

PedMad

Madrid Pedestrian Zone-Stratified Time-Based Tracking

By:

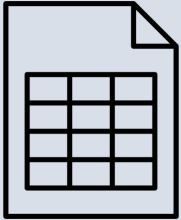
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Francisco Madrigal Puertas
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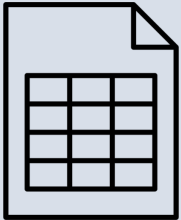
1. Dataset
2. Ontology
3. RML mapping and RDF generation
4. Apache Fuseki
5. Application Demo

1.1 Initial dataset



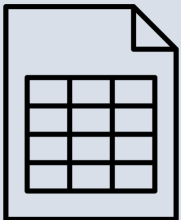
PEATONES-2021-updated.csv

Dataset about the number of pedestrians in the different areas of Madrid



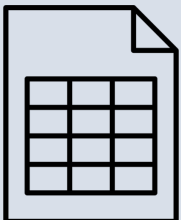
Distritos.csv

Dataset about the different areas of Madrid



AirPollution.csv

Problem: Too complex, incongruencies with stored data in the pedestrians observations



Bicicletas.csv

Problem: High storage cost

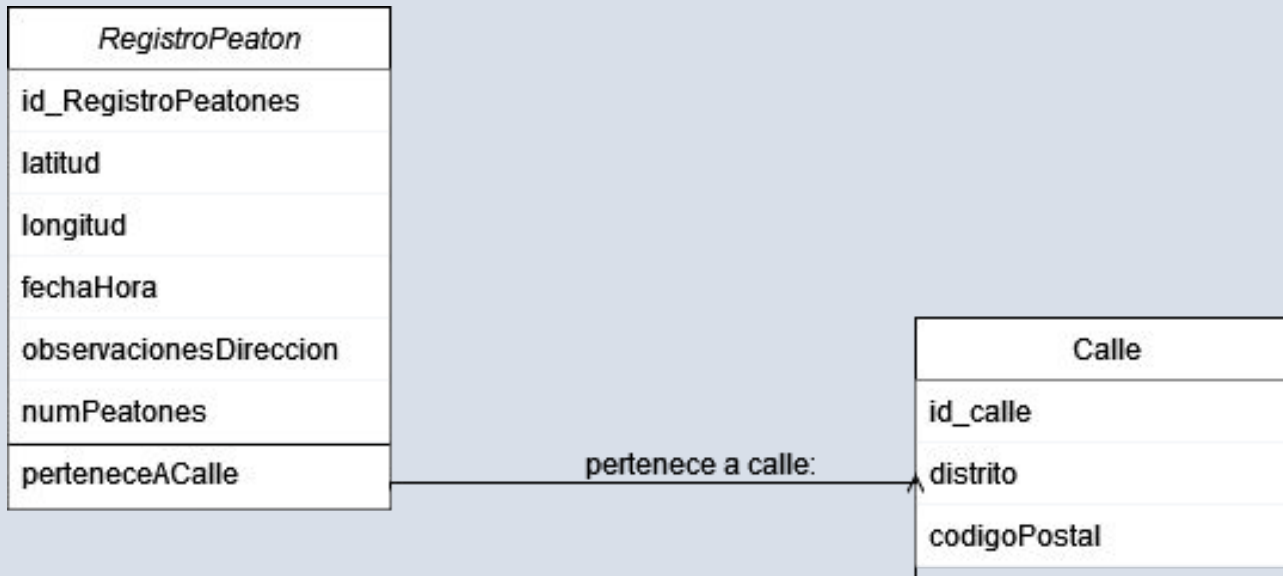
1.2 Final dataset

▼ All	▼ id_registroPeatones	▼ calle	▼ numPeatones	▼ fechaHora	▼ distrito	▼ codigoPostal	▼ observacionesDireccion	▼ latitud	▼ longitud
☆ ↻ 1.	PERM_PEA02_PM012021-01-01T00:00Z	calle de Fuencarral Choose new match	110	2021-01-01T00:00:00Z	Centro Choose new match	28004	Calle_Peatonal	40.42200905	-3.700891722
☆ ↻ 2.	PERM_PEA03_PM012021-01-01T00:00Z	San Bernardo street Choose new match	111	2021-01-01T00:00:00Z	Centro Choose new match	28015	Acera_Pares	40.42380314	-3.707379398
