

# GIS PROJEKAT 3

Ana Milenković 1524

# UVOD

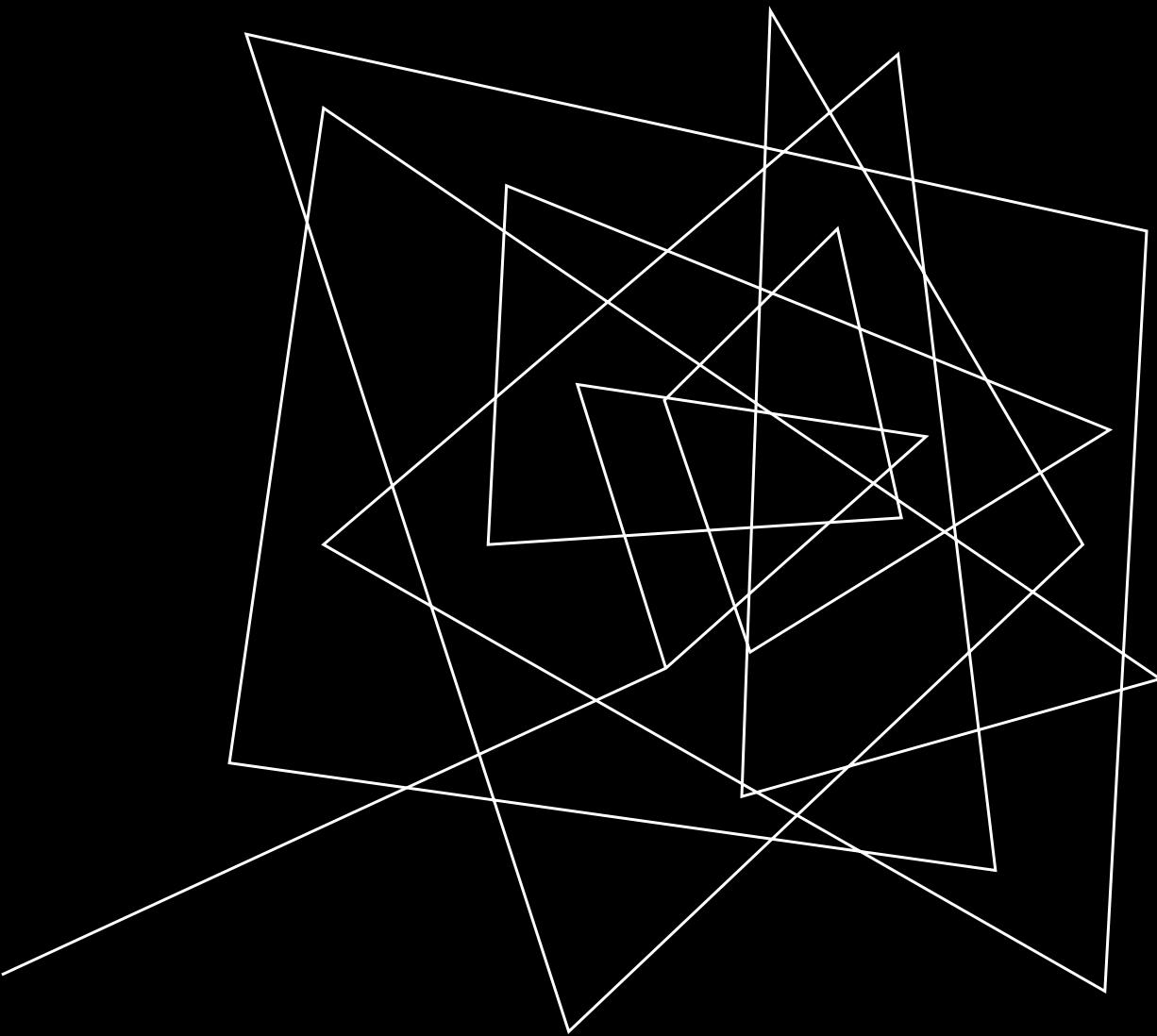
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U okviru ovog projekta, postojećoj FrontEnd javascript aplikaciji, pridodat je BackEnd API. API je kreiran tehnologijom .NET Core.

JS aplikaciji su pridodate nove funkcionalnosti, poput filtriranja svakog od slojeva, prostorni upit sa vezom dva sloja, kao i upit za podatke o saobraćaju.

Filtriranje se obavlja korišćenjem WMS i WFS servisa i poziva.

Za prostorne upite, API pribavlja podatke iz PostGIS baze i rezultate vraća javascript aplikaciji, koja ih potom koristi da potrebne objekte prikaže na mapi.



# SLIKE EKRANA

Prikaz urađenog

# PRVO OTVARANJE APLIKACIJE

- Prikaz mape sa svim slojevima

Welcome to Ana's Map of Nis

Leaflet | © OpenStreetMap

**Map Legend**

<span style="background-color: #FFFFCC;"></span> Administrative Boundaries <input type="button" value="Remove Layer"/>	<span style="background-color: #FFB6C1;"></span> Buildings <input type="button" value="Remove Layer"/>	<span style="background-color: #808080;"></span> Roads <input type="button" value="Remove Layer"/>	<span style="background-color: #FF00FF;"></span> Education <input type="button" value="Remove Layer"/>	<span style="background-color: #008000;"></span> Parks <input type="button" value="Remove Layer"/>	<span style="background-color: #0070C0;"></span> Commercial <input type="button" value="Remove Layer"/>	<span style="background-color: #00BFFF;"></span> Water <input type="button" value="Remove Layer"/>
Filter this layer where <input type="radio"/> Name is <input type="text"/> <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name <input type="radio"/> Type is <input type="text"/> <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name <input type="radio"/> Surface is <input type="text"/> <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name <input type="radio"/> Type is <input type="text"/> <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name is <input type="text"/> <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name <input type="radio"/> Type is <input type="text"/> <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name is <input type="text"/> <input type="button" value="Filter Layer"/>

Find all education within a  meter radius from street/road named

4

# APLIKACIJA

- Zoomed-in mapa

Welcome to Ana's Map of Nis

Leaflet | © OpenStreetMap

Map Legend

<span style="background-color: #FFFFCC;"></span> Administrative Boundaries <input type="button" value="Remove Layer"/> Filter this layer where <input type="radio"/> Name is <input type="button" value="Filter Layer"/>	<span style="background-color: #FFB6C1;"></span> Buildings <input type="button" value="Remove Layer"/> Filter this layer where <input type="radio"/> Name <input type="radio"/> Type is <input type="button" value="Filter Layer"/>	<span style="background-color: #666666;"></span> Roads <input type="button" value="Remove Layer"/> Filter this layer where <input type="radio"/> Name <input type="radio"/> Surface is <input type="button" value="Filter Layer"/>	<span style="background-color: #FF00FF;"></span> Education <input type="button" value="Remove Layer"/> Filter this layer where <input type="radio"/> Name <input type="radio"/> Type is <input type="button" value="Filter Layer"/>	<span style="background-color: #002060;"></span> Parks <input type="button" value="Remove Layer"/> Filter this layer where <input type="radio"/> Name is <input type="button" value="Filter Layer"/>	<span style="background-color: #006699;"></span> Commercial <input type="button" value="Remove Layer"/> Filter this layer where <input type="radio"/> Name <input type="radio"/> Type is <input type="button" value="Filter Layer"/>	<span style="background-color: #007FFF;"></span> Water <input type="button" value="Remove Layer"/> Filter this layer where <input type="radio"/> Name is <input type="button" value="Filter Layer"/>
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Find all education within a  meter radius from street/road named

