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Working title SDSS: Pascal (Place A Station Connect A Location)
GEO1005 – Project - SDSS

User requirements

The stakeholders for transport planning are: Transport planner, Urban planner and Public Transport operator. These stakeholders are people with experience in this field. Therefore, the SDSS should be programmed to their needs. However, every stakeholder has different objectives and goals. A transport planner is concerned about the quality of the transit network and travel times, a urban planner might think more about the accessibility and integration of transit nodes and a public transport operator would also be interested in the costs. Their mutual problem is where to place the transit nodes. The SDSS will focus on this objective, specifying on the user requirements of the transport planner.

The main goal of the SDSS is to support the planner with information, so that he is able to make a decision on where to place new transit nodes. This decision is based on travel distance to each node (400m to bus stop and 1600m to rail node), density and population, accessibility of the street network and the costs of the adjustment. To achieve a higher effectiveness of the decision the user should be able to analyse these elements. This analysis should result in given areas that should be suitable for new transit nodes, apply potential decision alternatives and evaluate the result. After evaluation the user should be able to try different alternatives to make this a iterative process. To get to this result the SDSS needs to implement different components.

SDSS features and components

The four main characteristics of a SDSS are Information (Data Management), Analysis, Visualization and a GUI. The implementation of these components are based on the user requirements.

Data

There are three different data sets imported in the SDSS

- A graph of the street network. It is important that every line segment (street) is labelled with attributes so the user is able to analyse the accessibility and use of the roads. So what type of street it is, is important for the user.
- The public transport nodes. Information about the type of node (rail/bus) and to what transit line it belongs is needed. These nodes should be integrated with the street network graph, so distances to each node can be analysed.
- Population density map. Different maps can be added, such as average age, income/jobs, etc.

Analysis

Unreachable areas

The shortest distance from each location to any node representing a station is calculated. Based on this map areas can be selected that are not well connected to the public transport network. Showing these areas can give a first indication of locations were new stations are required. To support the user in more detail unsuitable road for constructing stations can be filtered. Furthermore it can be calculated based on road type and distance to existing lines what the costs are or building a station in a particular location.

Density split between nodes
Each part of the road network is allocated to a node representing a station based on which node is closest to that particular part of the network. Using the population density the number of people that each node serves can be calculated.

Visualization/interface

Shortest distance to a node (figure 1)
Distance to each node can be visualized in a map using a gradual scale on each line segment on the street network.

Selecting remote/unreachable areas (figure 2)
A slider can be used, so that the user can determine the threshold on which the creation of the unreachable areas is based. Possibly we can make this interactive so that the areas change directly when the user moves the slider.

Calculate Population of unreachable areas based on the population density. This could be done for all areas (clicking a button or automatically), showing the result in a table or graph.

Fig 1: Shoretst distance to node

Fig 2: Unreachable areas

Showing good areas for node in unreachable area based on cost and road type
-Filtering out small road that are not suitable for bus stops.

-Coloring (graded scale) based on the cost of building a station in that particular place.

Placing node (closest distance/unreachable areas change)

By placing a node figure 1 & 2 are automatically updated showing the unreachable areas in the new situation.

Density split between nodes

Figure 3 shows the allocated road network. How many people are served by each node can be visualized by putting numbers next to the nodes or in a table/graph. The map should update automatically when a node is placed.

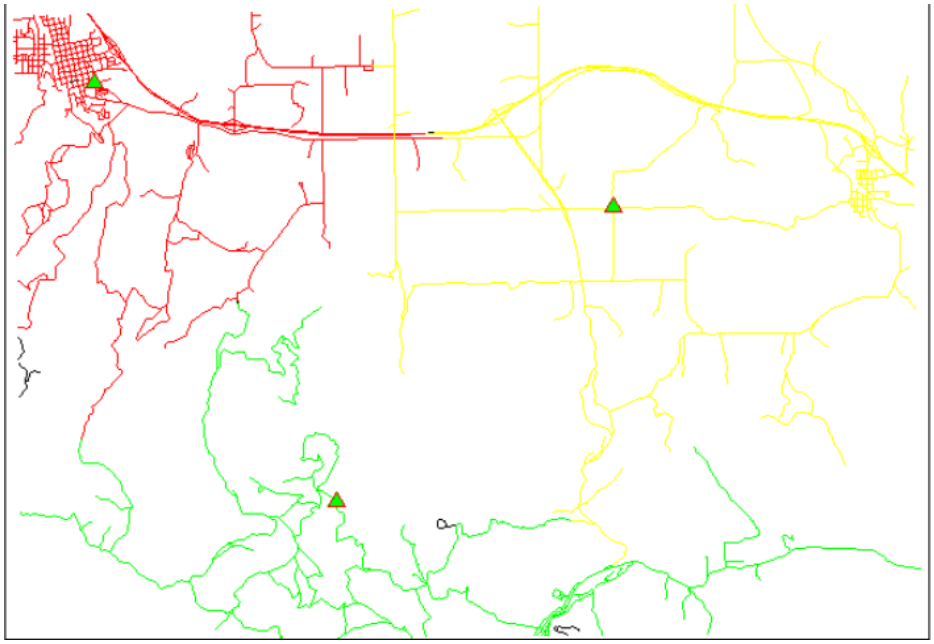

Fig 3: Network allocation