Practical activities- introduction to course

Rene Maas, 2022

About INTELTRANS project

Interreg Central Baltic Project: INTELTRANS – Intelligent Transport and Traffic Management study module, 2020-2022.

The transport system of the Central Baltic area is in need of better integration in order to take into account the mobility needs of the whole CB region. We need to increase traffic safety, efficiency, mobility and customer satisfaction across national borders, while reducing environmental impact. The project aims to contribute towards transport system that is safe, resilient, seamless and environmentally friendly for citizens, companies and society as a whole. To achieve this goal, project partners want to modernize transport and traffic management professional higher education (VET) curricula, learning processes, and learning environments.

In the effort of harmonizing transport curricula we must take into account new insights and demands connected with transport infrastructure, driver behaviour, as well as both the physical and general business environment. Globally new technologies for vehicles are coming and traffic management will be key to handle negative impact of transport. The project partners, universities of applied sciences, address emerging development needs by creating a joint Intelligent Transport and Traffic Management study module (15 ECTS) and pilot it with multinational groups of students, together with methodology and materials that are applicable and replicable outside current partnership.

Course Overview

- Earn 3 EAP
- Lasts 8 weeks
- Includes individual- and group tasks
- We are using: QGIS program
- Output of the course: Purposed **NMT (Non motorized traffic) network layout**

Course overview

- Project based course
  - Teams with 3 members
  - Could be made as one man team also
- Individual work
  - Moodle self-tests
- Group work tasks
  - Moodle tasks and project
- Focus on collaboration and individual contribution

Course goals

- To give opportunity to work with **spatial data** in QGIS and make **argued decision** where to plan **non motorized street network**
- Goals mean there have to be a plan, I suggest to plan ahead how to get maximum of this course
  - Start with inspecting goals and outcomes
  - Plan every week
  - Make all tests and assignments
  - Reflect to final documentation

Course main topics

- Data driven approach for traffic system related decisions
  - Contradictory to traditional approach- intuition, authority
- Does not mean that other approaches are bad
  - Approaches should be conjunctive and support each other

Why is this course important to new transport area workers

- Data driven approach should be a change in mindset
- Learn how to do spatial data manipulation and interpret results
- Learn QGIS and implement it in real world project
- How to do a project (important in worklife)

Course assessing

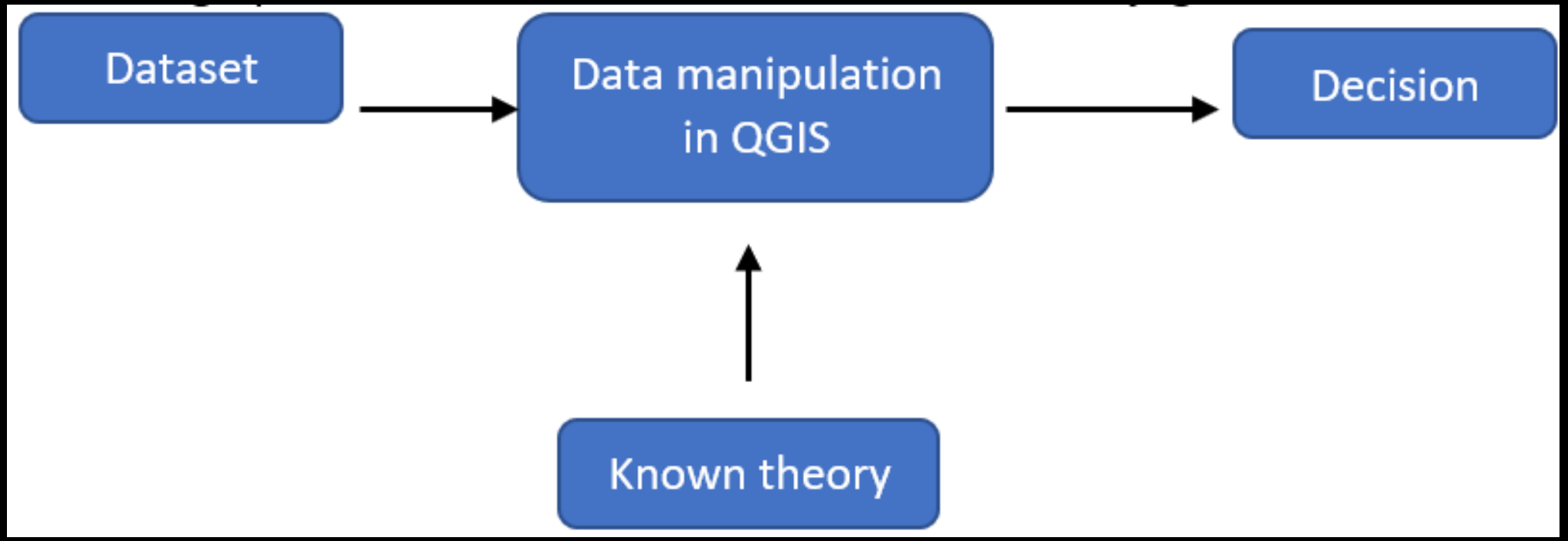
- During the course assesing includes following:
  - **Self-tests**- will be found in Moodle
  - **Project**- group work

Join cours in Moodle

- Moodle: Practical project activities - GIS and mobility

Course structure

- Where’s the most beneficial to make non motor traffic streets?
- Those are the main parts of the project



Data

- **Data**- something that reflects real world entities
- How could we manage the world without knowing what is out there?

- Try to think about following:
- Where we are holding data?
- What data reflects where people commute?

Non motorized traffic network

- Lets assume that we have city without non motorized traffic network
- We want to purpose NMT
- Where we should start planning network in the context of using mobility data?
- What data we could have for that?

Data is acquired, what next?