# APLIKACIJA

- Prikazani samo putevi i zgrade

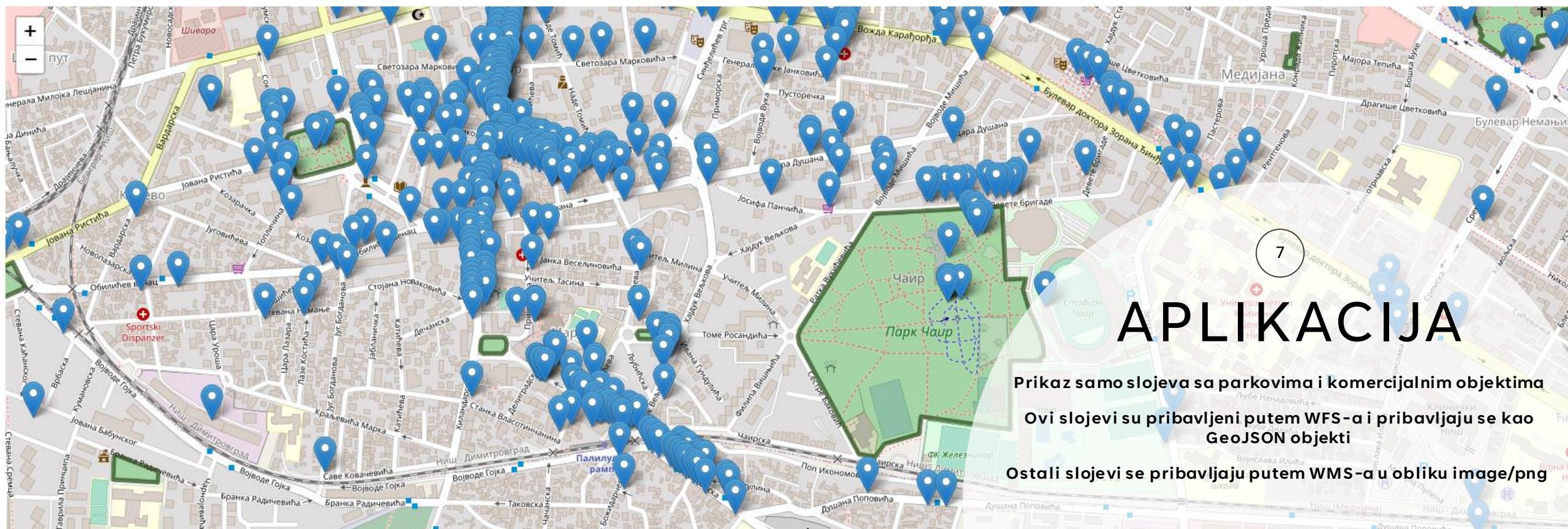
Welcome to Ana's Map of Nis

Map Legend

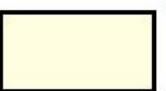
<span style="background-color: yellow; display: inline-block; width: 15px; height: 15px;"></span> Administrative Boundaries Show Layer Filter this layer where ○ Name is Filter Layer	<span style="background-color: pink; display: inline-block; width: 15px; height: 15px;"></span> Buildings Remove Layer Filter this layer where ○ Name ○ Type is Filter Layer	<span style="background-color: grey; display: inline-block; width: 15px; height: 15px;"></span> Roads Remove Layer Filter this layer where ○ Name ○ Surface is Filter Layer	<span style="background-color: magenta; display: inline-block; width: 15px; height: 15px;"></span> Education Show Layer Filter this layer where ○ Name ○ Type is Filter Layer	<span style="background-color: darkgreen; display: inline-block; width: 15px; height: 15px;"></span> Parks Show Layer Filter this layer where ○ Name is Filter Layer	<span style="background-color: blue; display: inline-block; width: 15px; height: 15px;"></span> Commercial Show Layer Filter this layer where ○ Name ○ Type is Filter Layer	<span style="background-color: lightblue; display: inline-block; width: 15px; height: 15px;"></span> Water Remove Layer Filter this layer where ○ Name is Filter Layer
--	---	--	--	---	--	---

