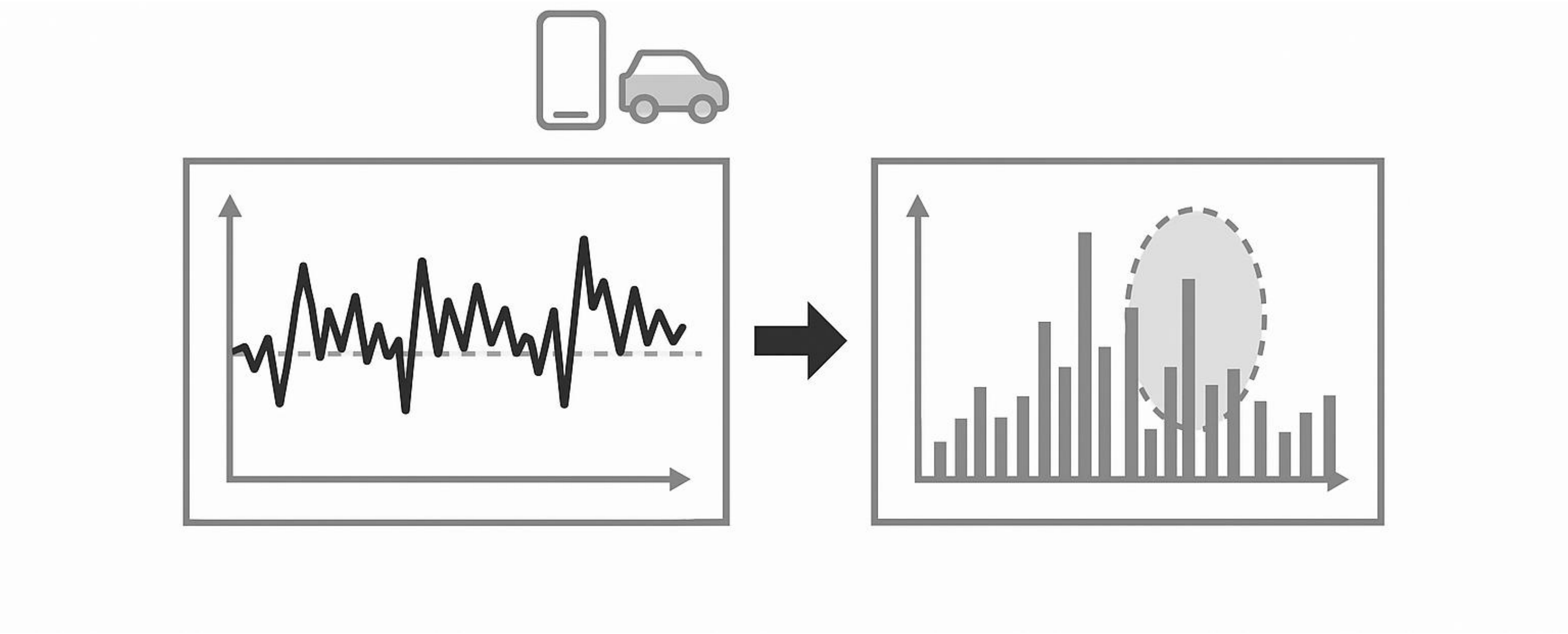
Principle: Sliding clusterings → features → event detection → online adaptation.

Where I applied it:

- Volvo — re-classification in real-time
- SiB Solutions — focus training on high impact hardships

Impact:

- Continuously improving comfort model via driver feedback
- Lifted worst-case classification from ~34% to ~74% in a production product



Regime Clustering & Operating Mode Segmentation

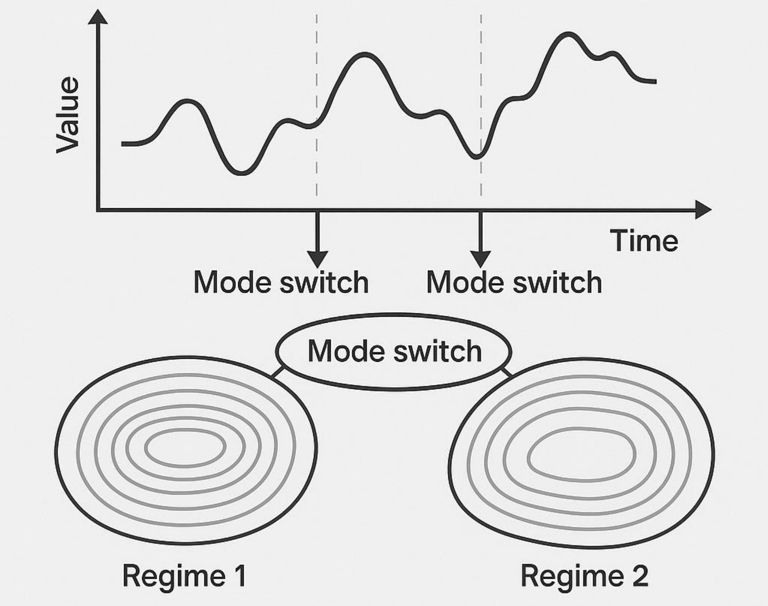
Principle: Systems operate in modes — detect regimes and specialize models instead of forcing one global one.

Where I applied it:

- SiB Solutions — separate hard vs easy object-cases, targeted training
- Ericsson — mode-segmented ad-hoc networking power consumtion analysis

Impact:

- Robust ML under distribution shifts
- Much more confident product marketing and safer operations planning during market shift



Hybrid GNSS + IMU + Opportunistic Anchors

Principle: Dead-reckon when needed, reset drift when anchors appear — fuse model + measurements.

Where I applied it:

- Dialysis soft-sensor — thermodynamic observer + PT100 sensors as anchors
- Volvo feed-forward control — prediction loop corrected by real-time feedback

Impact:

- Replaced complex hardware with model-driven estimation
- Low-latency stability on physical systems with drift correction