FAKULTÄT FÜR !NFORMATIK
Faculty of Informatics

Diplomarbeitspräsentation

Rapid Visualization Development based on Visual Programming

Masterstudium:
Computergraphik & Digitale Bildverarbeitung

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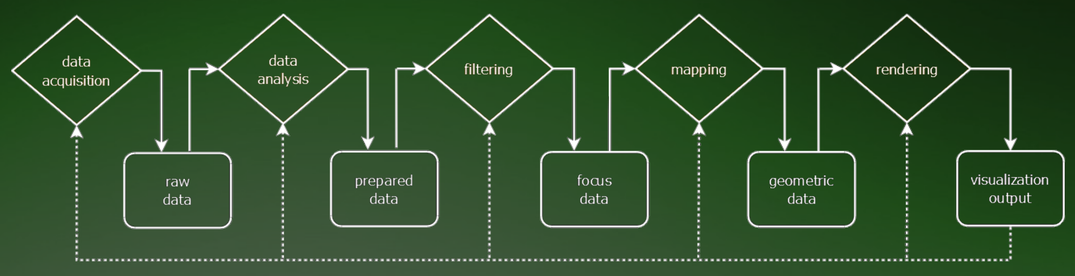
Motivation

It is a rather complicated task to rapidly develop custom visualizations especially for people without any significant programming experience.

The idea of this software (***OpenInsightExplorer***) is to combine the powers of ***visual programming***[1] and ***dataflow programming***[2].

Modules work as independent ***black boxes*** and implement the processing stages of the visualization pipeline.



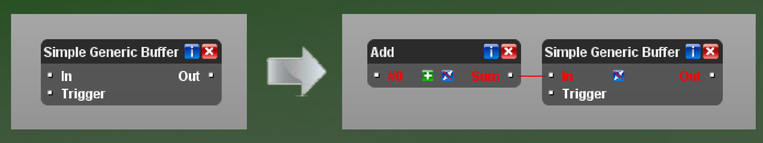
By connecting a set of compatible modules in the OpenInsightExplorer it is possible to adapt the visualization pipeline to a wide range of different applications.

All modules inside the OpenInsightExplorer are executed following the ***dataflow execution model*** (as soon as data is available on their inputs).

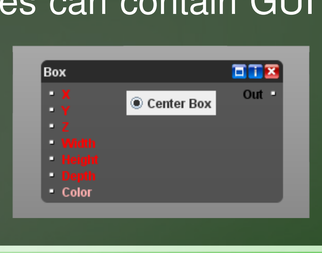
Features

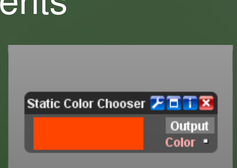
- Open source and platform independent
- Automatic parallelization
- Custom data types
- Data streams
- Type-safety
- Hardware acceleration (GPU)
- Modules can dynamically ***grow*** (inputs & outputs)

- Modules can ***adapt*** to data types (generic modules)



- Modules can contain GUI elements

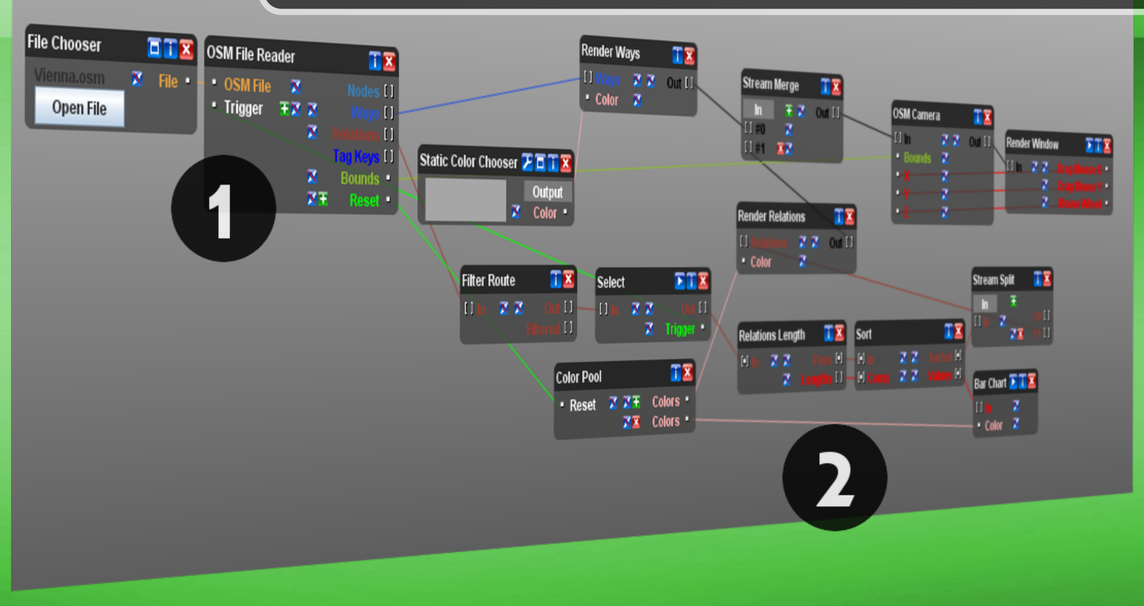




OpenInsightExplorer

Developing a visualization changes into ...

1 Dragging modules into the visual editor
2 Connecting them together
3 Running the final visualization



Evaluation

OpenInsightExplorer was evaluated by implementing example visualizations:

- ***Scientific visualization***
  GPU accelerated volume rendering

- ***Information visualization***
  A collection of ***OpenStreetMap***[3] visualizations

Conclusion

- A new framework for rapid development of visualizations
- It reduces the production cycle of the development
- More frequent reuse of off-the-shelf modules
- It is capable to handle ***scientific*** and ***information*** visualizations

[1] G. Fischer, E. Giaccardi, Y. Ye, A. G. Sutcliffe, and N. Mehandjiev. Meta-Design: a Manifesto for End-user development. Communication of the ACM, 47:33–37, 2004. **[2]** J. P. Morrison. Flow-Based Programming, 2nd Edition: A New Approach to Application Development. CreateSpace, Paramount, CA, 2010. **[3]** OpenStreetMap. http://www.openstreetmap.org.

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