Ideas and Plans

S Krishna Savant

Summary of Papers
NericeII

- Uses GPS, Accelerometer, Microphone
- Algorithm to virtually reorient accelerometer
  - Orient phone frame to vehicle frame
  - Use braking motions (using GPS) for reorienting
  - Use stationary/const. vel motion to estimate tilt
  - Detect user interaction
- Threshold-based heuristics to detect braking, bumps and potholes
  - Braking detection using GPS or Accelerometer
  - Mean of X-values over 4s > threshold (0.11/0.12g)
  - Bump detection: Z acceleration spikes > 1.75g

Summary of Papers
NericeII

- Heuristics to identify honking
  - DFT on 100 ms sample
  - Energy spikes in frequency domain
  - Heuristic of having > 2 spikes, one in 2.5-4 kHZ
- Cell tower information in dense areas
  - Strongest signal based localization
  - Maps tower-ID with average position
- Triggered sensing
  - To save power

Summary of Papers
Cloud Atlas

- Uses GPS traces for Map Building
- Map matching using Viterbi algorithm
  - (Hidden Markov Model) HMM representation
  - Dynamic programming algorithm
  - Inferencing whether or not it is a matched trace
  - New roads after repeated unmatched traces
  - Using GPS error thresholds for matching with lanes and walking trails etc

Summary of Papers
Driving Coach

- Gets sensor data from CAN bus.
- Extract features from the data
- Est. driving conditions & fuel consumption
- Fuzzy outputs
  - Urban/Highway/Combined
  - Very poor/ Poor/ Good /Very good
- *Give driving hints based on above 3
  - Hint -> fuzzy values (Vlikely/likely/unlikely/Vunlikely)
  - Example hints :
    - Switch off engine
    - Shift gear early
    - Acceleration too high

Summary of Papers
VTrack

- Uses sparse GPS and WiFi for delay est.
- HMM based map-matching
  - Uses Viterbi algorithm with interpolation, outlier removal and bad zone detection
- Estimate travel times from WiFi localization
- Detects hotspots (more delay than expected)
- Real Time route planning

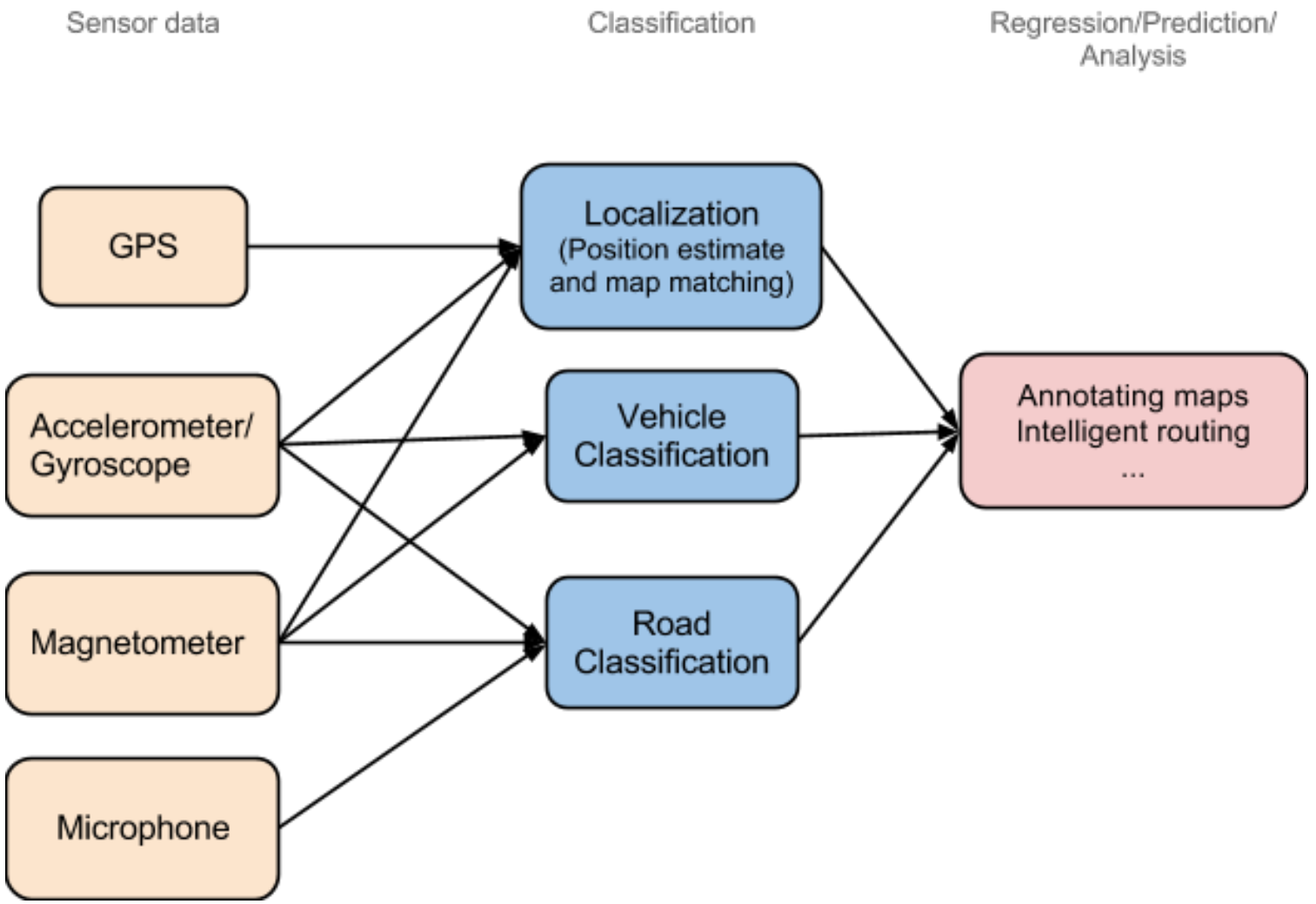
Summary of Papers
Wolverine

- Similar approach as Nericell
- Uses magnetometer for horizontal orientation instead of waiting for a braking event
- ML techniques for bump/brake events
- Obtaining training data using unsupervised K-means clustering to partition into 2 classes
- Using SVM classifier to classify on test data
- Uses mean and s.d. of accl. as features
- For braking use range(accl.) too

Summary of Papers
Miscellaneous

- SignalGuru : GLOSA
  - Windscreen mounted cameras
  - Image processing on video frames
  - Opportunistic wifi collaboration
  - SVR for learning adaptive signals
- Delay estimation using GPS data
- EnKF based highway traffic estimation
  - Model highway traffic as velocity flow
  - Velocity Continuous transmission model

The Framework
Broad view of the plan



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