

Databases Autumn 2020

Data Analysis Project P1: Schema Integration

*Visualizing Traffic density data and comparing them
to air pollution- and meteorological data in Basel,
London and Los Angeles*

December 3, 2020

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1 Entities and their attributes

We will specify the entities in their as is state and provide an exemplary tuple for each entity.

1.1 UTD19

Entitiy: UTD 19	Example
Attributes: <u>Day</u>	2017-05-06
<u>Interval</u>	0
<u>City</u>	augsburg
Detid	06.X-2li
Flow	12
Occupancy	0
Error	1
Speed	<Null>

Exemplary Tuple, in order of the Table above:

1.2 Detectors

Detectors	Example
<u>detid</u>	U1-52G
length	0.1960.
pos	0.0055
fclass	secondary
road	Gögginger Straße
limit	50
citycode	augsburg
lanes	1
linkid	72
long	10.8895527
lat	48.359957

1.3 Links

Links	Example
long	10.8910158
lat	48.3610789
<u>order</u>	1
piece	1
<u>linkid</u>	0
group	0.1
<u>citycode</u>	augsburg

Links (10.8910158,48.3610789,1,1,0,0.1,augsburg)

1.4 Air quality Basel Feldbergstrasse

AQ Basel Feldbergstrasse	Example
<u>Location</u>	Basel
<u>Datum/Zeit</u>	2001-04-24T05:00:00+00:00
timestamp text	2001-04-24 06:00:00
PM10 (Stundenmittelwerte [$\mu\text{g}/\text{m}^3$])	33.624
PM2.5 (Stundenmittelwerte [$\mu\text{g}/\text{m}^3$])	17.911
NO2 (Stundenmittelwerte [$\mu\text{g}/\text{m}^3$])	34.481
geo point 2d	47.5670167,7.5925446

1.5 Air quality Basel St. Johannisplatz

AQ Basel St Johannisplatz	Example
<u>Location</u>	Basel
<u>Datum/Zeit</u>	2015-09-15T07:00:00+00:00
timestamp text	2015-09-15 08:00:00
PM10 (Stundenmittelwerte [$\mu\text{g}/\text{m}^3$])	9.091
PM2.5 (Stundenmittelwerte [$\mu\text{g}/\text{m}^3$])	1.425
NO2 (Stundenmittelwerte [$\mu\text{g}/\text{m}^3$])	3.892
geo point 2d	47.5659354,7.58192

Exemplary Tuple, in order of the Table above:

AQ Basel Feldbergstrasse (2015-09-15T07:00:00+00:00,2015-09-15 08:00:00,9.091,,3.892,"47.5659354,7.58192"))

1.6 Air quality Basel Chrischona

AQ Basel Chrischona	Example
<u>Location</u>	Basel
<u>Datum/Zeit</u>	2003-06-04T03:00:00+00:00
timestamp text	2003-06-04T04:00:00+00:00
O3 (Stundenmittelwerte [$\mu\text{g}/\text{m}^3$])	114.265
geo point 2d	47.5717,7.6870833

1.7 Air quality London

As all the subfiles need to be downloaded for one site at a time from London Air: <https://www.londonair.org.uk/london/asp/datadownload.asp> but all have the same format, we will list one example for London upper Thames street.

AQ London upper thames street	Example
<u>Location</u>	London
<u>Site</u>	CT8
<u>Species</u>	PM10
<u>ReadingDateTime</u>	01/01/2015 00:00
<u>Value</u>	44
<u>Units</u>	ug/m3
<u>Provisional or Ratified</u>	R

1.8 Air Quality Los Angeles

AQ US hourly	Example
State Code	1
County Code	3
Site Num	10
Parameter Code	44201
POC	1
Latitude	30.497477999999997
Longitude	-87.880258
Datum	NAD83
Parameter Name	Ozone
Date Local	2017-03-01
Time Local	04:00
Date GMT	2017-03-01
Time GMT	10:00
Sample Measurement	0.022000000000000002
Units of Measure	Parts per million
MDL	0.005
Uncertainty	
Method Type	FEM
Method Code	87
Method Name	INSTRUMENTAL - ULTRA VIOLET ABSORPTION
State Name	Alabama
County Name	Baldwin
Date of Last Change	2017-05-18

