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

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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: Day	2017-05-06
Interval	0
City	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
detid	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
order	1
piece	1
linkid	0
group	0.1
citycode	augsburg

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

1.4 Air quality Basel Feldbergstrasse

AQ Basel Feldbergstrassse	Example
Location	Basel
Datum/Zeit	2001-04-24T05:00:00+00:00
timestamp text	2001-04-24 06:00:00
PM10 (Stundenmittelwerte [µg/m³])	33.624
PM2.5 (Stundenmittelwerte [µg/m³])	17.911
NO2 (Stundenmittelwerte [µg/m³])	34.481
geo point 2d	47.5670167,7.5925446

1.5 Air quality Basel St. Johannsplatz

AQ Basel St Johannsplatz	Example
Location	Basel
Datum/Zeit	2015-09-15T07:00:00+00:00
timestamp text	2015-09-15 08:00:00
PM10 (Stundenmittelwerte [µg/m³])	9.091
PM2.5 (Stundenmittelwerte [µg/m³])	1.425
NO2 (Stundenmittelwerte [µg/m³])	3.892
geo point 2d	47.5659354,7.58192

Exemplary Tuple, in order of the Table above:

AQ Basel Feldbergstrassse (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
Location	Basel
Datum/Zeit	2003-06-04T03:00:00+00:00
timestamp text	2003-06-04T04:00:00+00:00
O3 (Stundenmittelwerte [µg/m³])	114.265
geo point 2d	47.5717,7.6870833

1.7 Air qualitiy 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
Location	London
Site	CT8
Species	PM10
ReadingDateTime	01/01/2015 00:00
Value	44
Units	ug/m3
Provisional or Ratified	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
City Name	London or LA (depending on file)
date	2008-07-01
time	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
SiteCode	235
SiteName	235 A3-A35
DirectionName	von Frankreich
LaneCode	1
LaneName	Spur 1
Date	21.08.2014
TimeFrom	01:00
TimeTo	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.

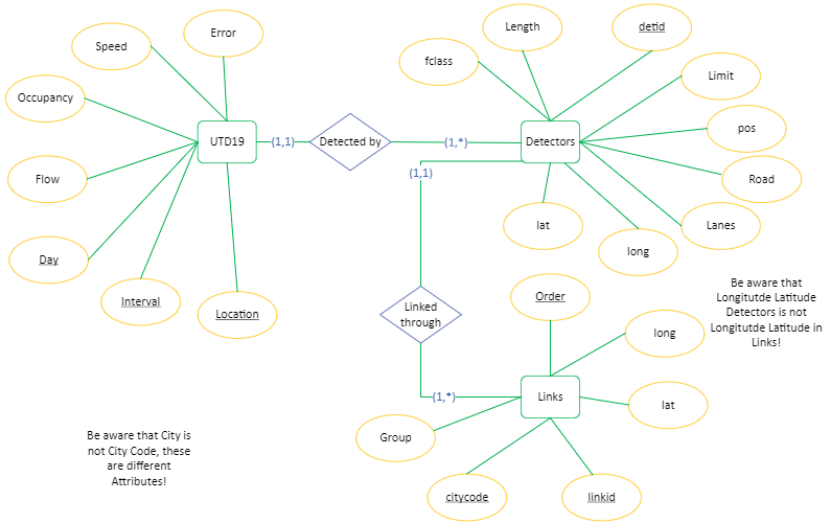

Figure 1: ER Diagramm of the utd19 traffic data

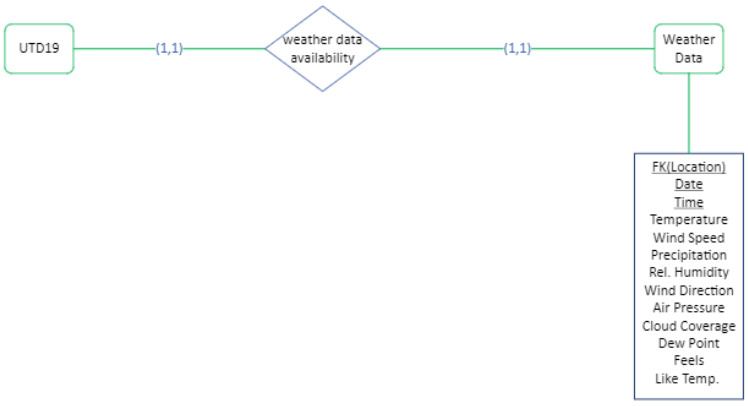

Figure 2: ER Diagramm of the weather datas. All attributes are written in a box for ease of read