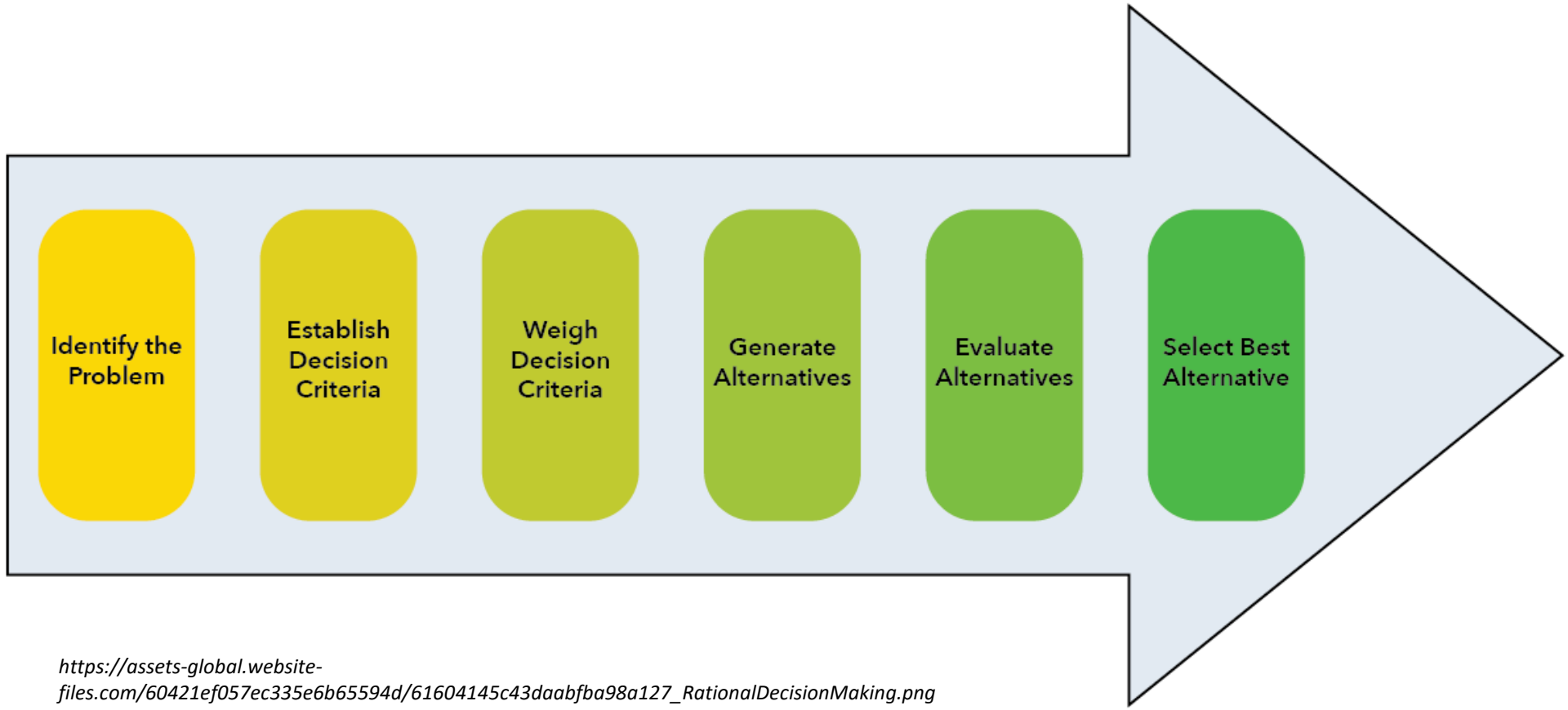
- What is the next thing to do with data after acquiring it?
- What purpose data should have, why we collect data?
  - To deduce information from data and reports
  - Afterward information could analyzed to answer questions

Today’s technology world

- Today’s world gives us many technological opportunities to understand the world around us
- Data could be accountant records on paper or more advanced as those records could be in Excel
- What Excel benefits us that paper is lacking?
  - Copy data easily
  - Hold data compactly
  - Manipulate it fastly
  - Send data to many partners and for long distances

How to make decisions- a framework

How we make decision?



https://assets-global.website-files.com/60421ef057ec335e6b65594d/61604145c43daabfba98a127_RationalDecisionMaking.png

1. Identify problem

- How to describe finding the best place for NMT streets as a problem?

Establish decision criteria

- What are the decision criterias?
- What is the most beneficial/ valuable for people when we think about investment in infrastructure?
- In other words, how do people understand that this money is well spent?

Choosing between different criterias

- What are other alternatives when deciding where to make non motorized traffic streets?
- In other words- what happens to be important as we decide where to make NMT streets.

Non motorized traffic streets

- Who will commute in those streets
- Lets try to make a profile:
- Group of people A
- Group of people B
- Group of people C

Non motorized traffic streets

What matters for non motorized traffic streets users?

- How easy is it to access to the network
- Streets network quality
- Are there any parking spaces
- Safety

