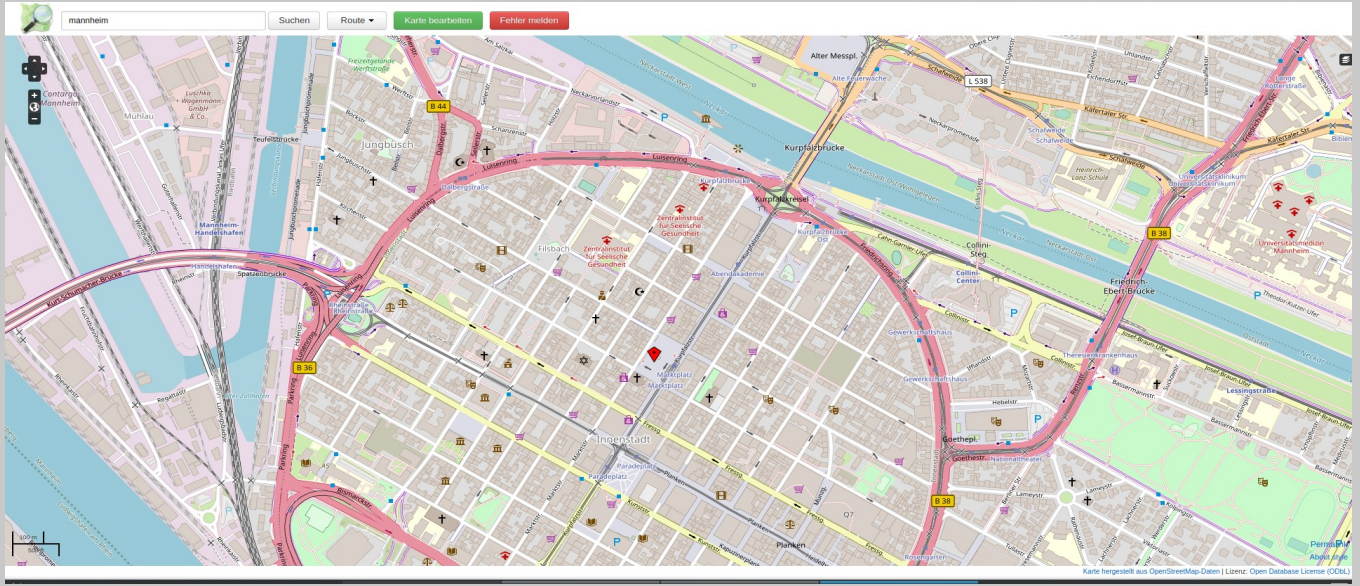
SUMO OSM POI Tools



This document describes some useful Tools to work with
Points of Interest (POIs) from Open Street Map (OSM) Data in SUMO Traffic Simulations.