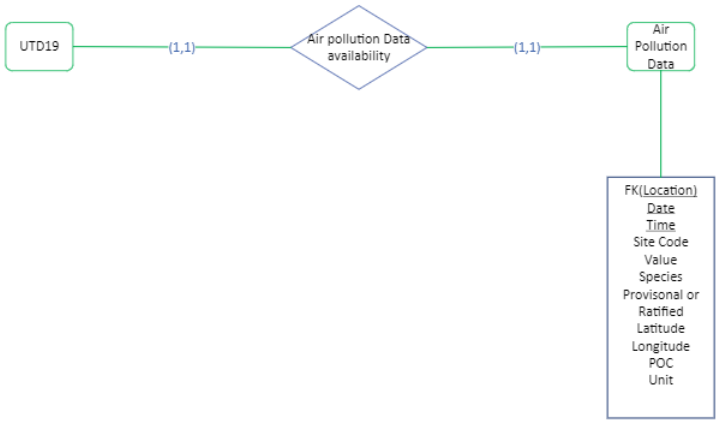

Figure 3: ER Diagramm of the air pollution datas. All attributes are written in a box for ease of read

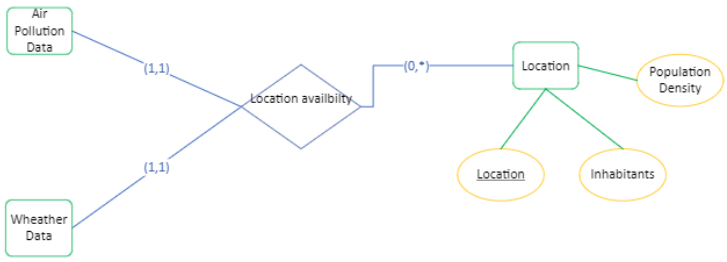

Figure 4: ER Diagramm of the location data

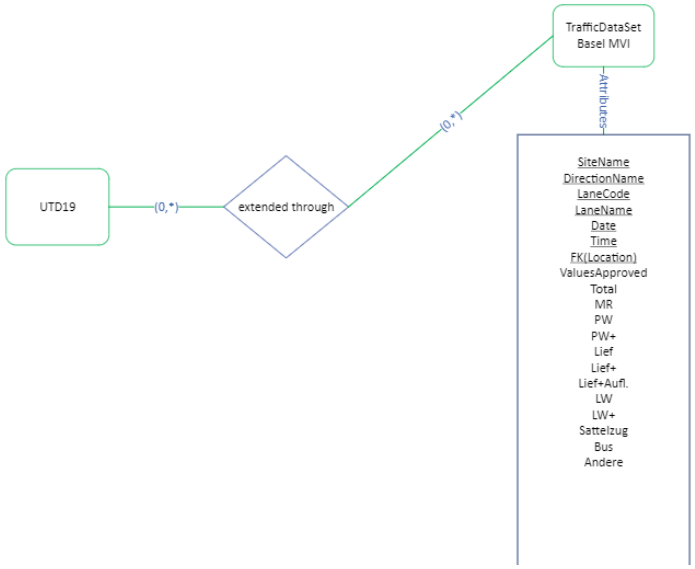

Figure 5: ER Diagramm of an additional traffic data source

3 logical scheme

UTD19	(Day, Interval, City, DetID, Flow, Occupancy, Speed)
Detectors	(DetID, LinkID, City Code, Length, Road, Speed Limit, Position, Lanes, Longitude, Latitude)
Links	(LinkID, City Code,Order, Latitude, Longitude, Group)
Weather Data	(Date, Time, CityName, Day, Interval, City, Cloud Cover, Temperature, Rel Humidity, Precipitation, Wind Speed)
W. D. Basel	(Date, Time, CityName, Day, Interval, City,Wind Direction, Cloud Cover low, Cloud Cover medium,Cloud Cover High, Snowfall amount, Air pressure, Cloud Cover, Temperature, Rel Humidity, Precipitation, Wind Speed)
W. D. London	(Date, Time, CityName, Day, Interval, City, Wind Chill,Heat index, Snow, Snow Depth , Wind Gust, Visibility, Conditions, Cloud Cover, Temperature, Rel Humidity, Precipitation, Wind Speed)
W. D. Los Angeles	(Date, Time, CityName, Day, Interval, City, Wind Chill,Heat index, Snow, Snow Depth , Wind Gust, Visibility, Conditions, Cloud Cover, Temperature, Rel Humidity, Precipitation, Wind Speed)
Air Pollution Data	(Location, Date, Time, Day, Interval, City)

Air Pollution Basel	(Location, Date, Time, Day, Interval, City, Geo Point 2D)
Feldbergstrasse	(Location, Date, Time,Day, Interval, City, Geo Point 2D, PM10 h. mean, PM2.5 h. mean, NO2 h. mean)
St. Johannsplatz	(Location, Date, Time, Day, Interval, City Geo Point 2D, PM10 h. mean, PM2.5 h. mean, O3 h. mean)
Chrischona	(Location, Date, Time, Day, Interval, City Geo Point 2D, O3 h. mean)
Air Pollution London	(Location, Date, Time, Day, Interval, City Site Code, Value, Species, Provisional or Ratified)