Lets get into the QGIS

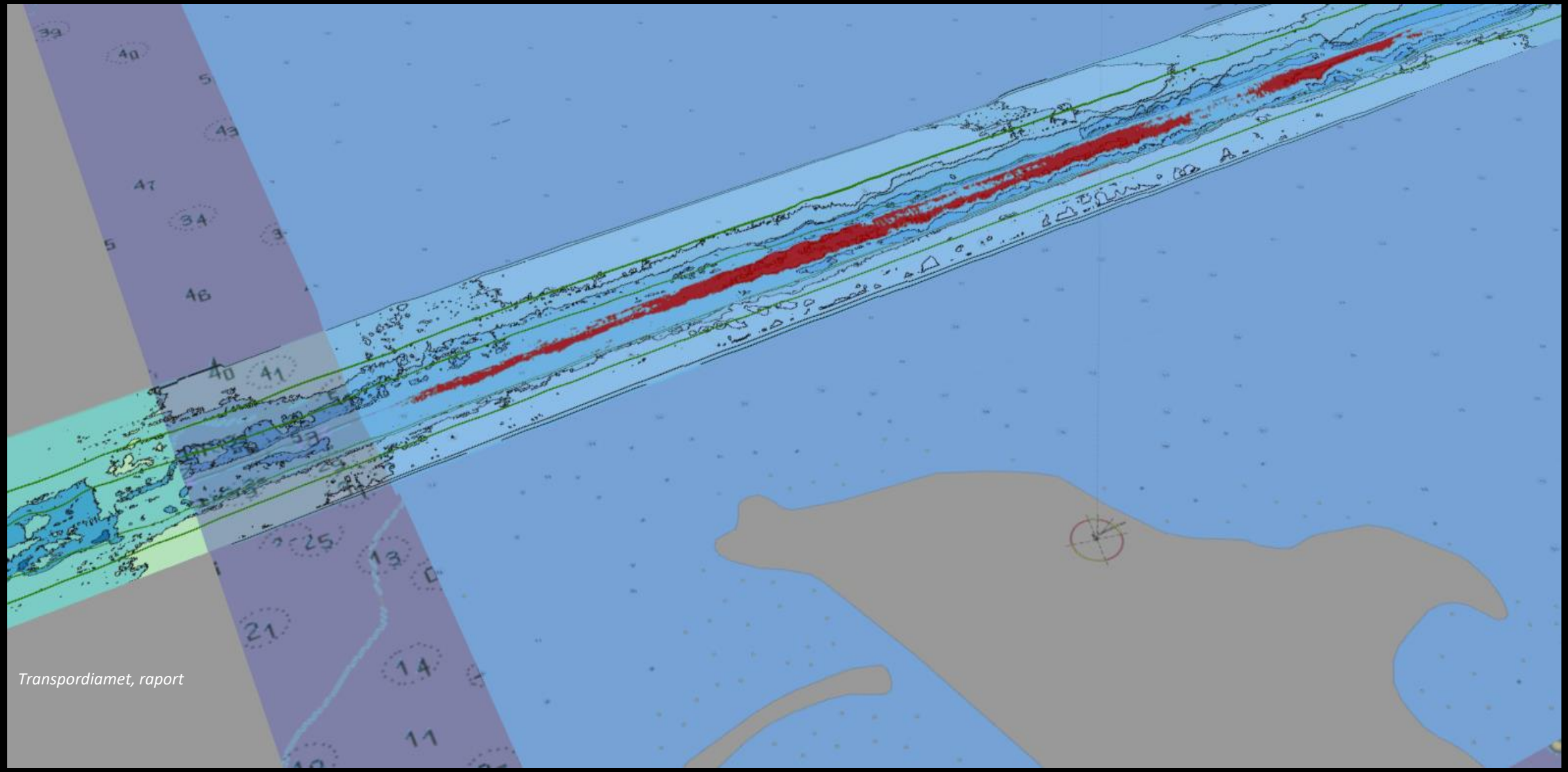
Two worlds

- How world is constructed?
- We have two kind of worlds
  - One is nature and self regulated
  - Second is constructed and is managed by ourself

Context and content- earth

- Two different focuses
  - Seeing the whole picture
  - Managing the places
- Seeing the whole
  - Patterns
  - Linkages
  - Trends
- Managing the places
  - Watersheds
  - Communities
  - Districts