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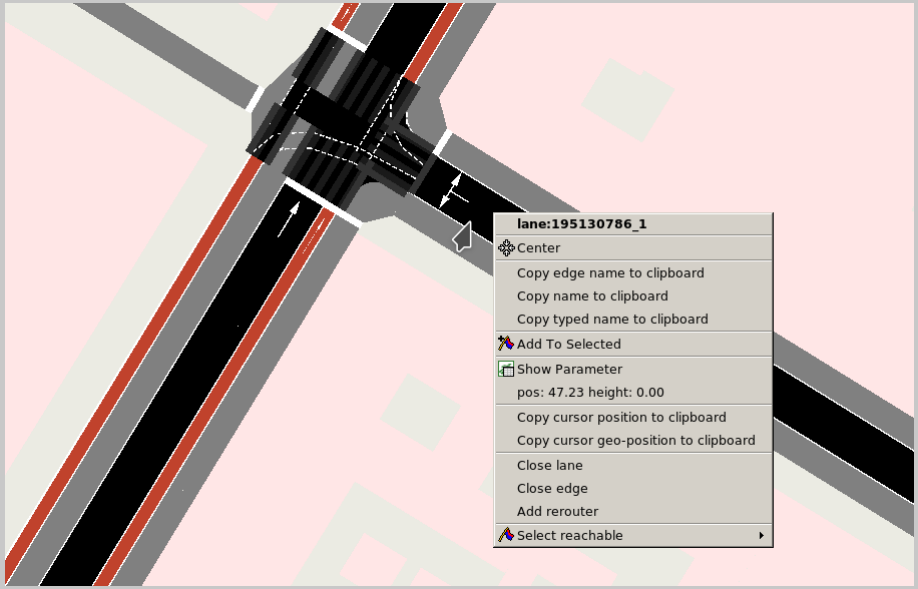
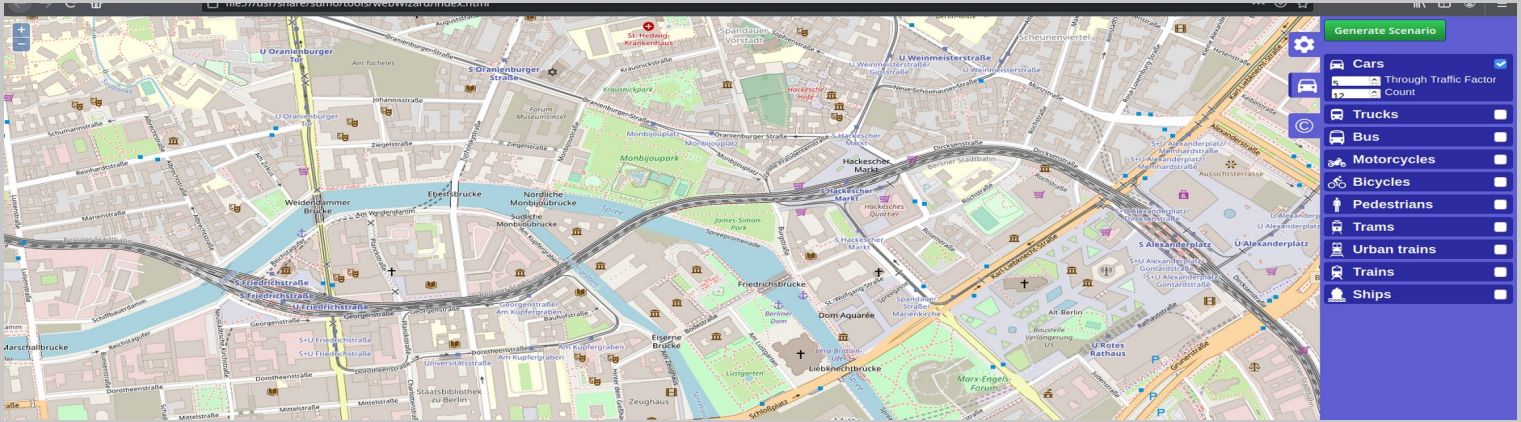
Motivation to develop the OSM POI Tools



In our research project “KI4ROBOFLEET” we faced the problem, that Routes can only be defined by Edges and Lanes in SUMO. Importing a map from Open Street Maps allows just to display the POIs (and Polygons), but an interaction between POIs (or Polygons) and vehicles is not possible in SUMO. Therefore a workaround has to be found. Another issue was the import of parking Areas, which are exported by OSM but cannot be utilized in SUMO. Finally we also wanted to have a nice SUMO Map with customized colors of the POIs and Polygons. To get all this issues done automatically, we wrote some useful scripts with a GUI for a user friendly usage.

Step 1: Use the osmWebWizard



Change to your SUMO_HOME Directory (e.g. /usr/share/sumo)
Go to the subdirectory “tools” (e.g. /usr/share/sumo/tools)
Type “python osmWebWizard.py” and the browser starts
Pick a region on the Map and make settings for random traffic
Click the “Generate Scenario” Button and SUMO starts.