☆ ↻ 3.	PERM_PEA04_PM012021-01-01T00:00Z	calle de Hortaleza Choose new match	15	2021-01-01T00:00:00Z	Centro Choose new match	28004	Acera_Pares	40.42107227	-3.70049043
☆ ↻ 4.	PERM_PEA05_PM012021-01-01T00:00Z	Carrera de San Jerónimo Choose new match	44	2021-01-01T00:00:00Z	Centro Choose new match	28014	Acera_Pares	40.41664098	-3.701246554
☆ ↻ 5.	PERM_PEA06_PM012021-01-01T00:00Z	Calle de Atocha Choose new match	49	2021-01-01T00:00:00Z	Centro Choose new match	28012	Acera_Impares	40.41110888	-3.696471467
☆ ↻ 6.	PERM_PEA07_PM012021-01-01T00:00Z	Calle Mayor Choose new match	26	2021-01-01T00:00:00Z	Centro Choose new match	28013	Acera_Impares	40.41637598	-3.706029098
☆ ↻ 7.	PERM_PEA08_PM012021-01-01T00:00Z	Gran Vía Choose new match	32	2021-01-01T00:00:00Z	Centro Choose new match	28013	Acera_Pares	40.4202703	-3.704325575
☆ ↻ 8.	PERM_PEA08_PM022021-01-01T00:00Z	Gran Vía Choose new match	95	2021-01-01T00:00:00Z	Centro Choose new match	28013	Acera_Impares	40.42015321	-3.70435898
☆ ↻ 9.	PERM_PEA09_PM012021-01-01T00:00Z	Paseo de Recoletos Choose new match	23	2021-01-01T00:00:00Z	Centro Choose new match	28001	Acera_Pares	40.41990798	-3.692363251
☆ ↻ 10.	PERM_PEA10_PM012021-01-01T00:00Z	calle de Génova Choose new match	46	2021-01-01T00:00:00Z	Chamberí Choose new match	28004	Acera_Pares	40.42695341	-3.69448847

