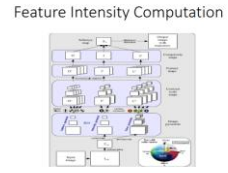
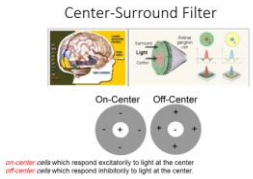
Scientific/Research Projects

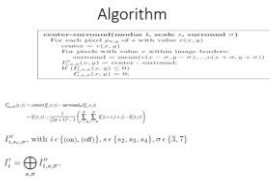
1- In-door navigation Algorithm using biologically Salient Region detector/Visual Attention System:

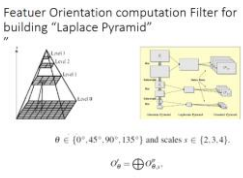
03/2015 – 07/2015

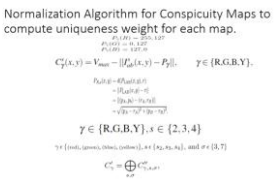
- Developed Salient Region Detector Algorithm.
- Developed Centre-Surround filter Algorithm.
- Visual landmark generated and redetected them with single feature per frame.
- Compared the generated visual landmark with other descriptors in OpenCV library like SIFT descriptor to compare accuracies.
- **Technologies used**: AI, machine-learning, computer vision, Java, JDBC and OpenCV
- **Algorithms**:
  1- Center-Surround Cell spatial Filter "on-center, Off-center" for building the Intensity-Pyramids.
  2- Feature orientation computation filter for building "Laplace Pyramids"
  3- Feature color computation filter for building "color Pyramids"
  4- Conspicuity Maps build-up algorithm.
  5- Normalization Algorithm for Conspicuity Maps to compute uniqueness weight for each map.
  6- Land-mark generation and redetection algorithms for "Tracking-Repeatability and ViewPoint Repeatability".
  7- Creation and checking stability of the landmark algorithm
- **Literature**:http://pages.iai.uni-bonn.de/frintrop_simone/publications.html
- **advisor**: Prof.Dr. Ing. Reiner Jäger FH Karlsruhe
- **supervisor**:Msc. Andreas Hoscislawski „andihos@arcor.de" „andihos@arcor.de"
- **Supervisor**:Msc. Stephan Batke stephan.batke@hs-karlsruhe.de
- **Further Details**:



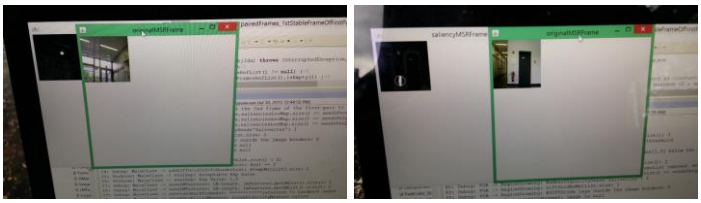








Some results:

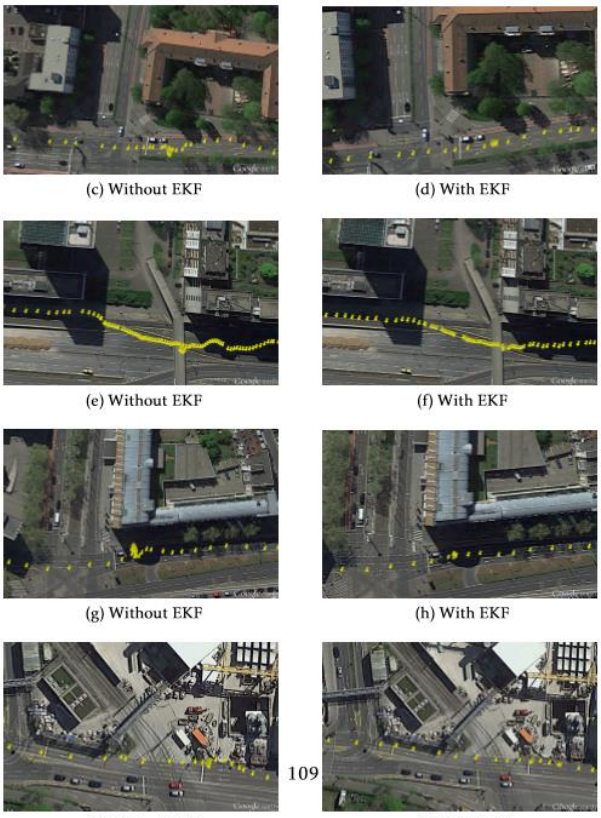


2-Master Thesis:Algorithm and Software development for OSM-Based Speed-Limit Warning System and fuel effeciency assistant.

11/2015 – 08/2016

Fraunhofer IOSB https://www.iosb.fraunhofer.de/

- Setting-up Squarell Bluetooth device. know-how to communicate to it wirelessly through Android test bench App.
- Developed and implemented Android simulator App that communicates with Squarell device through a friendly interface with the ability to request and receive all the possible CAN-BUS data messages via IoT-MQTT protocol from Paho library.
- Developed and implemented fuel efficiency assistant that prompt the driver via audible messages in order to reduce fuel consumption via IoT-MQTT protocol.
- Navigation and Positioning.
- Parameter estimation and machine learning system identification of drive train components of a truck.
- Implement Extended Kalman Filter for Automotive mode to estimate vehicle position, velocity, yaw angle and yaw rate.
- Developed a speed-limit warning system App for Android based on OSM data.
- Developed Java extractor algorithm to parse the Geographical locations and their corresponding speed limit from OSM, and store them in Android SQLite database
- **Research foucs**:
  Navigation and positioning, GNSS, Low-cost Multi-Sensors for Mobile Plateforms, Coordinate system transformation, ECEF, Geographic Frame, geocentric Frame, Parameter estimation, Extended Kalman Filter, CAN-BUS, OSM, Google Maps, android-GPS Android Services, Android Broadcast, Android Bluetooth SPP, SQUARELL and socket-programming.
- **Further Details**:
  https://drive.google.com/file/d/1lGaI7YeHck98H_wlbIk0zB8lKYJvgnmX/view
- **Some Results:**



(c) Without EKF (d) With EKF

(e) Without EKF (f) With EKF

(g) Without EKF (h) With EKF

(i) Without EKF (j) With EKF

Figure 73: The estimated vehicle position and velocity using EKF with high uncertainty of GNSS and low uncertainty of velocity sensor

3- Developer of „Crazy-8“ Android card game.

4- Co-author for : Geodatenstrukturen für Indoor-Navigation | Request PDF