Step 2: inspect the created files

Check where the newly created files are stored (e.g. *home*/myname/Sumo/2020-12-03-17-58-39)

Following files should have been created by the OSM WebWizard:

build.bat
osm_bbox.osm.xml
osm.netccfg
osm.net.xml
osm.passenger.trips.xml
osm.polycfg
osm.poly.xml
osm.sumocfg
osm.view.xml
run.bat

The numer of created files depends on the settings in OSM WebWizard

Step 2: inspect the created files

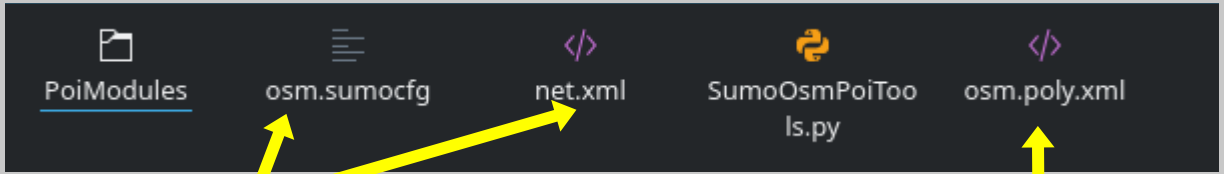
Description of the created files:

build.bat	Microsoft batch file which we don’t use
osm_bbox.osm.xml	
osm.netccfg	Configuration File for SUMO “netconvert” (not used)
osm.net.xml	The bare street-Net (without any buildings, etc.)
osm.passenger.trips.xml	List of random routes for random car traffic
osm.polycfg	Configzration File for SUMO “polyconvert”(not used)
osm.poly.xml	List of all POIs and Polygons of the Map
osm.sumocfg	SUMO Main file which loads all other files
osm.view.xml	View (and delay) Settings for the SUMO GUI
run.bat	Microsoft batch file which we don’t use

Step 3: Start the GUI for the SUMO OSM POI Tools

1. Chang to the directory “SumoOsmPoiTools”

You will find the following files:



This 2 dummy files should be replaced by your own osm.sumocfg file (with all required additional files)
Otherwise some functions won’t work properly

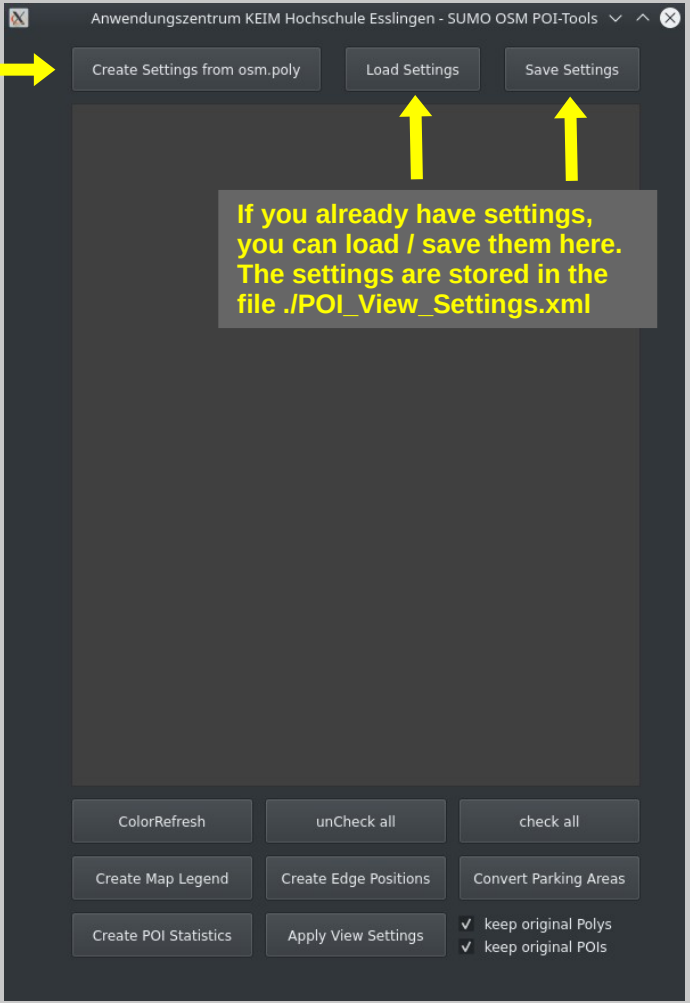
2. Replace this file with your own “osm.poly.xml” from Step 2