1.3 Reconciliation

▼ All	▼ id_registroPeatones	▼ calle	▼ numPeatones	▼ fechaHora	▼ distrito	▼ codigoPostal	▼ observacionesDireccion	▼ latitud	▼ longitud
☆	1.	PERM_PEA02_PM012021-01-01T00:00Z	calle de Fuencarral						
		Choose new match							
☆	2.	PERM_PEA03_PM012021-01-01T00:00Z	San Bernardo street						
		Choose new match							
☆	3.	PERM_PEA04_PM012021-01-01T00:00Z	calle de Hortaleza						
		Choose new match							
☆	4.	PERM_PEA05_PM012021-01-01T00:00Z	Carrera de San Jer						
		Choose new match							
☆	5.	PERM_PEA06_PM012021-01-01T00:00Z	Calle de Atocha	49	2021-01-01T00:00:00Z	Centro	Acera_Impares	40.41110888	-3.696471467
		Choose new match							
☆	6.	PERM_PEA07_PM012021-01-01T00:00Z	Calle Mayor	26	2021-01-01T00:00:00Z	Centro	Acera_Impares	40.41637598	-3.706029098
		Choose new match							
☆	7.	PERM_PEA08_PM012021-01-01T00:00Z	Gran Vía	32	2021-01-01T00:00:00Z	Centro	Acera_Pares	40.4202703	-3.704325575
		Choose new match							
☆	8.	PERM_PEA08_PM022021-01-01T00:00Z	Gran Vía	95	2021-01-01T00:00:00Z	Centro	Acera_Impares	40.42015321	-3.70435898
		Choose new match							
☆	9.	PERM_PEA09_PM012021-01-01T00:00Z	Paseo de Recoletos	23	2021-01-01T00:00:00Z	Centro	Acera_Pares	40.41990798	-3.692363251
		Choose new match							
☆	10.	PERM_PEA10_PM012021-01-01T00:00Z	calle de Génova	46	2021-01-01T00:00:00Z	Chamberí	Acera_Pares	40.42695341	-3.69448847
		Choose new match							
☆	11.	PERM_PEA11_PM012021-01-01T00:00Z	Calle de las Huertas, Madrid	11	2021-01-01T00:00:00Z	Centro	Calle_Peatonal	40.41338702	-3.697740186
		Choose new match							
☆	12.	PERM_PEA12_PM012021-01-01T00:00Z	Madrid Río	21	2021-01-01T00:00:00Z	Latina	Calle_Peatonal	40.41373441	-3.723947718
		Choose new match							
☆	13.	PERM_PEA13_PM012021-01-01T00:00Z	Princesa	223	2021-01-01T00:00:00Z	Moncloa-Aravaca	Acera_Impares	40.42479893	-3.712094845
		Choose new match							
☆	14.	PERM_PEA14_PM012021-01-01T00:00Z	Calle de Alberto Aguilera	77	2021-01-01T00:00:00Z	Chamberí	Acera_Pares	40.43046926	-3.713297939
		Choose new match							
☆	15.	PERM_PEA15_PM012021-01-01T00:00Z	Calle de Toledo	505	2021-01-01T00:00:00Z	Centro	Acera_Impares	40.41289138	-3.707464267
		Choose new match							
☆	16.	PERM_PEA16_PM012021-01-01T00:00Z	Plaza del Emperador Carlos V	30	2021-01-01T00:00:00Z	Arganzuela	Acera_Impares	40.409118	-3.692441
		Choose new match							
☆	17.	PERM_PEA17_PM012021-01-01T00:00Z	Ronda de Valencia	96	2021-01-01T00:00:00Z	Arganzuela	Acera_Pares	40.405367	-3.701798
		Choose new match							
☆	18.	PERM_PEA18_PM012021-01-01T00:00Z	Alcalá Street	221	2021-01-01T00:00:00Z	Centro	Acera_Pares	40.418256	-3.697732
		Choose new match							
☆	19.	PERM_PEA19_PM012021-01-01T00:00Z	Calle Bailén	7	2021-01-01T00:00:00Z	Centro	Acera_Pares	40.415111	-3.713569
		Choose new match							
☆	20.	PERM_PEA02_PM012021-01-01T04:00Z	calle de Fuencarral	139	2021-01-01T04:00:00Z	Centro	Calle_Peatonal	40.42200905	-3.700891722
		Choose new match							
☆	21.	PERM_PEA03_PM012021-01-01T04:00Z	San Bernardo street	12	2021-01-01T04:00:00Z	Centro	Acera_Pares	40.42380314	-3.707379398
		Choose new match							
☆	22.	PERM_PEA04_PM012021-01-01T04:00Z	calle de Hortaleza	6	2021-01-01T04:00:00Z	Centro	Acera_Pares	40.42107227	-3.70049043

2.1 Ontology



2.1 Ontology Example

```
# Instance Registro Peatones
<rec:registroPeatones/PERM_PEA02_PM012021-01-01T00:00Z>
  rdf:type owl:registroPeatones ;
  :id_registroPeatones "PERM_PEA02_PM012021-01-01T00:00Z" ;
  :latitud 40.42200905 ;
  :longitud -3.700891722 ;
  :fechaHora "2021-01-01T00:00:00Z" ;
  :observacionesDireccion "Calle peatonal" ;
  :numPeatones 110 ;
  :perteneceACalle <rec:Calle/Calle Fuencarral> .

# Instance Calle
<rec:Calle/Calle Fuencarral>
  rdf:type owl:Calle;
  :id_calle "Calle Fuencarral" ;
  :distrito "Centro" ;
  :codigoPostal 28004 .
```