Managing the places

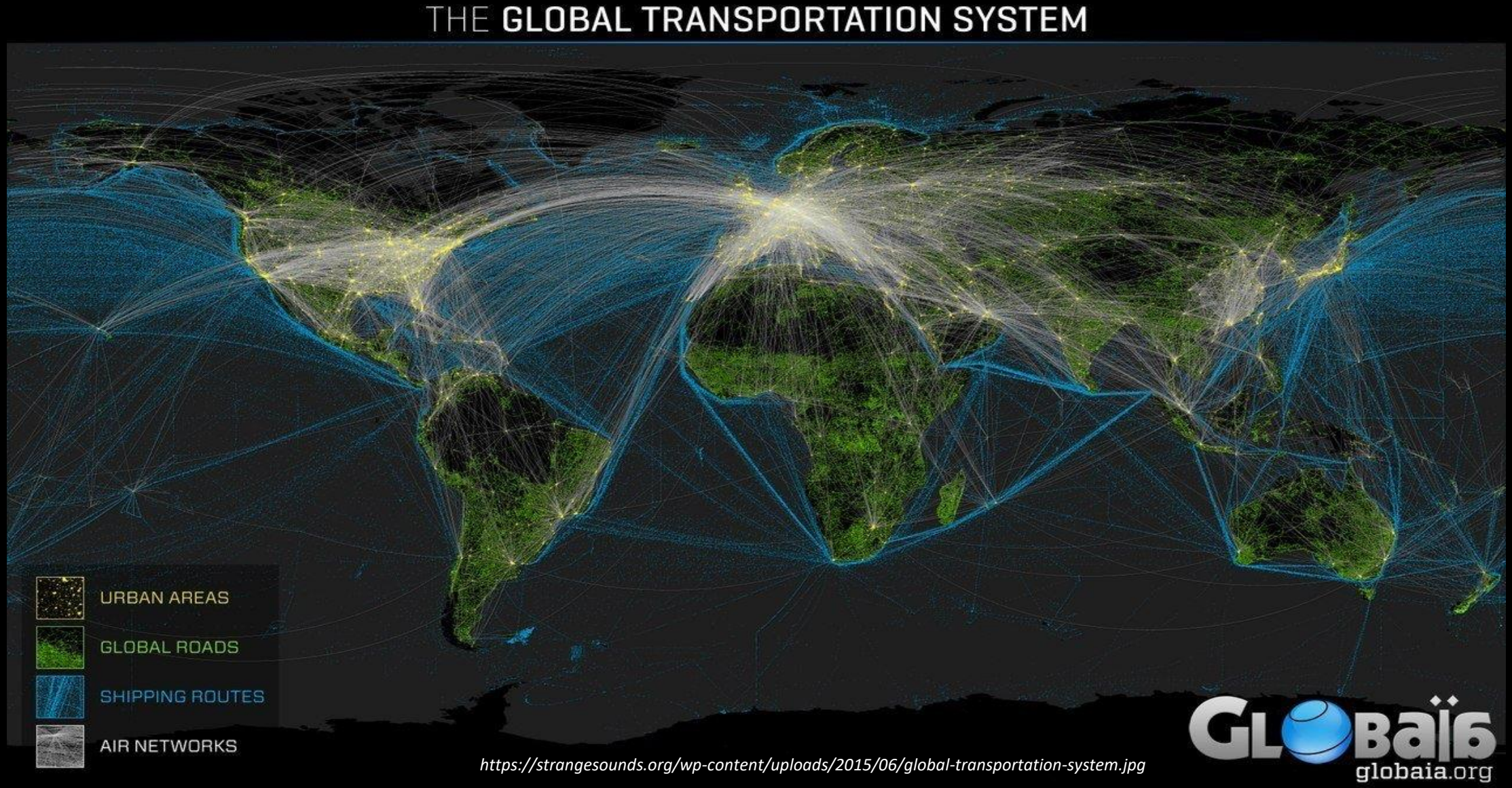


Transpordiamet, raport

Linkages- seeing the bigger picture

https://media.pri.org/s3fs-public/styles/story_main/public/eu-privacy-right-to-be-forgotten-facebook-2012-1-23.jpg?itok=yY7EACx1

Seeing the bigger picture



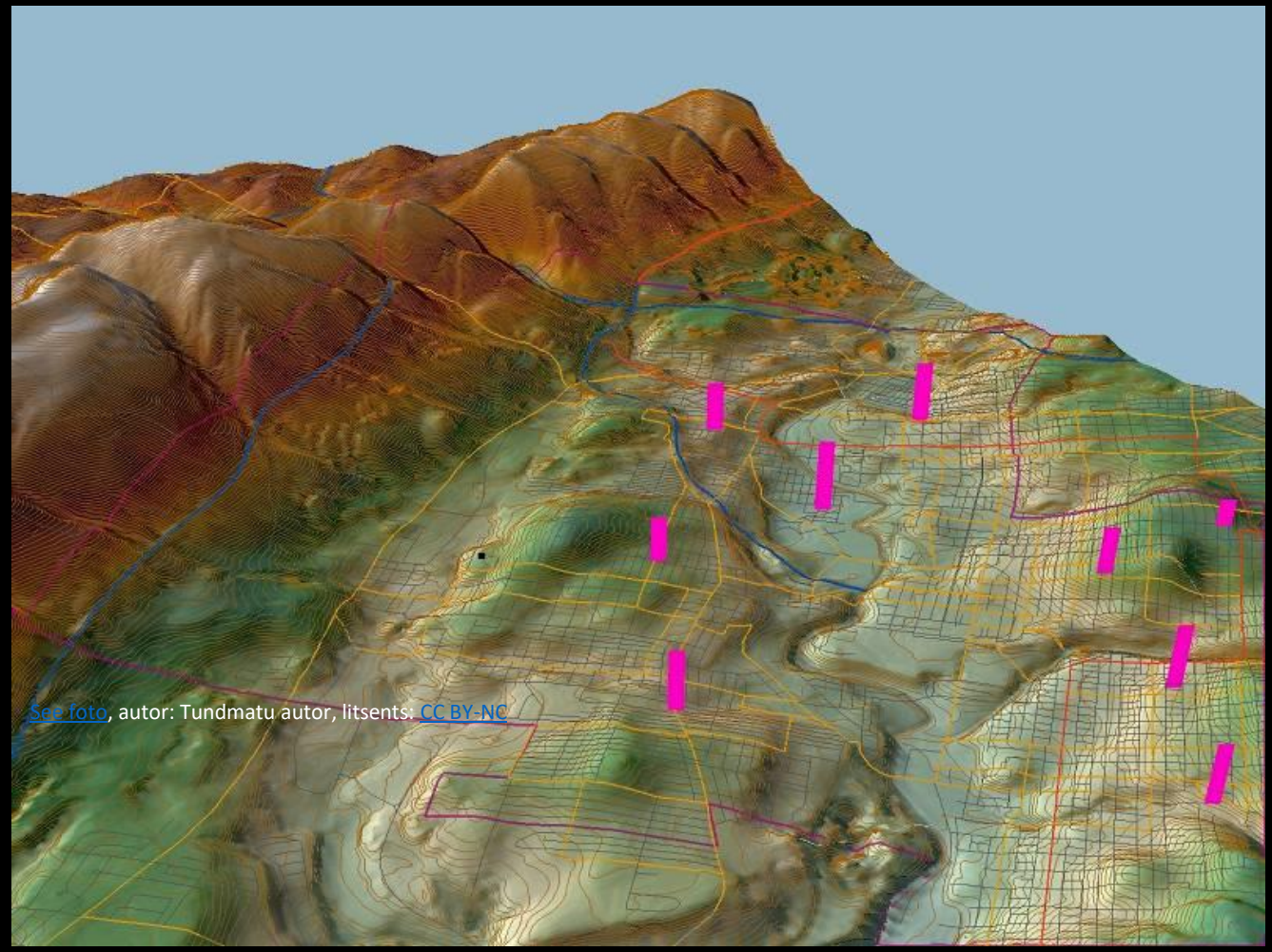
https://strangesounds.org/wp-content/uploads/2015/06/global-transportation-system.jpg