Find all education within a  meter radius from street/road named

Welcome to Ana's Map of Nis



#### Map Legend



Administrative Boundaries

Show Layer



Buildings

Show Layer



Roads

Show Layer



Education

Show Layer



Parks

Remove Layer



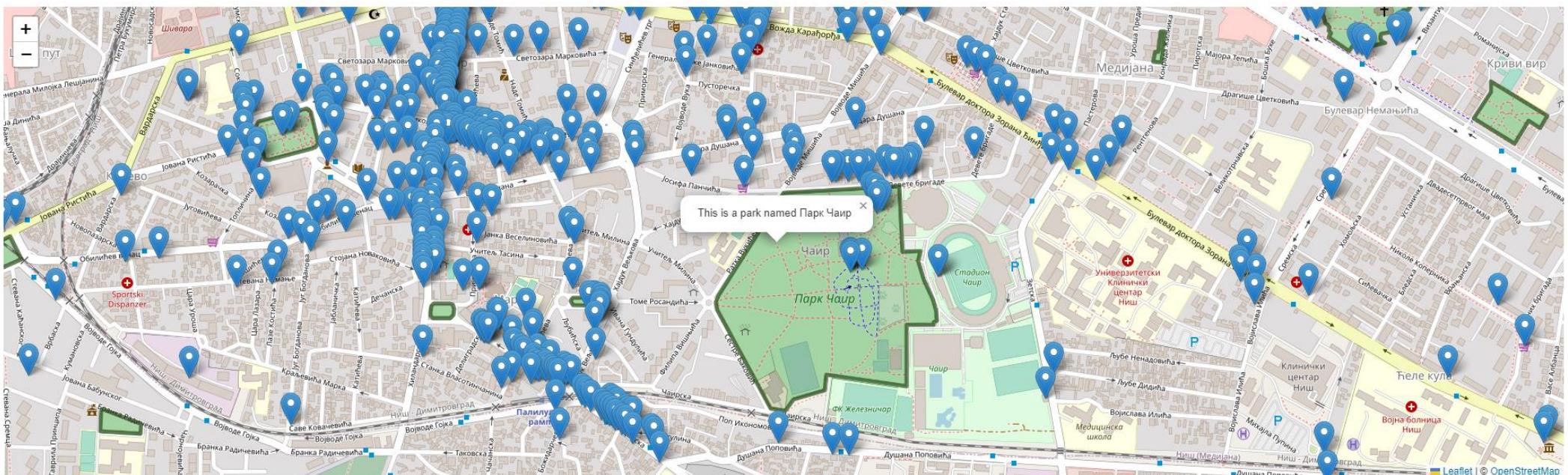
Commercial

Remove Layer

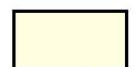
# APLIKACIJA

## Klik na park

Welcome to Ana's Map of Nis



### Map Legend



Administrative Boundaries

Show Layer



Buildings

Show Layer



Roads

Show Layer



Education

Show Layer



Parks

Remove Layer



Commercial

Remove Layer

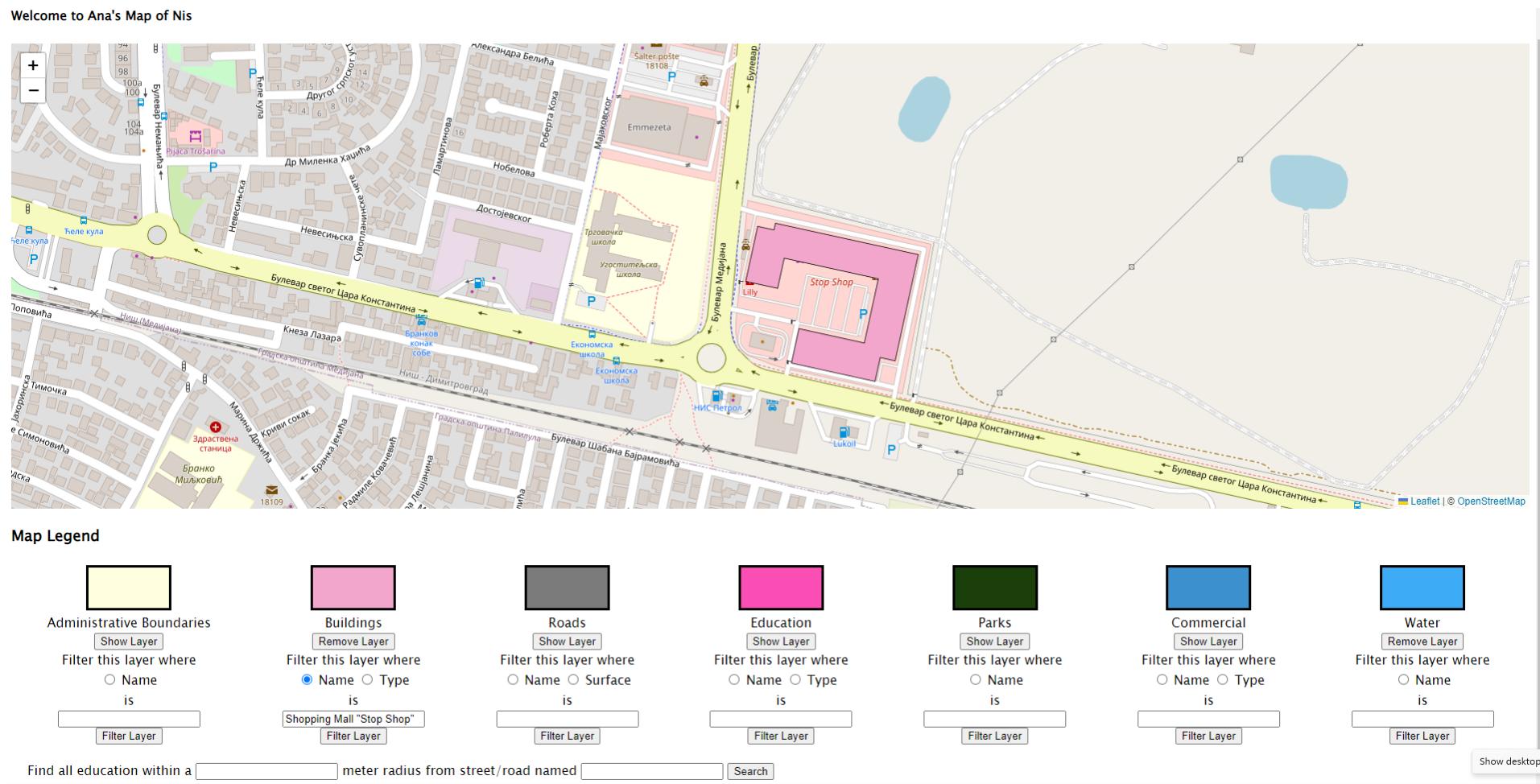


Water

Show Layer

# APLIKACIJA

- Prikazana samo zgrada sa imenom "Shopping Mall "Stop Shop""



# APLIKACIJA

- Prikazana samo zgrade koje spadaju u policijske stanice

Welcome to Ana's Map of Nis

Map Legend

- Administrative Boundaries  
Show Layer  
Filter this layer where Name is  Filter Layer
- Buildings  
Remove Layer  
Filter this layer where Name  Type is  police Filter Layer
- Roads  
Show Layer  
Filter this layer where Name  Surface is  Filter Layer
- Education  
Show Layer  
Filter this layer where Name  Type is  Filter Layer
- Parks  
Show Layer  
Filter this layer where Name is  Filter Layer
- Commercial  
Show Layer  
Filter this layer where Name  Type is  Filter Layer
- Water  
Show Layer  
Filter this layer where Name is  Filter Layer

Find all education within a  meter radius from street/road named  Search

# APLIKACIJA

- Prikazani samo putevi čija je površina asfalt

Welcome to Ana's Map of Nis

Map Legend

<span style="background-color: yellow; display: inline-block; width: 20px; height: 20px;"></span> Administrative Boundaries <input type="button" value="Show Layer"/>	<span style="background-color: pink; display: inline-block; width: 20px; height: 20px;"></span> Buildings <input type="button" value="Show Layer"/>	<span style="background-color: gray; display: inline-block; width: 20px; height: 20px;"></span> Roads <input type="button" value="Remove Layer"/>	<span style="background-color: magenta; display: inline-block; width: 20px; height: 20px;"></span> Education <input type="button" value="Show Layer"/>	<span style="background-color: black; display: inline-block; width: 20px; height: 20px;"></span> Parks <input type="button" value="Show Layer"/>	<span style="background-color: blue; display: inline-block; width: 20px; height: 20px;"></span> Commercial <input type="button" value="Show Layer"/>	<span style="background-color: lightblue; display: inline-block; width: 20px; height: 20px;"></span> Water <input type="button" value="Show Layer"/>
Filter this layer where <input type="radio"/> Name is <input type="text"/> <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name <input checked="" type="radio"/> Type is <input type="text"/> <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name <input checked="" type="radio"/> Surface is <input type="text"/> <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name <input type="radio"/> Type is <input type="text"/> <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name is <input type="text"/> <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name <input type="radio"/> Type is <input type="text"/> <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name is <input type="text"/> <input type="button" value="Filter Layer"/> Find all education within a <input type="text"/> meter radius from street/road named <input type="text"/> <input type="button" value="Search"/> Network access

# APLIKACIJA

- Prikazani samo komercijalni objekti koji spadaju u kafiće

Welcome to Ana's Map of Nis

This is a location of cafe named Biro

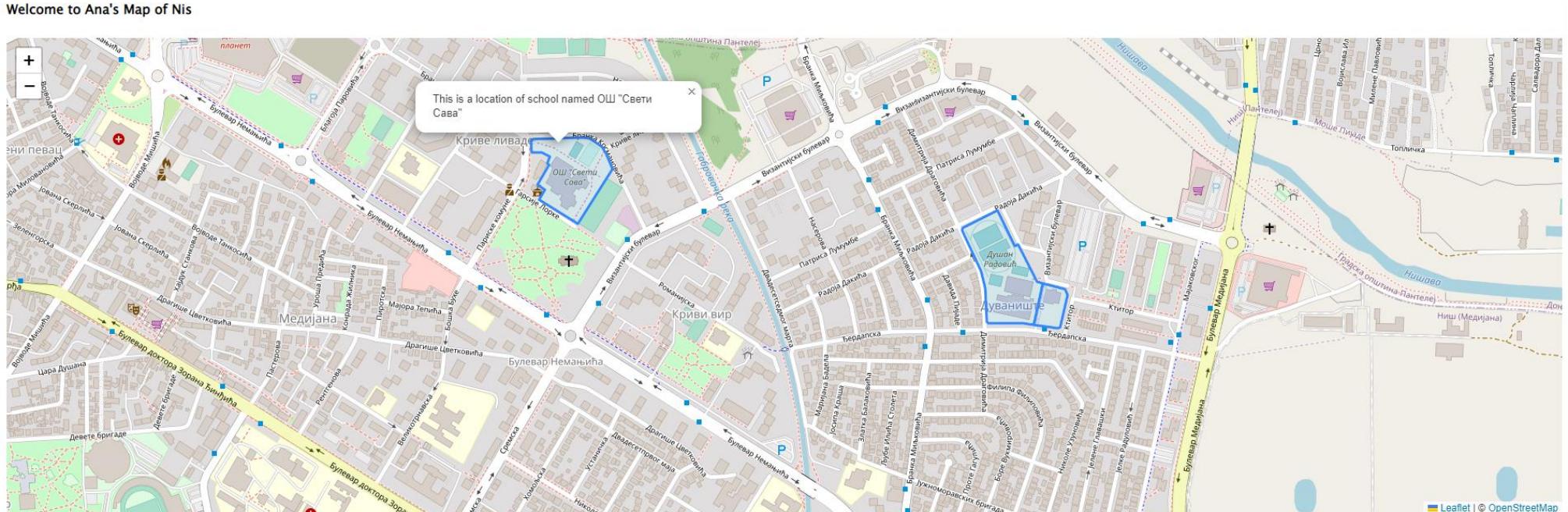
Map Legend

Layer Type	Show Layer	Remove Layer	Filter Layer
Administrative Boundaries	Show Layer		
Buildings	Show Layer		
Roads	Show Layer		
Education	Show Layer		
Parks	Show Layer		
Commercial	Remove Layer		
Water	Show Layer		