3. RML mapping and RDF generation

```
@prefix rr: <http://www.w3.org/ns/r2rml#>.
@prefix rml: <http://semweb.mmlab.be/ns/rml#>.
@prefix ql: <http://semweb.mmlab.be/ns/ql#>.
@prefix xsd: <http://www.w3.org/2001/XMLSchema#>.
@prefix gn: <https://www.geonames.org/ontology#> .
@prefix registro: <http://opendataandkg.org/group06/ontology/registroPeatones#> .
@prefix calle: <http://opendataandkg.org/group06/ontology/calle#> .
@prefix dc: <http://purl.org/dc/elements/1.1/> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix esCalle: <http://vocab.linkeddata.es/datosabiertos/def/urbanismo-infraestructuras/callejero#Via> .
@prefix esCodPostal: <http://vocab.linkeddata.es/datosabiertos/def/urbanismo-infraestructuras/direccion-postal#DireccionPostal> .
@prefix eslat: <http://www.w3.org/2003/01/geo/wgs84_pos#lat> .
@prefix eslong: <http://www.w3.org/2003/01/geo/wgs84_pos#long> .
@prefix esFechaHora: <http://def.seegrid.csiro.au/isotc211/iso19115/2003/dataquality#dateTime> .
@prefix esDist: <http://www.w3.org/ns/locn#Address> .
@prefix gtfs: <http://vocab.gtfs.org/gtfs.ttl#> .
@base <http://opendataandkg.org/group06/ontology#> .

<#TriplesMapRegistroPeaton> a rr:TriplesMap;
  rml:logicalSource [
    rml:source "PEATONES-2021-updated.csv" ;
    rml:referenceFormulation ql:CSV
  ];

  rr:subjectMap [
    rr:template "http://opendataandkg.org/group06/ontology/registroPeatones/resource/{id_registroPeatones}";
    rr:class gn:RegistroPeatones;
  ];

  rr:predicateObjectMap [
    rr:predicate gn:perteneceACalle;
    rr:objectMap [
      rr:template "http://opendataandkg.org/group06/ontology/calle/resource/{calle}";
      rr:termType rr:IRI;
    ]
  ];

  rr:predicateObjectMap [
    rr:predicate esFechaHora:fechaHora;
    rr:objectMap [
      rml:reference "fechaHora";
      rr:datatype xsd:dateTime
    ]
  ];
```


4. Upload with Fuseki

Apache Jena Fuseki datasets manage help server status

Apache Jena Fuseki
Version 4.10.0. Uptime 1h 13m 55s

Filter datasets Clear

name	actions
/Pedmad	query add data edit info

« 1 »