1.9 weather Basel

weather Basel	Example
City Name	Basel
timestamp	20101020T0000
Basel Temperature [2 m elevation corrected]	8.190529
Basel Relative Humidity [2 m]	87.0
Basel Mean Sea Level Pressure [MSL]	1009
Basel Precipitation Total	0.0
Basel Snowfall Amount	0.0
Basel Cloud Cover Total	100.0
Basel Cloud Cover High [high cld lay]	0.0
Basel Cloud Cover Medium [mid cld lay]	100.0
Basel Cloud Cover Low [low cld lay]	100.0
Basel Wind Speed [10 m]	29.519999
Basel Wind Direction [10 m]	16.179985

1.10 weather London, Los Angeles (Same format two different CSV files)

weather London, Los Angeles	Example
<u>City Name</u>	London or LA (depending on file)
<u>date</u>	2008-07-01
<u>time</u>	0
tempC	17
windspeedKmph	1
weatherDesc	Clear
precipMM	0
precipInches	0
humidity	71
pressureMB	1013
pressureInches	30
cloudcover	0
DewPointC	16
WindChillC	21
FeelsLikeC	21

1.11 Basel MVI)

Basel MVI	Example
<u>SiteCode</u>	235
SiteName	235 A3-A35
<u>DirectionName</u>	von Frankreich
<u>LaneCode</u>	1
LaneName	Spur 1
<u>Date</u>	21.08.2014
<u>TimeFrom</u>	01:00
<u>TimeTo</u>	02:00
ValuesApproved	-
ValuesEdited	-
TrafficType	MIV
Total	58
MR	58
PW	0
'PW+'	0
Lief	0
'Lief+'	0
'Lief+Aufl.'	0
LW	0
'LW+'	0
Sattelzug	0
Bus	0
andere	0
DateTimeFrom	2014-08-21 00:00:00+00:00
DateTimeTo	2014-08-21 01:00:00+00:00
Year	2014
Month	8
Day	21
Weekday	3
HourFrom	1

2 ER-Diagram

This section present the ER Diagramms of the integrated data.

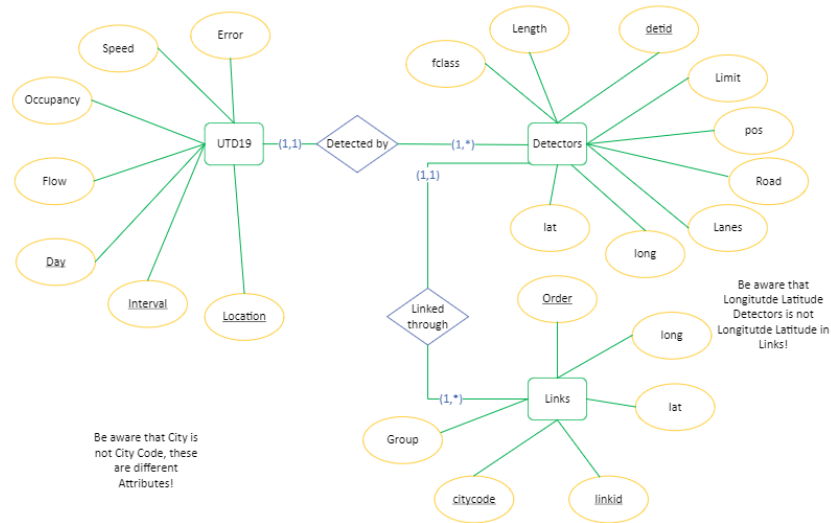


Figure 1: ER Diagramm of the utd19 traffic data

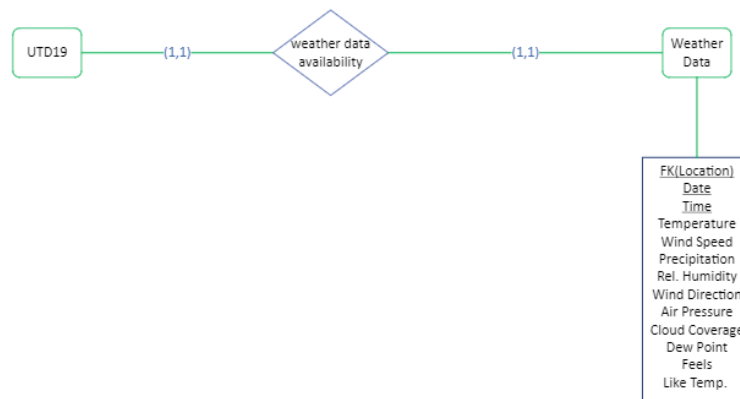


Figure 2: ER Diagramm of the weather datas. All attributes are written in a box for ease of read