3. Run the python3 script:

```
/SumoOsmPoiTools$ python3 SumoOsmPoiTools.py
```

Step 4: create initial Settings

By pressing this button
all <poly> and <poi> Tags
are read from “osm.poly.xml”
and random colors are assigned



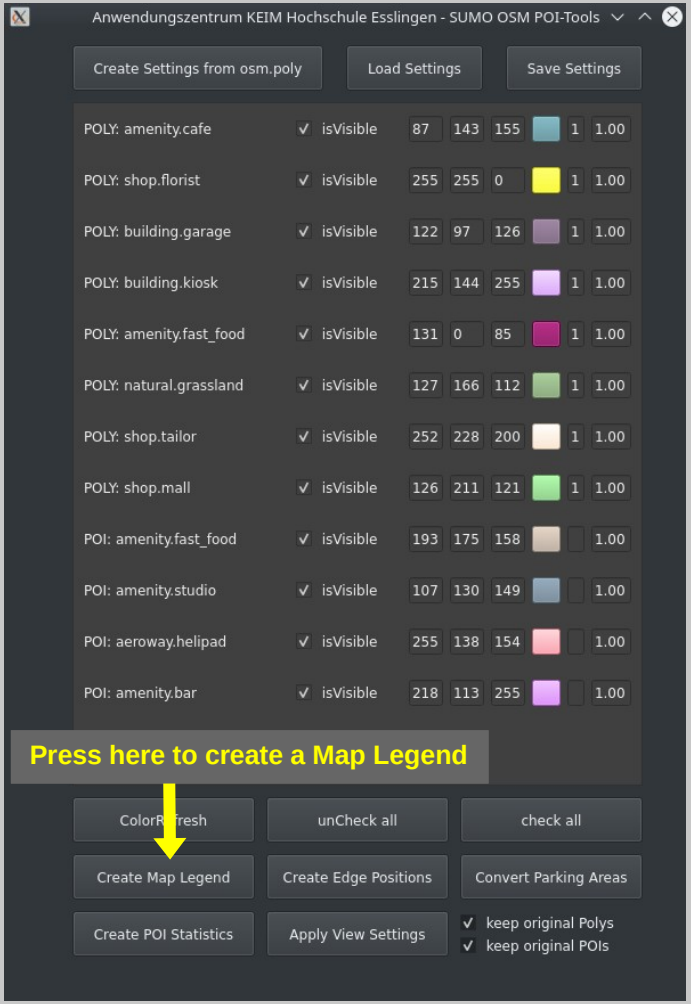
Step 5: adjust and apply Settings

Finally press here to apply the current settings to your osm.poly.xml
-> a new file “osm.poly.customized.xml” is created

To make the Settings visible in SUMO you have to Replace the original osm.poly.xml with the osm.poly.customized.xml