GIS

- Geographic information system
- Geographic
  - Location based information on Earth
- Info
  - Knwoledge about object or event
- System
  - Organized information and software/hardware

GIS- Geographic information system

- Tool
- Let’s watch a video LINK



GIS components

- **Hardware**- computers and servers to store data
- **Software and algorithms-** data manipulation and visualising
- **Data in digital forms-** data, stored in computer or servers and are subject to manipulation
- Watch video LINK

We have this as computers

We have this as QGIS program

We dont have it yet

GIS is used by

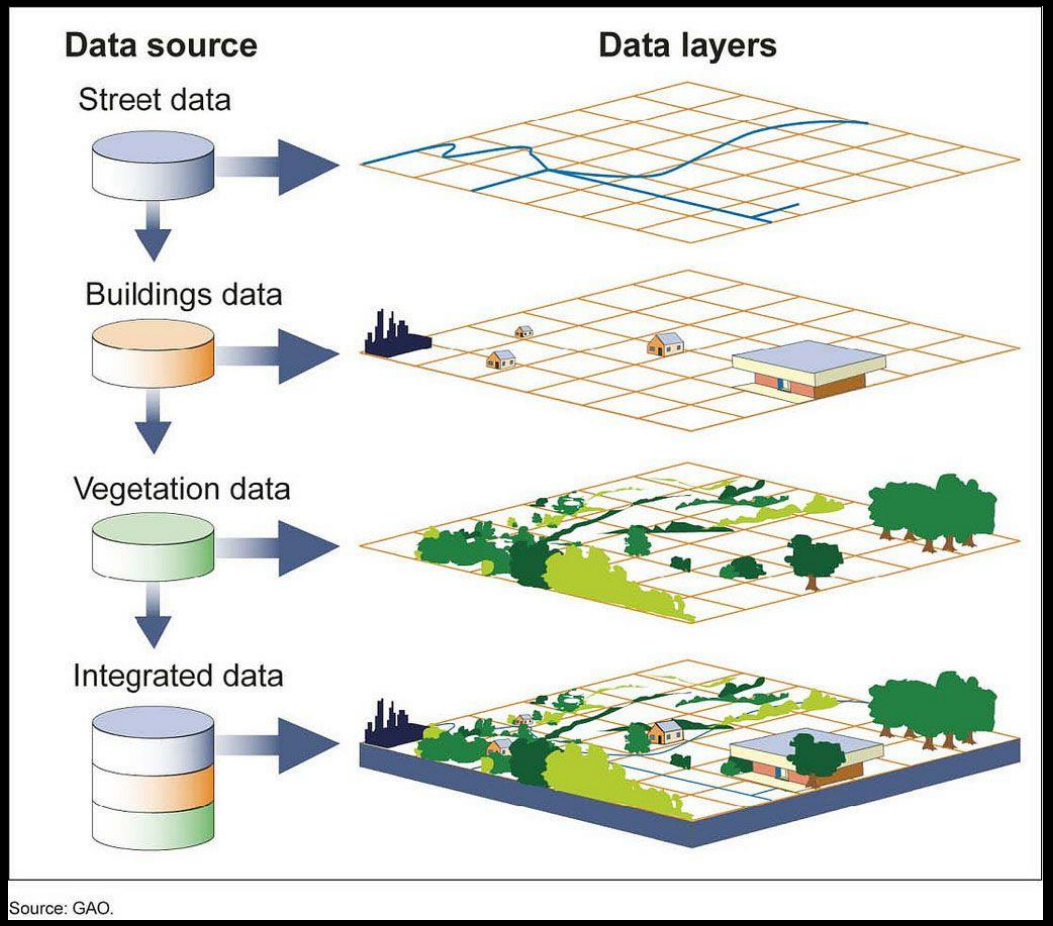
- International organizations
  - Reports
- Private Industry
  - Reports, busines cases
- Government
  - Deciding for investment
- Academic institutions
  - Research and development

GIS- opportunities

- Result should answer our research question!!!
- WHERE?
  - Where are biggest noise emitters?
  - Where most of the injures happens?
  - Where most of the crashes happens?
  - Where to locate house in mountains?
  - Where elephants get harm most by people?

GIS and data on layers

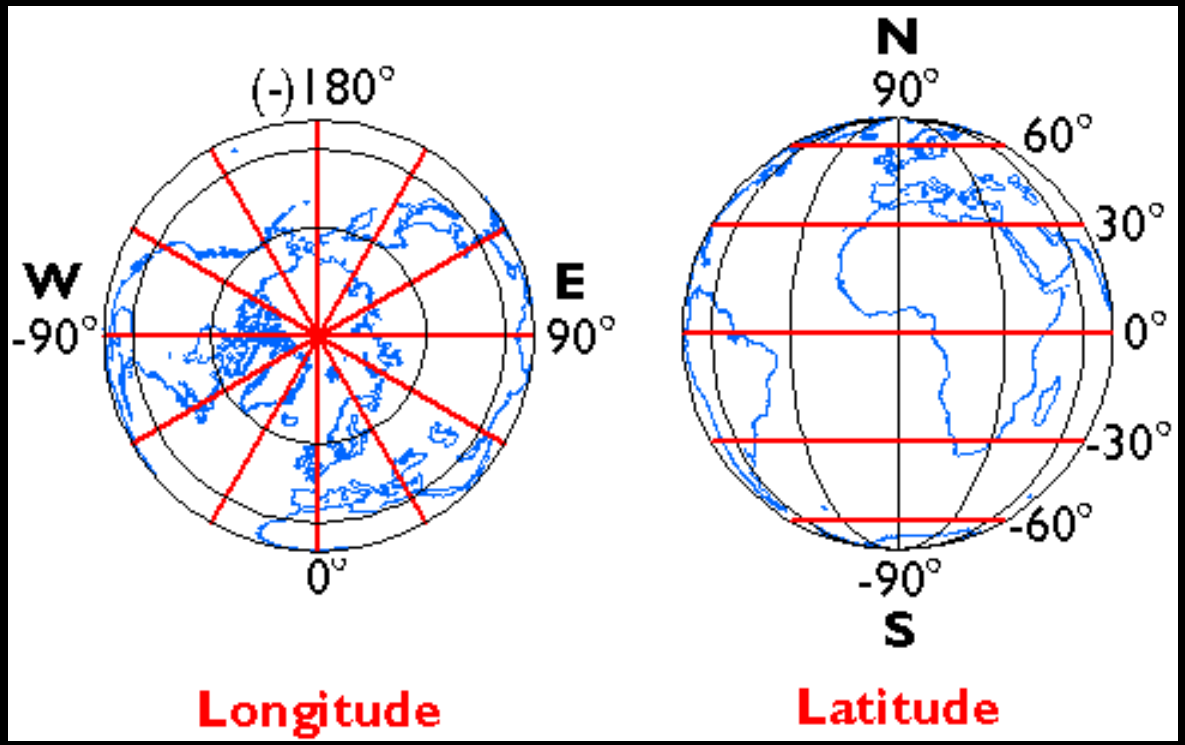
- One layer is one type of data aggregated to one map „sheet“.
- Placing many layers on top of each other we could understand and visualize more about the world.