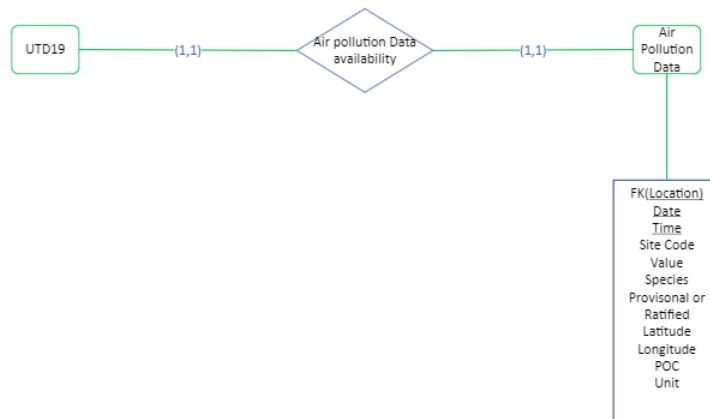


Figure 3: ER Diagramm of the air pollution datas. All attributes are written in a box for ease of read

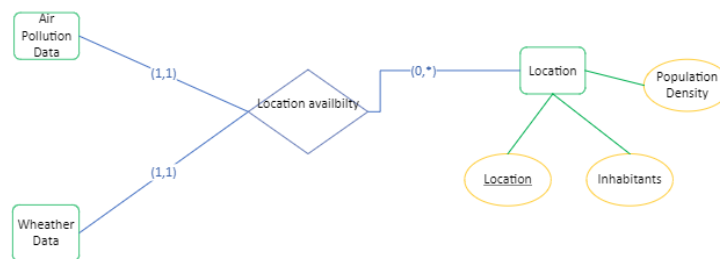


Figure 4: ER Diagramm of the location data

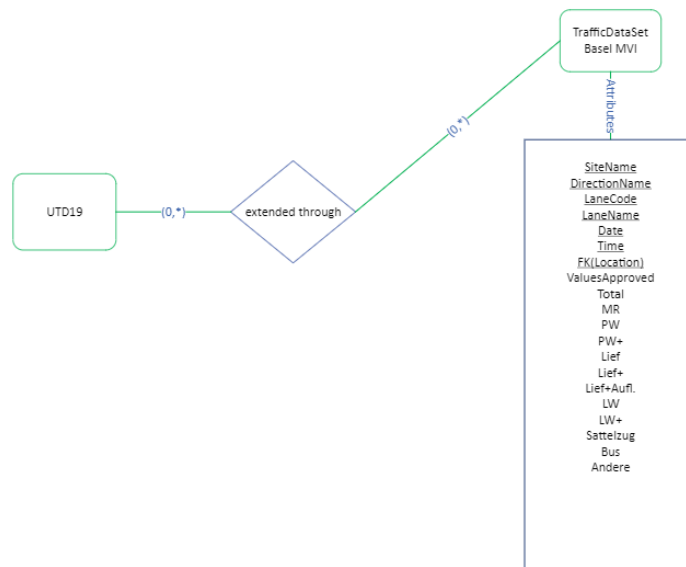


Figure 5: ER Diagramm of an additional traffic data source

3 logical scheme

UTD19	(<u>Day</u> , <u>Interval</u> , <u>DetID</u> , <u>Location</u> , Flow, Occupancy, Speed)
Detectors	(<u>DetID</u> , <u>LinkID</u> , <u>City Code</u> , Length, Road, Speed Limit, Position, Lanes, Longitude, Latitude)
Links	(<u>LinkID</u> , <u>City Code</u> , Order, Latitude, Longitude, Group)
Weather Data	(<u>Date</u> , <u>Time</u> , <u>CityName</u> , <u>Location</u> , Temperature, Wind Speed, Precipitation, Rel Humidity, Wind Direction, Air pressure, Cloud Coverage, Dew Point, Feels Like Temp.)
Air Pollution Data	(<u>Date</u> , <u>Time</u> , <u>Site Code</u> , <u>Location</u> , SO2 Value, NO Value, NO2 Value, CO Value, O3 Value, Latitude, Longitude, POC, Unit)
Basel MVI	(<u>Location</u> , <u>Interval</u> , <u>Day</u> , <u>SiteName</u> , <u>DirectionName</u> , <u>LaneCode</u> , <u>LaneName</u> , <u>Date</u> , TimeFrom, Time To, DateTimeFrom, DateTimeTo, Year, ValuesApproved, ValuesEdited, Total, MR, PW, PW+, Lief, Lief+, Lief+Aufl., LW, LW+, Sattelzug, Bus, Andere)
Location	(<u>Location</u> , Inhabitants, Population Density)