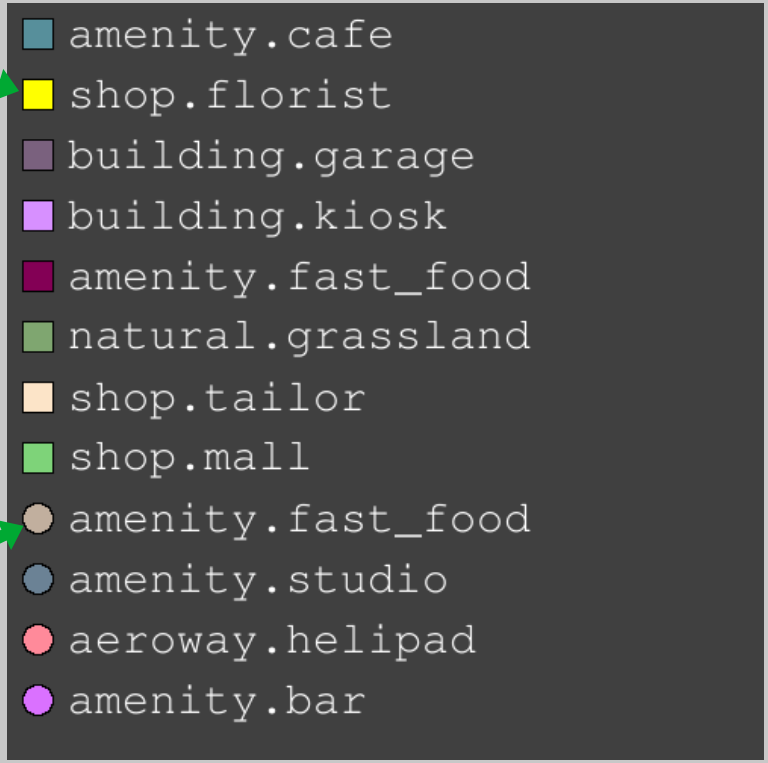
Set here how to deal with entries in osm.poly.xml for which no settings are defined