https://media.nationalgeographic.org/assets/photos/000/322/32282.jpg

GIS data

- Data has spatial/ geographic reference
- Meaning that we know where in the world this data came from
  - Geographic reference could be:
    - **Geographic coordinates**
      - Latitude and longitude
      - Measured in degrees
    - **Projected coordinate system**
      - Using grid coordinates
      - Measured in metrics



GIS data

- **Includes**:
- Geographic coordinates as **X and Y**
- And something that describes what happened on that particular point- attributes and their values

GIS data

- Let's assume that we have a couple of cities represented by points and we describe them by population.
- We could also describe them in other ways.
- What should be attributes when we want to know what city has the most sunny days during the year?

GIS attributes

- GIS is **infosystem** where **geographic locations** are kept with extra information about it, **called attributes**

QGIS official site

Attributes

	fid	kool_nimi
1	1	Rääma_pk
2	2	Pärnu_ülejõe_pk
3	3	kuninga_tänava_
4	4	vanalinna_pk

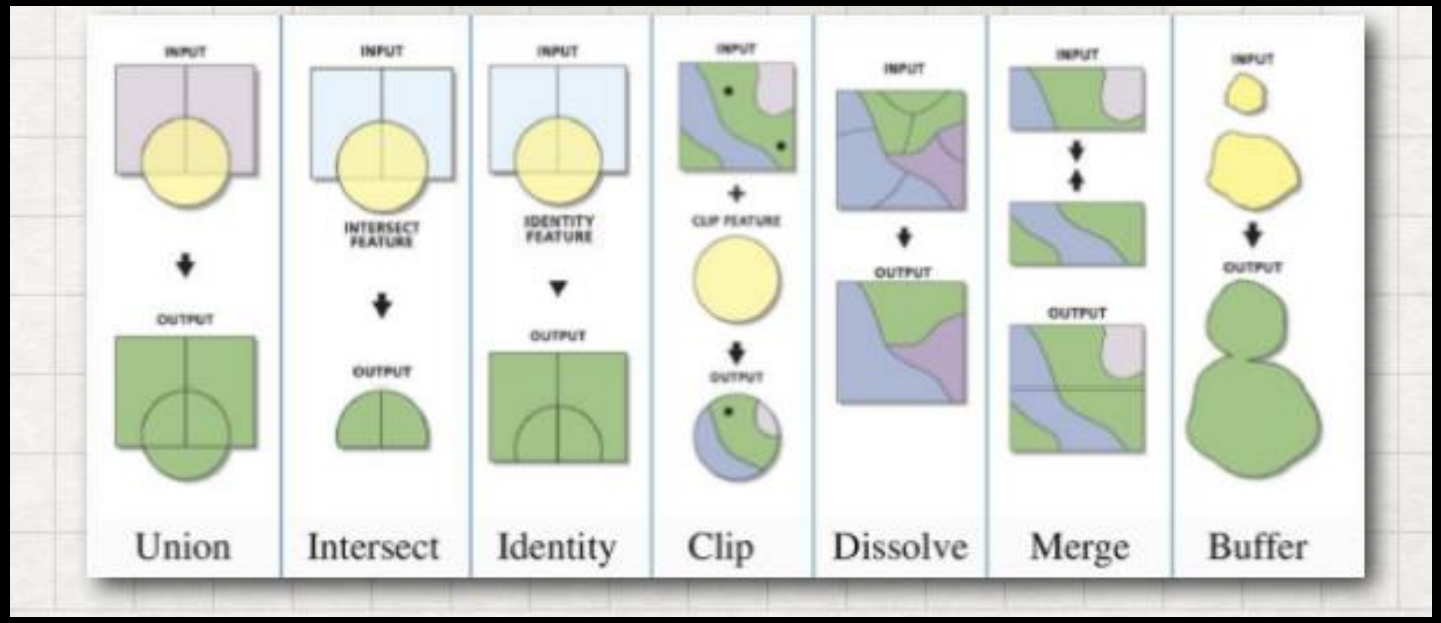
Attribute values

GIS functions

- Spatial and non spatial data assembly
- Spatial and non spatial data storage
- Spatial data analysis and manipulation
- Spatial data output and visualizing

