Summerschool 2004

Schematic visualization of traffic networks

Daniela Oelke (research student)

Outline

Part one: schematic representation of bus / tram routes

- init AG / Context
- The task
- The algorithm
- Extensions
- Final conclusion

Part two: improving route maps
init AG / Context

Everything that has to do with telematics and electronic fare collection systems for public transport

--> automatic vehicle location system

--> electronic payment systems

--> software for the central control offices of transportation

--> Intelligent Route Information System

The task

Aim: a module that helps to create a schematic representation of several bus and tram routes

Steps:

1.) building an application as a basis to work on
   (read data in, draw a graph)

2.) layout the graph

3.) extensions
The algorithm

Springlayout – Algorithms

- The idea:
  - Edges → springs
  - Nodes → electrically equally charged particles

- Simulation of physical properties
  → resulting forces can be calculated

- Aim: Condition of equilibrium
Advantages of the resulting representation:

- Nodes are evenly spread
- Tendency to edges with the same length
- Only few intersections
- Angles are maximized

Extensions

Why are extensions necessary?

The legibility of the bus / tram system can be increased by:

- more straight lines
- not so many different angles between the edges
- a geographically correct representation
Extensions

Users can define straight lines (1)

How?
line of nodes --> select starting point and end point
slope --> position of starting point to end point

Extensions

Users can define straight lines (2) – Further problems:

• What if there is more than one possible path between the two selected nodes?
Extensions

Users can define straight lines (3) – Further problems:

- Where does the line start and end?

Final Conclusions

Points to improve:

- runtime
- drawing (e.g. overlapping of labels)
- more automatic (e.g. geographical orientation)
- editor (e.g. undo-functionality, new thread)

==> challenging task and a motivation to learn more about Information Visualization 😊
Part one: schematic representation of bus / tram routes

Part two: improving route maps

- Computer-generated maps ↔ handdrawn maps
- Solution of the Stanford University
- The problems → the task

Problems of computer-generated route maps:

- constant scale factor
- cluttered with information irrelevant to navigation
- no distinction between essential and extraneous information!
Part two: improving route maps

Solution:

• different scale factor
• only relevant information
• simplifications

LineDrive of the Stanford University

But: If you stray you are lost
--> more context?
Any questions?

Good ideas?