Step 6: (optionally) create a Map Legend



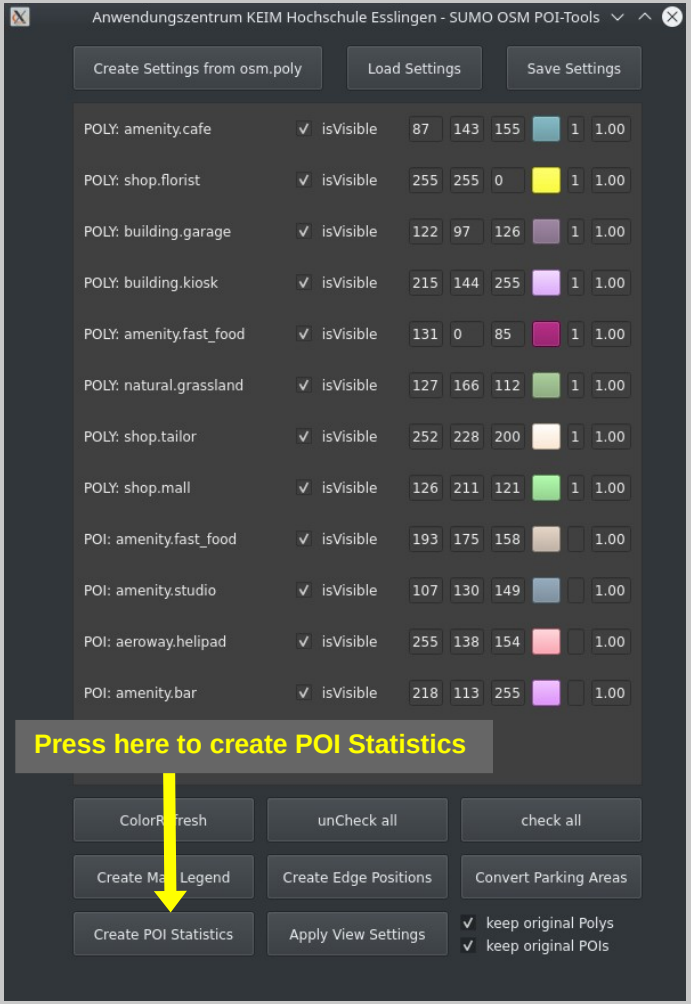
Squares for POLYs

Circles for POIs



The file ./POI_Legend.png is created

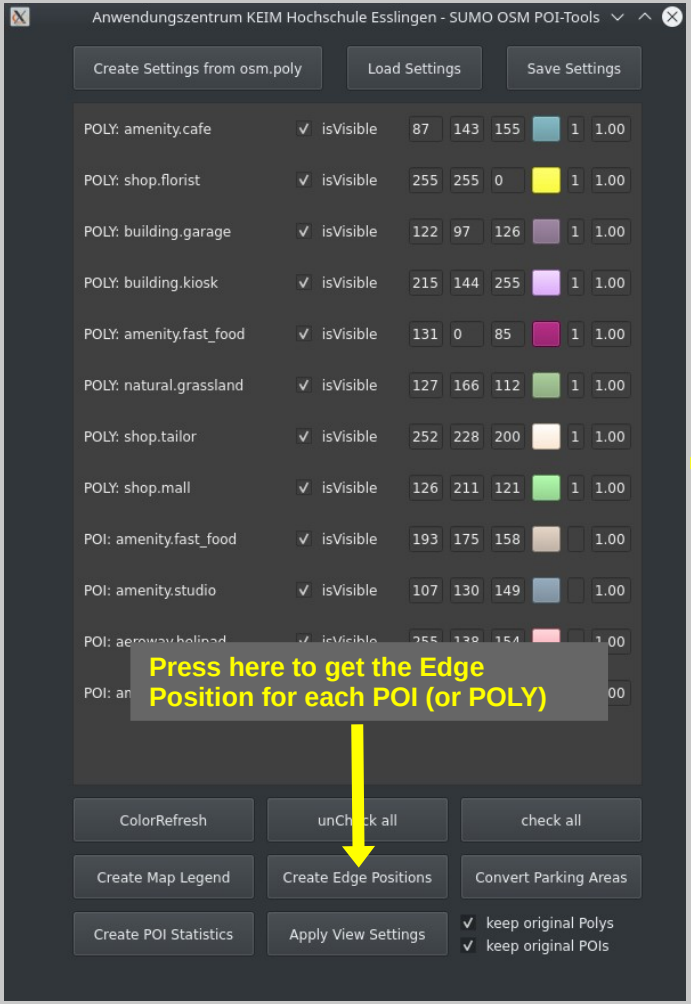
Step 7: (optionally) create POI Statistics




```
 82 poly,shop.doityourself,1
 83 poly,natural.tree_row,7
 84 poly,waterway.river,2
 85 poly,sport.swimming,1
 86 poly,amenity.fuel,1
 87 poly,building.parish_hall,1
 88 poly,historic.memorial,2
 89 poly,amenity.social_centre,1
 90 poly,amenity.bicycle_parking,7
 91 poly,building.memorial,1
 92 poly,tourism.artwork,1
 93 poly,building.silo,2
 94 poly,landuse.brownfield,1
 95 poly,sport.basketball;soccer,1
 96 poly,building.construction,9
 97 poly,landuse.construction,6
 98 poly,landuse.retail,3
 99 poly,man_made.water_tower,1
100 poly,sport.multi,2
101 poly,historic.passage,1
102 poly,man_made.bridge,6
103 poly,sport.table_tennis,3
104 poly,man_made.surveillance,1
105 poly,amenity.bicycle_repair_station,1
106 poly,building.hut,1
107 poly,building.train_station,1
108 poly,building.ship,1
109 poly,historic.ship,1
```

The file ./PoiStatistics.csv is created.
Each unique entry in osm.poly.xml is counted