GIS functions II

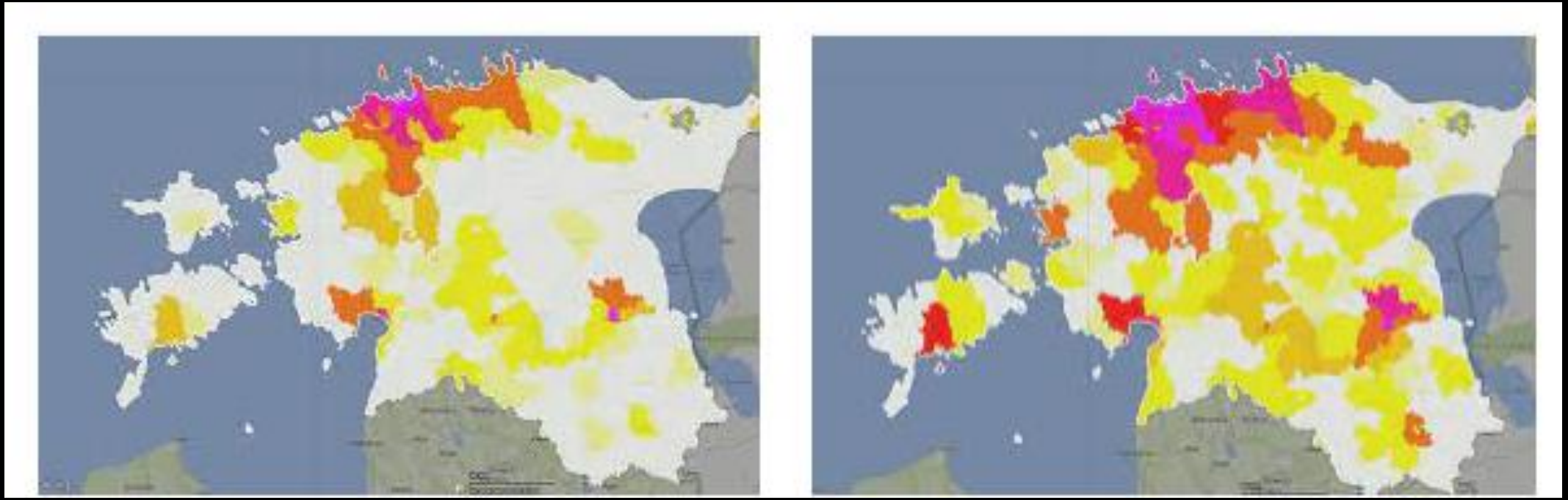
- Spatial analysing



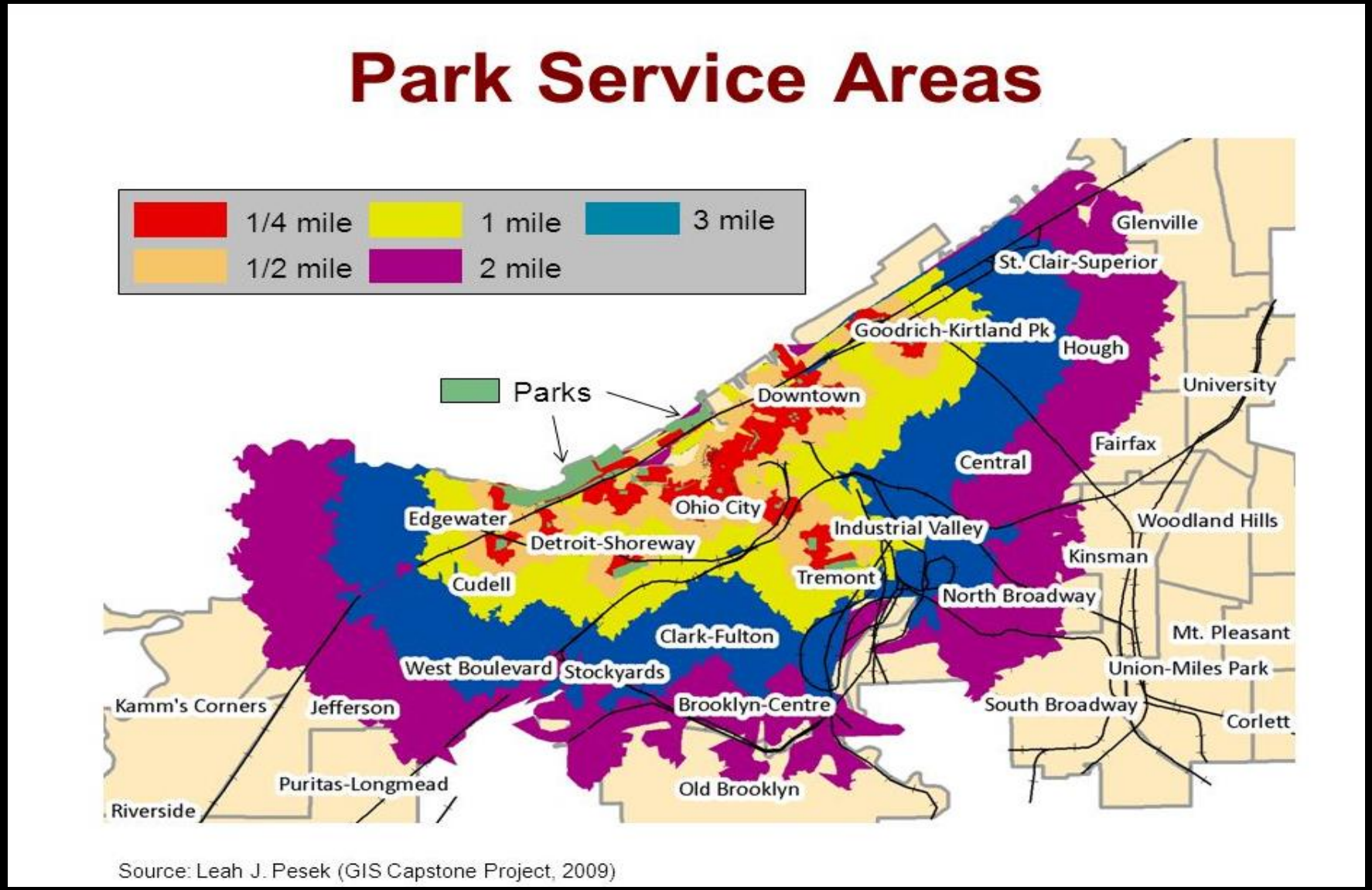
https://courses.cs.ut.ee/MTAT.08.040/2020_fall/uploads/Main/ITS_Lecture_7.pdf