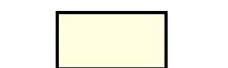
Find all education within a  meter radius from street/road named

# APLIKACIJA

- Prikazani samo edukativni objekti koji su u radijusu od 200m od ulice "Византијски булевар"



## Map Legend



Administrative Boundaries

Show Layer

Filter this layer where

Name

is

Filter Layer



Buildings

Show Layer

Filter this layer where

Name

is

police Filter Layer



Roads

Show Layer

Filter this layer where

Name

is

asphalt Filter Layer



Education

Remove Layer

Filter this layer where

Name

is

Filter Layer



Parks

Show Layer

Filter this layer where

Name

is

Filter Layer



Commercial

Show Layer

Filter this layer where

Type

is

cafe Filter Layer



Water

Show Layer

Filter this layer where

Name

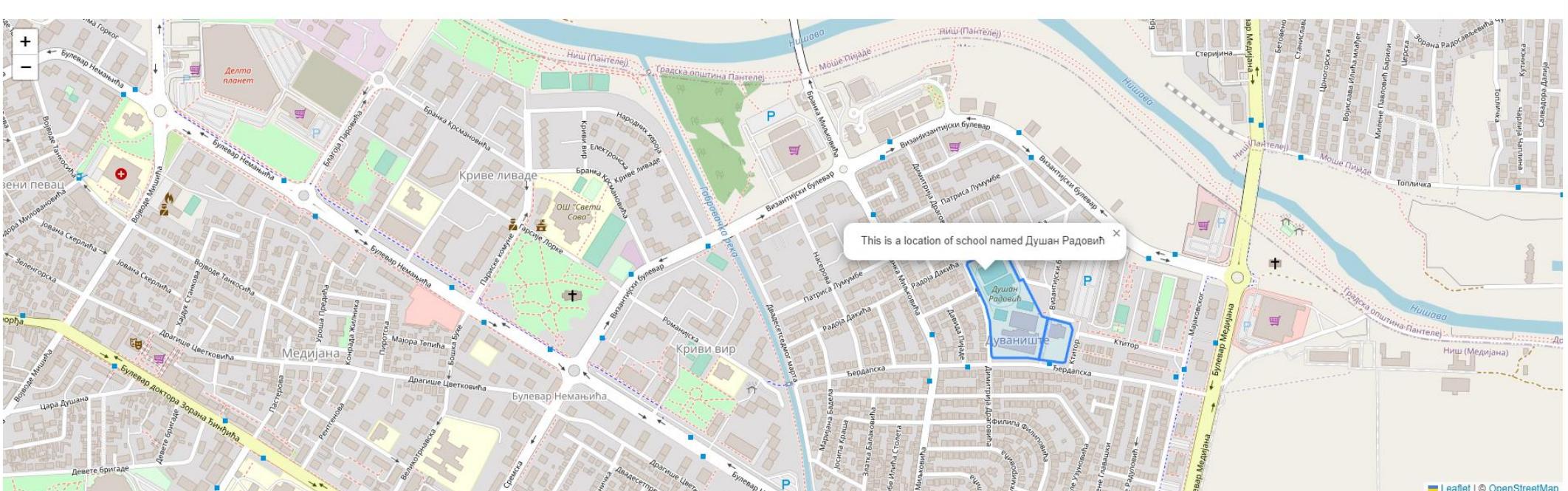
is

Filter Layer

Find all education within a  meter radius from street/road named  Search

# APLIKACIJA

- Prikazani samo edukativni objekti koji su u radijusu od 100m od ulice "Византијски булевар"



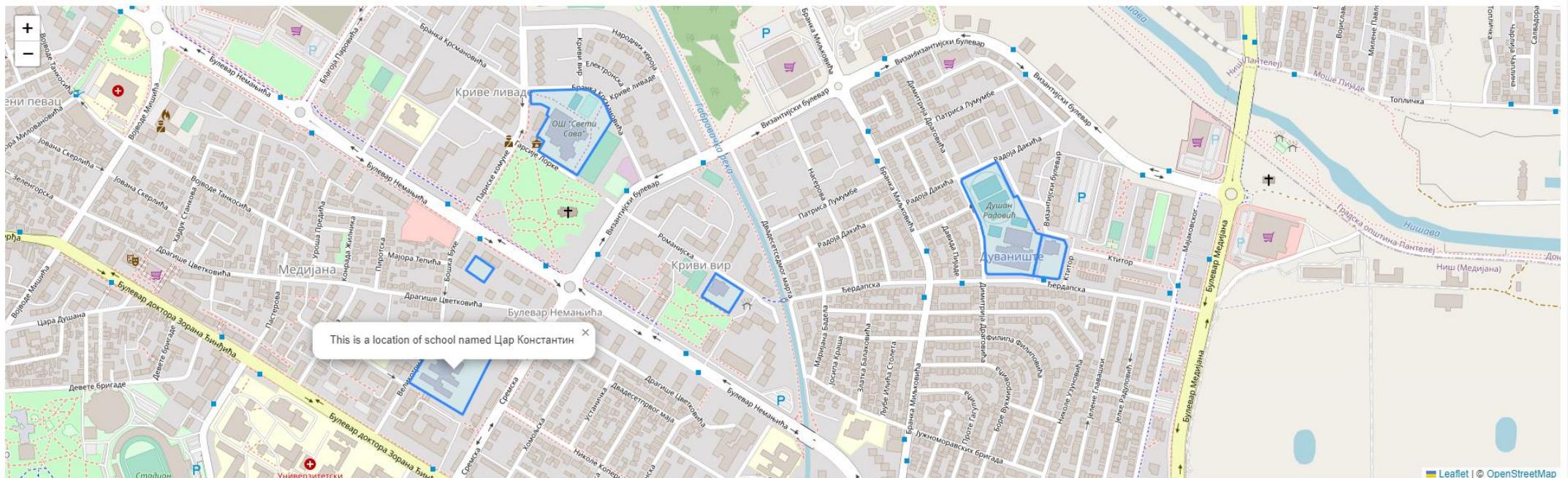
Map Legend

Administrative Boundaries	Buildings	Roads	Education	Parks	Commercial
<input type="button" value="Show Layer"/>	<input type="button" value="Show Layer"/>	<input type="button" value="Show Layer"/>	<input type="button" value="Remove Layer"/>	<input type="button" value="Show Layer"/>	<input type="button" value="Show Layer"/>
Filter this layer where					
<input type="radio"/> Name					
is	is	is	is	is	is
<input type="text"/>					
<input type="button" value="Filter Layer"/>					

Find all education within a  meter radius from street/road named

# APLIKACIJA

- Prikazani samo edukativni objekti koji su u radijusu od 500m od ulice "Византијски булевар"