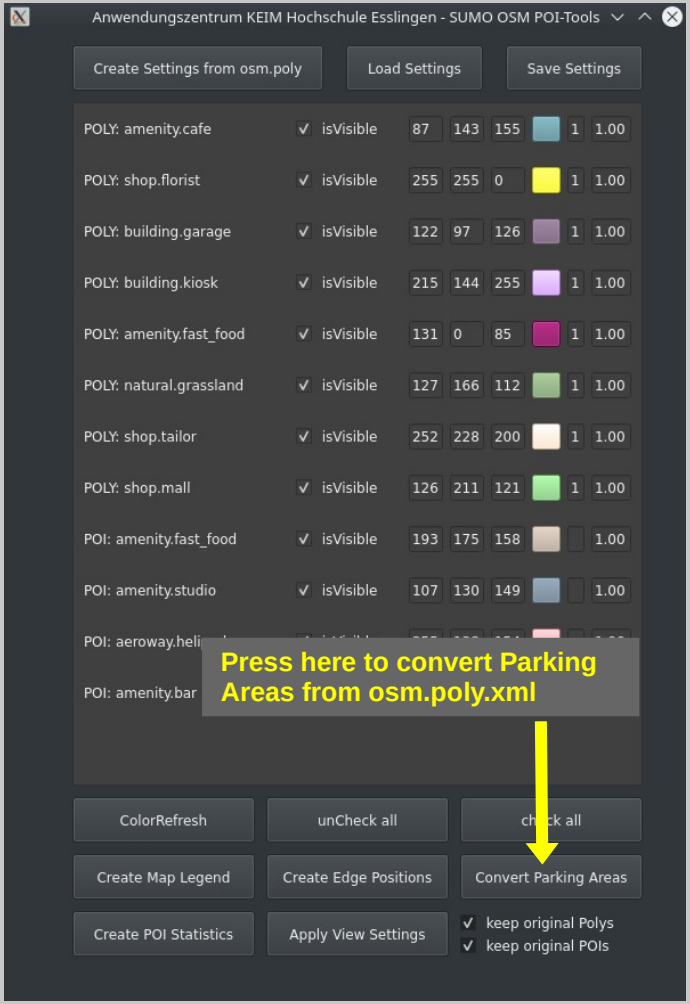
Step 8: create POI EdgePositions file




```
<polyposition>
  <polyposition id="147407756" type="amenity.bar" lane="25548343#1_0" position="11.47" details="{'addr:city':
  <polyposition id="168246142" type="amenity.cafe" lane="171452686_0" position="65.92" details="{'addr:city':
  <polyposition id="174441433" type="aeroway.helipad" lane="169689583#3_0" position="8.96" details="{'aeroway
  <polyposition id="178958709#1" type="shop.florist" lane=":793914526_w1_0" position="4.02" details="{'addr:c
  <polyposition id="182747680" type="building.garage" lane="-334457598#0_0" position="99.14" details="{'build
  <polyposition id="182747698" type="building.garage" lane="169684595#2_0" position="26.32" details="{'addr:c
  <polyposition id="182747707" type="building.garage" lane="237029638#1_0" position="41.90" details="{'buildi
  <polyposition id="182748611" type="building.garage" lane=":2449795599_0_0" position="3.23" details="{'build
  <polyposition id="182748613" type="building.garage" lane="-334457598#0_0" position="51.56" details="{'build
  <polyposition id="182748615" type="building.garage" lane="-169689362#0_0" position="36.67" details="{'build
  <polyposition id="182750865" type="building.garage" lane="-532149775#2_0" position="41.46" details="{'build
  <polyposition id="182750867" type="building.garage" lane="-532149775#2_0" position="20.09" details="{'build
  <polyposition id="182753486" type="building.garage" lane="24608228_0" position="69.78" details="{'building'
  <polyposition id="182753488" type="building.garage" lane="24608228_0" position="32.14" details="{'building'
  <polyposition id="182754714" type="building.garage" lane="169684595#5_0" position="15.57" details="{'buildi
  <polyposition id="182754715" type="building.garage" lane="169684595#7_0" position="10.83" details="{'buildi
  <polyposition id="182754717" type="building.garage" lane="169684595#2_0" position="69.18" details="{'buildi
  <polyposition id="185332035" type="building.kiosk" lane=":clus r_1763710124_1 3718516_1763718524_28226023
  <polyposition id="188472750" type="amenity.fast_food" lane="171507738_0" positi n="10.45" details="{'addr:c
  <polyposition id="189928045" type="natural.grassland" lane="24377399_0" position="482.76" details="{'natura
  <polyposition id="197146176" type="amenity.fast_food" lane="5097830#0_0" position="12.05" details="{'addr:c
  <polyposition id="197146181#1" type="shop.tailor" lane=":27088458_w2_0" position="2.58" details="{'addr:cit
  <polyposition id="197885379#1" type="shop.mall" lane="174845336#0_0" position="120.71" details="{'addr:city
  <polyposition id="209312375" type="building.garage" lane="-25832158_0" position="22.88" details="{'building
  <polyposition id="209497671" type="amenity.bar" lane="258979225#1_0" position="17.46" details="{'addr:city'
  <polyposition id="209967643" type="building.garage" lane="209962016_0" position="40.41" details="{'building
```