Upper thames Street	(Location, Date, Time, Day, Interval, City Site Code, Value, Species, Provisional or Ratified)
Farrington Street	(Location, Date, Time, Day, Interval, City, Site Code, Value, Species, Provisional or Ratified)
Walbrook Whraf	(Location, Date, Time, Day, Interval, City Site Code, Value, Species, Provisional or Ratified)
Beech Street	(Location, Date, Time, Day, Interval, City Site Code, Value, Species, Provisional or Ratified)
Air Pollution US	(Location, Date, Time, Day, Interval, City, State Code, County Code, Site Number, Parameter Code, Paraneter Name, POC, Latitude, Longitude, MDL, Uncertainity, Units of measurement)
Air Pol. US SO_2	(Location, Date, Time, Day, Interval, City, State Code, County Code, Site Number, Parameter Code, Paraneter Name, POC, Latitude, Longitude, MDL, Uncertainity, Units of measurement)
Air Pol. US CO	(Location, Date, Time, Day, Interval, City, State Code, County Code, Site Number, Parameter Code, Paraneter Name, POC, Latitude, Longitude, MDL, Uncertainity, Units of measurement)
Air Pol. US O_3	(Location, Date, Time, Day, Interval, City, State Code, County Code, Site Number, Parameter Code, Paraneter Name, POC, Latitude, Longitude, MDL, Uncertainity, Units of measurement)
Air Pol. US NO_2	(Location, Date, Time, Day, Interval, City, State Code, County Code, Site Number, Parameter Code, Paraneter Name, POC, Latitude, Longitude, MDL, Uncertainity, Units of measurement)
ExtendedThrough	(City, Interval, Day, SiteName, DirectionName, LaneCode , LaneName, Date, TimeFrom, Time To, DateTimeFrom, DateTimeTo, Year,)
Basel MVI	(PrimaryKeys(City, Interval, Day, SiteName, DirectionName, LaneCode , LaneName, Date, TimeFrom, Time To, DateTimeFrom, DateTimeTo, Year),

ValuesApproved, ValuesEdited, Total, MR, PW, PW+, Lief, Lief+,
Lief+Aufl., LW, LW+, Sattelzug, Bus, Andere)