Examples- Estonia

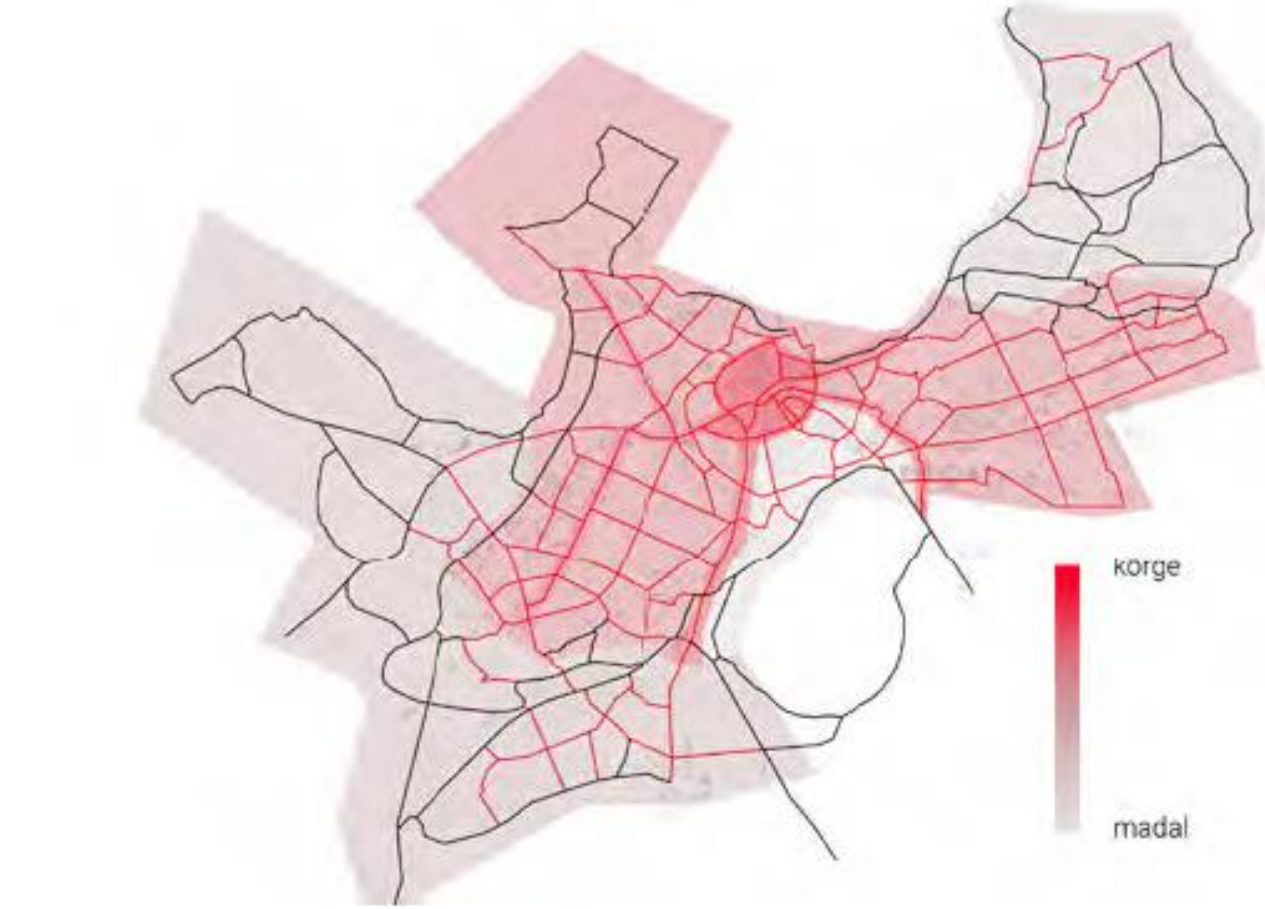
- Problem over here is how many people left urban areas for working/learning and went to rural areas.
- What data should we take into consideration? Mobility?



What we could do with information about where people commute to park?



Non motorized traffic potensial usage in Tallinn



Joonis 5.4. Põhivõrgu rajamise prioriteedid (prioriteetsed osad on tumedamad)

Tallinna jalgrattastrateegia, PDF, 2019

At the end of the course your team should submit the following layers

- Demand layer- students by home areas
- Offer layer- school positions
- Gravity model of 3 objects
- Hot zone- where are the most mobility zones
- Purposed non motorized traffic street layer

At the end of the course your team should submit the following II

- Theory that includes:
  - Description/definition of what is mobility and GIS,
  - Description of mobility forecasting model steps (4. step traffic assignment model),
  - Huff Gravity scetch from project.

Today's Individual work in Moodle

- Read text and answer to the two questions:
  - What is **mobility** and what is **GIS**?
  - Accepting only answers where own words are used to describe terms
  - Additionally include this lecture overview by answering following:
    - **What?**- what happened in lecture;
    - **So what?-** why it is important to you;
    - **Now what?-** what could do with this information where to head.

Conclusion and key take-aways

- GIS- geographic information system
- GIS has data related to some geographic point in space.
- Every object/feature in GIS has some attributes (extra information).
- Data is saved to the database in forms of rows and columns.
- Spatial analysis means data manipulation by comparing different layers or adding buffers to existing layer.

Thank you for your attention!

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