The file ./EdgePositions.xml is created.
The lane ID and the lanePosition can be used to define Start- and Endpoints for SUMO Routes (from one POI or POLY to another)

Step 9: convert Parking Areas



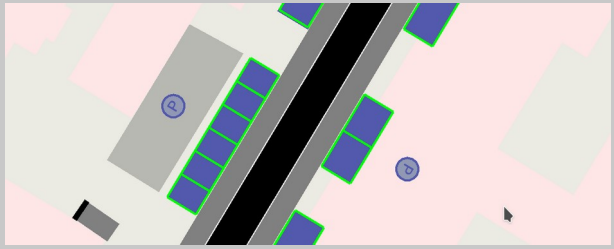

```
<additional>
  <parkingArea id="101202313" lane="564962290#1_0" friendlyPos="true" roadsideCapacity="1" startPos="101.92" endPos="101.92"/>
  <parkingArea id="101219015" lane="40350414#3_0" friendlyPos="true" roadsideCapacity="1" startPos="76.26" endPos="76.26"/>
  <parkingArea id="102203931" lane="24554928#0_0" friendlyPos="true" roadsideCapacity="1" startPos="18.98" endPos="18.98"/>
  <parkingArea id="102559458" lane="264144246_0" friendlyPos="true" roadsideCapacity="1" startPos="17.80" endPos="17.80"/>
  <parkingArea id="102664328" lane="-74194500#0_0" friendlyPos="true" roadsideCapacity="1" startPos="38.36" endPos="38.36"/>
  <parkingArea id="102902690" lane="22332013#1_0" friendlyPos="true" roadsideCapacity="1" startPos="3.51" endPos="3.57"/>
  <parkingArea id="111556866" lane=":236135657_w0_0" friendlyPos="true" roadsideCapacity="1" startPos="0.00" endPos="0.00"/>
  <parkingArea id="114806087" lane="150549252#1_0" friendlyPos="true" roadsideCapacity="1" startPos="26.38" endPos="90.88"/>
  <parkingArea id="130294359" lane="-131229979_0" friendlyPos="true" roadsideCapacity="1" startPos="17.06" endPos="21.77"/>
  <parkingArea id="131229978" lane="114323879#1_0" friendlyPos="true" roadsideCapacity="10" startPos="37.40" endPos="37.40"/>
  <parkingArea id="150570217" lane="-4403852#0_0" friendlyPos="true" roadsideCapacity="1" startPos="16.31" endPos="16.31"/>
```

The file ./parkingAreas.xml is created.

```
<configuration xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

    <input>
        <net-file value="osm.net.xml"/>
        <route-files value="InitialRoute.xml"/>
        <additional-files value="osm.poly.xml, parkingAreas.xml"/>
    </input>
```

Add parkingAreas.xml to osm.sumocfg



Now the Parking Areas are visible in the Map (and not just as an osm.poly.xml entry)
The Parking Areas can be utilized now by the vehicles.