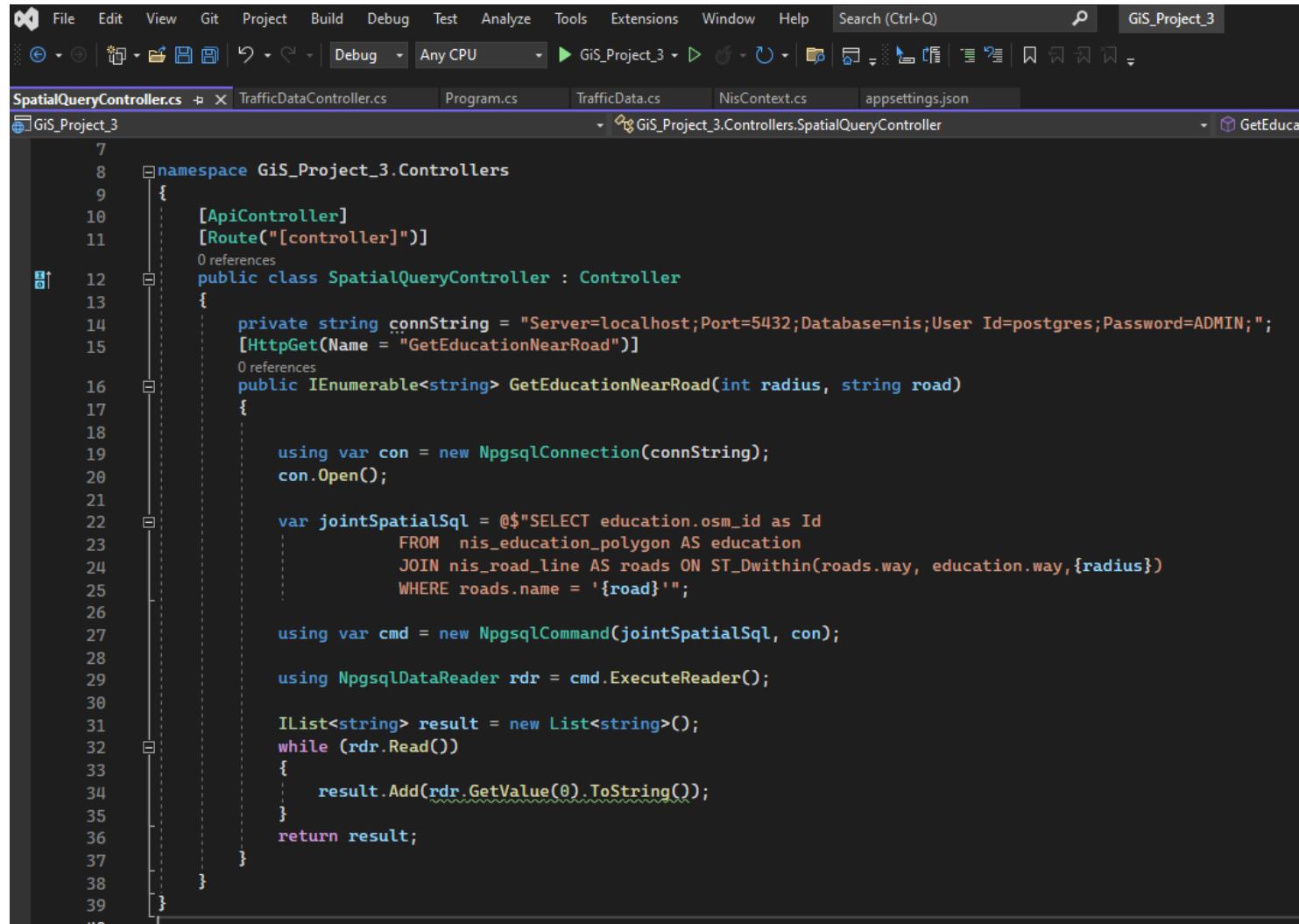
Map Legend

Administrative Boundaries <a href="#">Show Layer</a>	Buildings <a href="#">Show Layer</a>	Roads <a href="#">Show Layer</a>	Education <a href="#">Remove Layer</a>	Parks <a href="#">Show Layer</a>	Commercial <a href="#">Show Layer</a>	Water <a href="#">Show Layer</a>
Filter this layer where <input type="radio"/> Name is <input type="text"/> <a href="#">Filter Layer</a>	Filter this layer where <input type="radio"/> Name <input checked="" type="radio"/> Type is <input type="text"/> <a href="#">Filter Layer</a>	Filter this layer where <input type="radio"/> Name <input checked="" type="radio"/> Surface is <input type="text"/> <a href="#">Filter Layer</a>	Filter this layer where <input type="radio"/> Name <input type="radio"/> Type is <input type="text"/> <a href="#">Filter Layer</a>	Filter this layer where <input type="radio"/> Name is <input type="text"/> <a href="#">Filter Layer</a>	Filter this layer where <input type="radio"/> Name <input checked="" type="radio"/> Type is <input type="text"/> <a href="#">Filter Layer</a>	Filter this layer where <input type="radio"/> Name is <input type="text"/> <a href="#">Filter Layer</a>

Find all education within a  meter radius from street/road named  [Search](#)

# WEB API

- SQL parametrizovaní Spatial join upit



The screenshot shows the Visual Studio IDE interface with the following details:

- File Bar:** File, Edit, View, Git, Project, Build, Debug, Test, Analyze, Tools, Extensions, Window, Help.
- Search Bar:** Search (Ctrl+Q).
- Project Explorer:** Shows files like SpatialQueryController.cs, TrafficDataController.cs, Program.cs, TrafficData.cs, NisContext.cs, and appsettings.json.
- Solution Explorer:** Shows the project structure.
- Toolbox:** Standard development tools.
- Code Editor:** Displays the C# code for the SpatialQueryController class.

```
7
8     namespace GiS_Project_3.Controllers
9     {
10         [ApiController]
11         [Route("[controller]")]
12         public class SpatialQueryController : Controller
13         {
14             private string connString = "Server=localhost;Port=5432;Database=nis;User Id=postgres;Password=ADMIN;";
15             [HttpGet(Name = "GetEducationNearRoad")]
16             public IEnumerable<string> GetEducationNearRoad(int radius, string road)
17             {
18
19                 using var con = new NpgsqlConnection(connString);
20                 con.Open();
21
22                 var jointSpatialSql = @$"SELECT education.osm_id as Id
23                                     FROM nis_education_polygon AS education
24                                     JOIN nis_road_line AS roads ON ST_Dwithin(roads.way, education.way,{radius})
25                                     WHERE roads.name = '{road}'";
26
27                 using var cmd = new NpgsqlCommand(jointSpatialSql, con);
28
29                 using NpgsqlDataReader rdr = cmd.ExecuteReader();
30
31                 IList<string> result = new List<string>();
32                 while (rdr.Read())
33                 {
34                     result.Add(rdr.GetValue(0).ToString());
35                 }
36
37                 return result;
38             }
39         }
```