/Pedmadbueno/sparql JSON Turtle

```

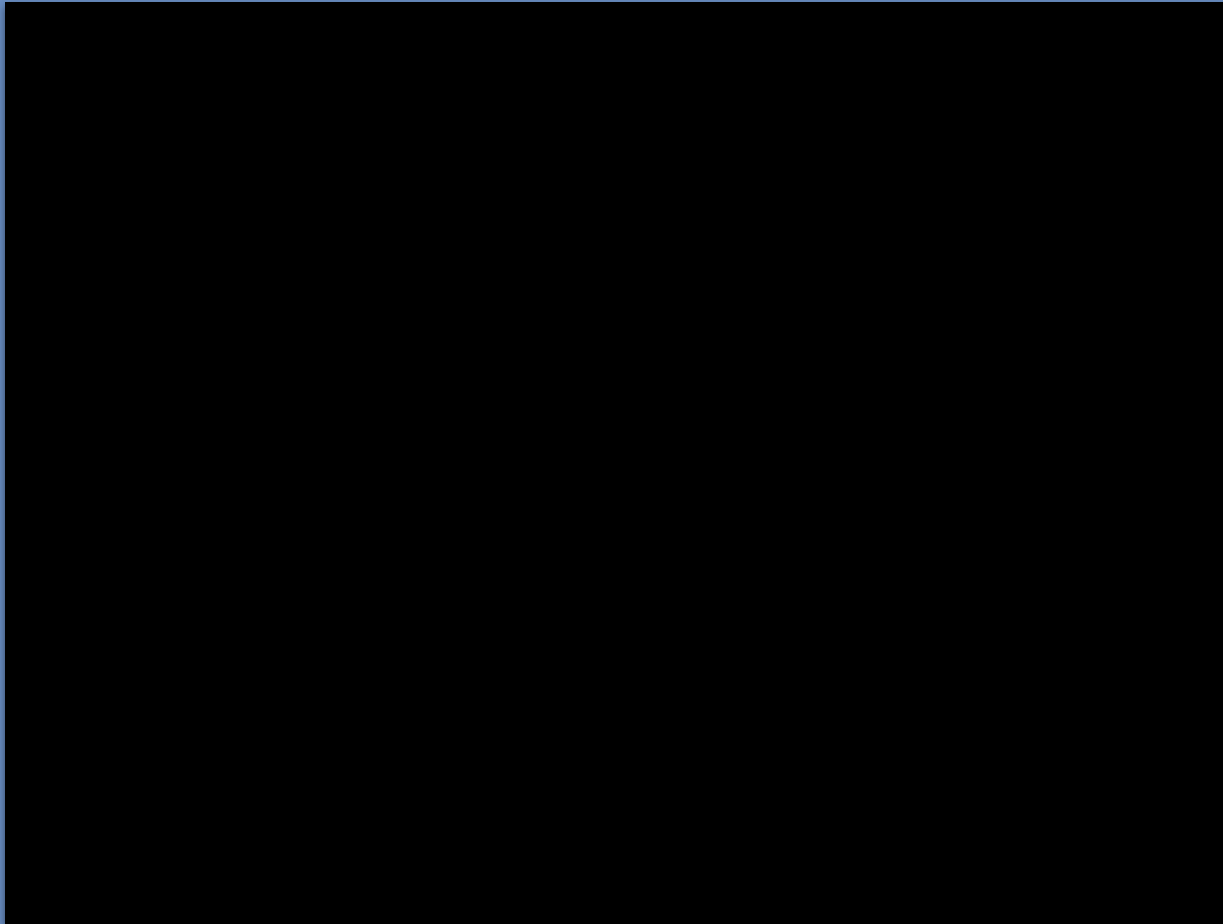
1 PREFIX es: <http://eulerssharp.sourceforge.net/2003/03swap/log-rules#>
2 PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
3 PREFIX gn: <https://www.geonames.org/ontology#>
4 prefix esFechaHora: <http://def.seegrid.csiro.au/isotc211/iso19115/2003/dataquality#dateTime>
5 prefix esCalle: <http://vocab.linkeddata.es/datosabiertos/def/urbanismo-infraestructuras/callejero#Via>
6
7 SELECT ?calle ?calleWikidata (avg(?numPeatonos) as ?SumaPeatonos)
8 WHERE {
9   ?pedestrianRecord gn:numPeatonos ?numPeatonos .
10  ?pedestrianRecord gn:perteneceACalle ?calle.
11  ?pedestrianRecord esFechaHora:fechaHora ?fechahora.
12  ?calle esCalle:same_as_wikidata_calle ?calleWikidata
13  filter(?fechahora = "2021-12-06T20:00:00Z"^^xsd:dateTime).
14  filter(?calle =<http://opendataandkg.org/group06/ontology/calle/resource/Paseo%20de%20Recoletos>).
15 }
16 group by ?calle ?calleWikidata
  
```

Table Response 1 result in 0.06 seconds

Simple view ☐ Ellipse ☒ Filter query results Page size: 50

calle	calleWikidata	SumaPeatonos
<http://opendataandkg.org/group06/ontology/calle/resource/Paseo%20de%20Recoletos>	<https://www.wikidata.org/wiki/Q255087...>	"149.0"^^<http://www.w3.org/2001/XMLSchema#flo...

5. Application demo



Thank you for listening!

Any questions?

