Proposition de thèse de doctorat

Début : 2016-2017

Titre de la thèse : Visualization of multi layered spatio-temporal 3D urban datasets

Laboratoire : UMR 1563 AAU

Equipe : informatique - ECN

Localisation de la thèse : ECN et/ou ensa Nantes

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Description du sujet

The understanding of complex spatio-temporal urban data is a critical challenge in urban planning as the stakeholders have to take into account numerous constraints related to various domains embedding sustainable, social and economical concerns.
To tackle this problem, information visualization uses methods based on human perception and cognition to show the underlying meaning of datasets. This PhD thesis proposes to explore visualization methods in various 3D environments (Desktop, VR, AR, SAR) to find the best solution for a given user task at a given urban scale (building, street, district, etc.).
This PhD in Information Visualization takes place into an pluridisciplinary environment (architecture, geography, physical simulations, computer science, humanities): the CRENAU that belongs to architecture school of Nantes, CNRS and Ecole Centrale de Nantes, and is a founding member of the IRSTV research institute (http://www.irstv.cnrs.fr/article.php3?id_article=319). This work is linked to two others topics in our lab: interaction with GIS data and augmented/virtual reality applications.

Research subject, work plan:
The work is about displaying spatio-temporal urban data in an effective way. Based on the user's profile, behavior and task, the most appropriate visualization type and data quality will be estimated. More precisely, this PhD thesis proposes to consider each data as a layer that will be processed according to the data type and the required levels of detail as well as the display context. The data model will be based on standards currently used in GIS and/or BIM communities. User tests will be conducted to evaluate the quality of proposed solutions. The research challenges include both visualization solution proposal (which will depend at least on the heterogeneous input data, the rendering device, the scale and the user skills) and the construction of an evaluation framework for information visualization.

References:

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Compétences requises
MsC in computer science, computer graphics, visualisation