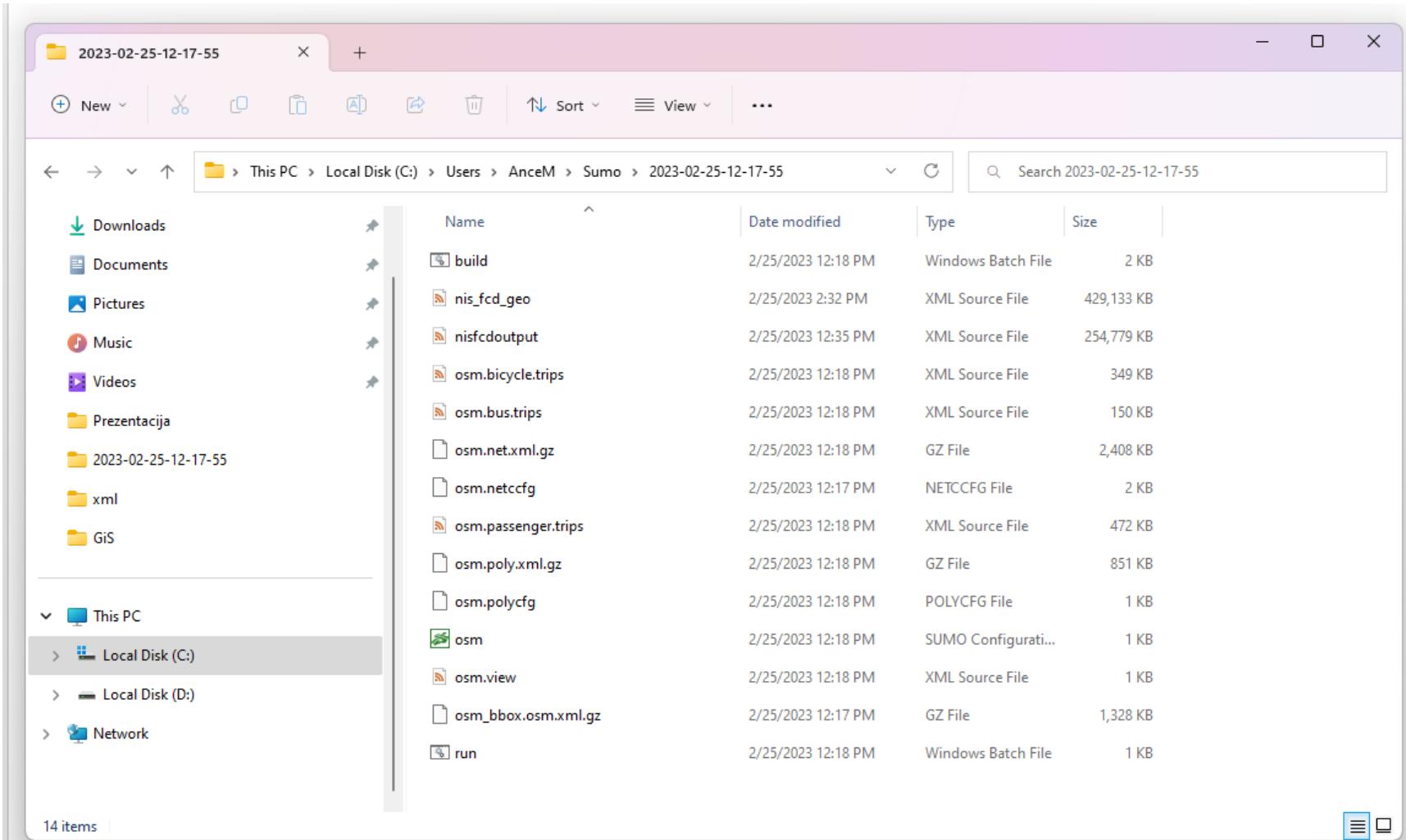
The screenshot shows a browser's developer tools code editor with the tab bar at the top. The tabs include 'index.html M', '# style.css', 'JS main.js', and 'X'. The search bar at the top right contains the text 'GIS\_Project2'. The main area displays the 'main.js' file with line numbers from 385 to 429. The code is written in JavaScript and performs a spatial join operation. It retrieves a radius and road name from input fields, encodes the road name, and sends a GET request to a local endpoint. The response is then used with \$.ajax to query a Geoserver WFS endpoint for education features. The resulting data is processed to filter features based on their OSM ID, and the filtered layer is added to a map.

```
385 //spatial join layer
386
387 var btnEduRoads = document.getElementById("btn-edu-road");
388 btnEduRoads.onclick = function(){
389     var radius = document.getElementById("input-radius").value;
390     var roadName = document.getElementById("input-road").value;
391
392     const encodedRoad = encodeURIComponent(roadName);
393
394     fetch(`https://localhost:7151/SpatialQuery?radius=${radius}&road=${encodedRoad}`, {
395         method: 'GET',
396         headers: {
397             'Content-Type': 'application/json'
398         },
399         crossOrigin: null
400     })
401     .then(response => response.json())
402     .then(data => $.ajax({
403         url: "http://localhost:8080/geoserver/nis/wfs",
404         data: {
405             service: "WFS",
406             version: "1.0.0",
407             request: "GetFeature",
408             typeName: "nis:nis_education",
409             outputFormat: "application/json",
410             srsName: "epsg:4326",
411         },
412         dataType: "json",
413         success: function (response) {
414             removeLayerFromMap(educationLayer);
415             educationLayer = L.geoJSON(response, {onEachFeature: onEachFeature,
416                 filter:function(feature,layer){
417                     for(var i = 0; i < data.length; i++){
418                         if(feature.properties.osm_id == data[i]){
419                             return true;
420                         }
421                     }
422                 }
423             })
424             .addTo(map);
425         },
426     })
427     .catch(error => console.error(error));
428
429 }
```

# JS APP

- Fetch poziv ka prethodno prikazanom endpoint-u
- Rezultati se koriste za dalje filtriranje sloja

# GENERISANI SUMO PODACI



# SUMO

- Podatke generisane preko SUMO Web Wizarda je potrebno konvertovati u fcd (floating car data) format
  - To se postiže sledećom komandom:  
"sumo -c osm.sumocfg --fcd-output nis\_fcd\_geo.xml --fcd-output.geo"
  - Zatim je potrebno fcd podatke ubaciti u PostGreSQL bazu
  - Fcd2pgsql alat je izbačen iz upotrebe od strane SUMO I više ne stiže uz tools koji se dobijaju uz instalaciju SUMO
  - Zato je bilo potrebno konverotvati fcd.xml u fcd.csv, jer je csv moguce importovati u PostGreSQL

# GENERISANI SUMO PODACI - FCD GEO OUTPUT

```
C:\Users\AnceM\Sumo>2023-02-25-12-17-55> nis_fcd_geo.xml
35
36    </configuration>
37  -->
38
39  <fcd-export xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="http://sumo.dlr.de/xsd/fcd_file.xsd">
40      <timestep time="0.00">
41          <vehicle id="bike0" x="21.889278" y="43.318103" angle="290.39" type="bike_bicycle" speed="0.00" pos="1.70" lane="115675457_0" slope="0.00"/>
42          <vehicle id="bus0" x="21.912518" y="43.308515" angle="23.25" type="bus_bus" speed="0.00" pos="12.10" lane="-115561388#2_0" slope="0.00"/>
43      </timestep>
44      <timestep time="1.00">
45          <vehicle id="bike0" x="21.889267" y="43.318106" angle="290.39" type="bike_bicycle" speed="0.92" pos="2.62" lane="115675457_0" slope="0.00"/>
46          <vehicle id="bus0" x="21.912523" y="43.308524" angle="23.25" type="bus_bus" speed="1.02" pos="13.12" lane="-115561388#2_0" slope="0.00"/>
47          <vehicle id="veh1" x="21.911363" y="43.309357" angle="354.06" type="veh_passenger" speed="0.00" pos="5.10" lane="-417228579#2_0" slope="0.00"/>
48      </timestep>
49      <timestep time="2.00">
50          <vehicle id="bike0" x="21.889249" y="43.318111" angle="290.39" type="bike_bicycle" speed="1.58" pos="4.20" lane="115675457_0" slope="0.00"/>
51          <vehicle id="bike1" x="21.925491" y="43.316948" angle="353.00" type="bike_bicycle" speed="0.00" pos="1.70" lane="-328746445#1_0" slope="0.00"/>
52          <vehicle id="bus0" x="21.912534" y="43.308541" angle="23.25" type="bus_bus" speed="2.08" pos="15.20" lane="-115561388#2_0" slope="0.00"/>
53          <vehicle id="veh1" x="21.911361" y="43.309371" angle="354.06" type="veh_passenger" speed="1.58" pos="6.68" lane="-417228579#2_0" slope="0.00"/>
54          <vehicle id="veh2" x="21.936736" y="43.325089" angle="87.19" type="veh_passenger" speed="0.00" pos="5.10" lane="-251678541#0_0" slope="0.00"/>
55      </timestep>
56      <timestep time="3.00">
57          <vehicle id="bike0" x="21.889218" y="43.318120" angle="290.39" type="bike_bicycle" speed="2.70" pos="6.91" lane="115675457_0" slope="0.00"/>
58          <vehicle id="bike1" x="21.925490" y="43.316955" angle="353.00" type="bike_bicycle" speed="0.81" pos="2.51" lane="-328746445#1_0" slope="0.00"/>
59          <vehicle id="bike2" x="21.935313" y="43.328018" angle="356.79" type="bike_bicycle" speed="0.00" pos="1.70" lane="264474357#1_0" slope="0.00"/>
60          <vehicle id="bus0" x="21.912549" y="43.308567" angle="22.95" type="bus_bus" speed="3.19" pos="0.98" lane=":1305222046_6_0" slope="0.00"/>
61          <vehicle id="bus1" x="21.914518" y="43.321775" angle="210.94" type="bus_bus" speed="0.00" pos="0.73" lane="-302169818#2_0" slope="0.00"/>
62          <vehicle id="veh1" x="21.911357" y="43.309407" angle="354.06" type="veh_passenger" speed="3.96" pos="10.64" lane="-417228579#2_0" slope="0.00"/>
63          <vehicle id="veh2" x="21.936756" y="43.325089" angle="87.19" type="veh_passenger" speed="1.63" pos="6.73" lane="-251678541#0_0" slope="0.00"/>
64          <vehicle id="veh3" x="21.899504" y="43.322779" angle="63.50" type="veh_passenger" speed="0.00" pos="5.10" lane="624091858#1_0" slope="0.00"/>
65      </timestep>
66      <timestep time="4.00">
67          <vehicle id="bike0" x="21.889176" y="43.318132" angle="290.39" type="bike_bicycle" speed="3.63" pos="10.54" lane="115675457_0" slope="0.00"/>
68          <vehicle id="bike1" x="21.925488" y="43.316970" angle="353.00" type="bike_bicycle" speed="1.69" pos="4.20" lane="-328746445#1_0" slope="0.00"/>
69          <vehicle id="bike2" x="21.935312" y="43.328026" angle="356.79" type="bike_bicycle" speed="0.80" pos="2.50" lane="264474357#1_0" slope="0.00"/>
70          <vehicle id="bike3" x="21.923914" y="43.312855" angle="169.88" type="bike_bicycle" speed="0.00" pos="1.70" lane="624844117#0_0" slope="0.00"/>
71          <vehicle id="bus0" x="21.912564" y="43.308603" angle="20.44" type="bus_bus" speed="4.15" pos="5.13" lane=":1305222046_6_0" slope="0.00"/>
72          <vehicle id="bus1" x="21.914511" y="43.321767" angle="211.16" type="bus_bus" speed="1.07" pos="1.07" lane=":cluster_3064171594_3064171596_9659285540_>
73          <vehicle id="veh1" x="21.911350" y="43.309457" angle="354.06" type="veh_passenger" speed="5.57" pos="16.20" lane="-417228579#2_0" slope="0.00"/>
74          <vehicle id="veh2" x="21.936796" y="43.325090" angle="87.19" type="veh_passenger" speed="3.27" pos="10.00" lane="-251678541#0_0" slope="0.00"/>
75          <vehicle id="veh3" x="21.899523" y="43.322786" angle="63.50" type="veh_passenger" speed="1.76" pos="6.86" lane="624091858#1_0" slope="0.00"/>
76          <vehicle id="veh4" x="21.921844" y="43.310132" angle="342.92" type="veh_passenger" speed="0.00" pos="5.10" lane="-109749483#2_0" slope="0.00"/>
77      </timestep>
78      <timestep time="5.00">
79          <vehicle id="bike0" x="21.889122" y="43.318147" angle="290.39" type="bike_bicycle" speed="4.70" pos="15.23" lane="115675457_0" slope="0.00"/>
80          <vehicle id="bike1" x="21.925484" y="43.316994" angle="353.00" type="bike_bicycle" speed="2.65" pos="6.85" lane="-328746445#1_0" slope="0.00"/>
81          <vehicle id="bike2" x="21.935311" y="43.328041" angle="356.79" type="bike_bicycle" speed="1.71" pos="4.21" lane="264474357#1_0" slope="0.00"/>
82          <vehicle id="bike3" x="21.923915" y="43.312850" angle="169.88" type="bike_bicycle" speed="0.61" pos="2.31" lane="624844117#0_0" slope="0.00"/>
83          <vehicle id="bike4" x="21.922616" y="43.312471" angle="220.80" type="bike_bicycle" speed="0.00" pos="1.70" lane="058527517_0" slope="0.00"/>
Ln 1, Col 1  Spaces: 4  UTF-8  CRLF  XML  ⚙  ⚙  20
```

```
> Program Files (x86) > Eclipse > Sumo > tools > xml > nis_fcd_geo.csv
1 timestep;time;vehicle_angle;vehicle_id;vehicle_lane;vehicle_pos;vehicle_slope;vehicle_speed;vehicle_type;vehicle_x;vehicle_y
2 0.00;290.39;bike0;115675457_0;1.70;0.00;0.00;bike_bicycle;21.889278;43.318103
3 0.00;23.25;bus0;-115561388#2_0;12.10;0.00;0.00;bus_bus;21.912518;43.308515
4 1.00;290.39;bike0;115675457_0;2.62;0.00;0.92;bike_bicycle;21.889267;43.318106
5 1.00;23.25;bus0;-115561388#2_0;13.12;0.00;1.02;bus_bus;21.912523;43.308524
6 1.00;354.06;veh1;-417228579#_0;5.10;0.00;0.00;veh_passenger;21.911363;43.309357
7 2.00;290.39;bike0;115675457_0;4.20;0.00;1.58;bike_bicycle;21.889249;43.318111
8 2.00;353.00;bike1;-328746445#1_0;1.70;0.00;0.00;bike_bicycle;21.925491;43.316948
9 2.00;23.25;bus0;-115561388#2_0;15.20;0.00;2.08;bus_bus;21.912534;43.308541
10 2.00;354.06;veh1;-417228579#_0;6.68;0.00;1.58;veh_passenger;21.911361;43.309371
11 2.00;87.19;veh2;-251678541#0_0;5.10;0.00;0.00;veh_passenger;21.936736;43.325089
12 3.00;290.39;bike0;115675457_0;6.91;0.00;2.70;bike_bicycle;21.889218;43.318120
13 3.00;353.00;bike1;-328746445#1_0;2.51;0.00;0.81;bike_bicycle;21.925490;43.316955
14 3.00;356.79;bike2;264474357#1_0;1.70;0.00;0.00;bike_bicycle;21.935313;43.328018
15 3.00;22.95;bus0;:1305222046_6_0;0.98;0.00;3.19;bus_bus;21.912549;43.308567
16 3.00;210.94;bus1;:-302169818#2_0;0.73;0.00;0.00;bus_bus;21.914518;43.321775
17 3.00;354.06;veh1;-417228579#_0;10.64;0.00;3.96;veh_passenger;21.911357;43.309407
18 3.00;87.19;veh2;-251678541#0_0;6.73;0.00;1.63;veh_passenger;21.936756;43.325089
19 3.00;63.50;veh3;624091858#1_0;5.10;0.00;0.00;veh_passenger;21.899584;43.322779
20 4.00;290.39;bike0;115675457_0;10.54;0.00;3.63;bike_bicycle;21.889176;43.318132
21 4.00;353.00;bike1;-328746445#1_0;4.20;0.00;1.69;bike_bicycle;21.925488;43.316970
22 4.00;356.79;bike2;264474357#1_0;2.50;0.00;0.80;bike_bicycle;21.935312;43.328026
23 4.00;169.88;bike3;624844117#0_0;1.70;0.00;0.00;bike_bicycle;21.923914;43.312855
24 4.00;20.44;bus0;:1305222046_6_0;5.13;0.00;4.15;bus_bus;21.912564;43.308603
25 4.00;211.16;bus1;:cluster_3064171594_3064171596_9659285540_20_0;1.07;0.00;1.07;bus_bus;21.914511;43.321767
26 4.00;354.06;veh1;-417228579#2_0;16.20;0.00;5.57;veh_passenger;21.911350;43.309457
27 4.00;87.19;veh2;-251678541#0_0;10.00;0.00;3.27;veh_passenger;21.936796;43.325090
28 4.00;63.50;veh3;624091858#1_0;6.86;0.00;1.76;veh_passenger;21.899523;43.322786
29 4.00;342.92;veh4;-109749483#2_0;5.10;0.00;0.00;veh_passenger;21.921844;43.310132
30 5.00;290.39;bike0;115675457_0;15.23;0.00;4.70;bike_bicycle;21.889122;43.318147
31 5.00;353.00;bike1;-328746445#1_0;6.85;0.00;2.65;bike_bicycle;21.925484;43.316994
32 5.00;356.79;bike2;264474357#0_0;4.21;0.00;1.71;bike_bicycle;21.935311;43.328041
33 5.00;169.88;bike3;624844117#0_0;2.31;0.00;0.61;bike_bicycle;21.923915;43.312850
34 5.00;239.80;bike4;958527517#_0;1.70;0.00;0.00;bike_bicycle;21.903616;43.313471
35 5.00;13.01;bus0;:1305222046_6_0;10.03;0.00;4.90;bus_bus;21.912570;43.308647
36 5.00;211.57;bus1;:cluster_3064171594_3064171596_9659285540_20_0;3.06;0.00;1.99;bus_bus;21.914497;43.321752
37 5.00;354.06;veh1;-417228579#_0;24.02;0.00;7.82;veh_passenger;21.911342;43.309527
38 5.00;87.19;veh2;-251678541#0_0;15.04;0.00;5.04;veh_passenger;21.936858;43.325092
39 5.00;63.50;veh3;624091858#1_0;11.10;0.00;4.24;veh_passenger;21.899570;43.322803
40 5.00;342.92;veh4;-109749483#2_0;7.22;0.00;2.12;veh_passenger;21.921837;43.310150
41 5.00;357.46;veh5;251678537#0_0;5.10;0.00;0.00;veh_passenger;21.937082;43.325194
42 6.00;290.39;bike0;115675457_0;20.70;0.00;5.47;bike_bicycle;21.889059;43.318165
43 6.00;353.00;bike1;-328746445#1_0;10.23;0.00;3.38;bike_bicycle;21.925480;43.317024
44 6.00;356.79;bike2;264474357#1_0;6.73;0.00;2.52;bike_bicycle;21.935310;43.328064
45 6.00;169.88;bike3;624844117#0_0;4.07;0.00;1.76;bike_bicycle;21.923919;43.312834
46 6.00;239.80;bike4;958527517#_0;2.32;0.00;0.62;bike_bicycle;21.903609;43.313468
47 6.00;2.82;bus0;-115561399_0;3.04;0.00;5.98;bus_bus;21.912570;43.308701
48 6.00;212.19;bus1;:cluster_3064171594_3064171596_9659285540_20_0;6.06;0.00;3.00;bus_bus;21.914477;43.321730
```

GENERISANI SUMO  
PODACI - FCD GEO  
OUTPUT KONVERTOVAN  
U CSV UZ  
POMOĆ XML2CSV.PY DA  
BI SE MOGAO  
IMPORTOVATI U  
POSTGRESQL

# POPUNJENA BAZA PREGLED U PGADMIN4

The screenshot shows the pgAdmin 4 interface. At the top, there's a toolbar with various icons for dashboard, properties, SQL, statistics, dependencies, dependents, processes, and a connection to 'public.nis\_fcd/nis/postgres@PostgreSQL 15'. Below the toolbar is a sub-toolbar with icons for file operations, zoom, and search, followed by a dropdown set to '100 rows'.

The main area has tabs for 'Query' (which is selected) and 'Scratch Pad'. Under 'Query', there's a code editor containing the following SQL:

```
1 SELECT * FROM public.nis_fcd
2 LIMIT 100
3
```

Below the code editor is a 'Data Output' tab. The data is presented in a table with 58 rows and 13 columns. The columns are:

	timestep_time	vehicle_angle	vehicle_id	vehicle_lane	vehicle_pos	vehicle_slope	vehicle_speed	vehicle_type	vehicle_x	vehicle_y	
33		5	239.8	bike4	958527517_0	1.7	0	bike_bicycle	21.903616	43.313473	
34		5	13.01	bus0	:1305222046_6_0	10.03	0	bus_bus	21.91257	43.308647	
35		5	211.57	bus1	:cluster_3064171594_3064171596_9659285540_20_0	3.06	0	bus_bus	21.914497	43.32175	
36		5	354.06	veh1	-417228579#2_0	24.02	0	veh_passenger	21.911343	43.30953	
37		5	87.19	veh2	-251678541#0_0	15.04	0	veh_passenger	21.936857	43.325092	
38		5	63.5	veh3	624091858#1_0	11.1	0	veh_passenger	21.89957	43.322803	
39		5	342.92	veh4	-109749483#2_0	7.22	0	veh_passenger	21.921837	43.31015	
40		5	357.46	veh5	251678537#0_0	5.1	0	veh_passenger	21.937082	43.325195	
41		6	290.39	bike0	115675457_0	20.7	0	bike_bicycle	21.88906	43.318165	
42		6	353	bike1	-328746445#1_0	10.23	0	bike_bicycle	21.92548	43.317024	
43		6	356.79	bike2	264474357#1_0	6.73	0	bike_bicycle	21.93531	43.328064	
44		6	169.88	bike3	624844117#0_0	4.07	0	bike_bicycle	21.92392	43.312836	
45		6	239.8	bike4	958527517_0	2.32	0	bike_bicycle	21.903608	43.31347	
46		6	2.82	bus0	-115561390_0	3.04	0	bus_bus	21.91257	43.3087	
47		6	212.19	bus1	:cluster_3064171594_3064171596_9659285540_20_0	6.06	0	bus_bus	21.914476	43.32173	
48		6	282.44	bus2	-195781839#5_0	12.1	0	bus_bus	21.93347	43.309597	
49		6	354.85	veh1	-417228579#2_0	34.05	0	veh_passenger	21.911331	43.309616	
50		6	87.19	veh2	-251678541#0_0	22.07	0	veh_passenger	21.936945	43.325092	
51		6	63.5	veh3	624091858#1_0	17.3	0	veh_passenger	21.89964	43.322826	
52		6	342.92	veh4	-109749483#2_0	11.77	0	veh_passenger	21.921822	43.31019	
53		6	357.46	veh5	251678537#0_0	6.53	0	veh_passenger	21.93708	43.325207	
54		6	211.46	veh6	108942988#4_0	5.1	0	veh_passenger	21.91994	43.314823	
55		7	290.39	bike0	115675457_0	26.45	0	bike_bicycle	21.888992	43.318184	
56		7	300.51	bike1	-328746445#1_0	14.35	0	bike_bicycle	21.925451	43.31705	
57		7	356.79	bike2	264474357#1_0	10.33	0	bike_bicycle	21.935308	43.328094	
58		7	169.88	bike3	624844117#0_0	6.88	0	bike_bicycle	21.923925	43.31281	

At the bottom left, it says 'Total rows: 100 of 100' and 'Query complete 00:00:00.119'. At the bottom right, it says 'Ln 1, Col 1'.

# Format podataka

- Podaci ne sadrže timestamp, vec timestep, imaginarni trenutak u vremenu, a ne konkretno vreme
- Lokacija se pamti kao Lat i Lon, a ne kao geom, odnosno way
- Prilikom pisanja upita, potrebno je Lat i Lon transformisati u geom uz pomoć ST\_MakePoint

# PRIKAZ PUTEVA GDE JE BRZINA SA OBRAĆAJA VEĆA OD 10 U MOMENTU U VREMENU 1000



## Map Legend

 Administrative Boundaries <a href="#">Show Layer</a>	 Buildings <a href="#">Show Layer</a>	 Roads <a href="#">Remove Layer</a>	 Education <a href="#">Show Layer</a>	 Parks <a href="#">Show Layer</a>	 Commercial <a href="#">Show Layer</a>	 Water <a href="#">Show Layer</a>
Filter this layer where <input type="radio"/> Name is <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name <input type="radio"/> Type is <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name <input type="radio"/> Surface is <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name <input type="radio"/> Type is <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name is <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name <input type="radio"/> Type is <input type="button" value="Filter Layer"/>	Filter this layer where <input type="radio"/> Name is <input type="button" value="Filter Layer"/>

Find all education within a meter radius from street/road named

Find streets with most traffic where speed is greater than 10 m/s and in time moment (0 to 2206) 1000