

## NM2: *interactive visualization*

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### information

project-based course, semsster 2, 6 ects

### contents

The course will cover a variety of issues related to rich media presentations using current web technology, with a special focus on interactive visualization(s) of dynamic complex systems.

The delivery platform of choice is the *flash* plugin, which is currently the only widely available rich media technology for the web. This platform allows for high-performance animation, efficient data (re)presentation, as well as interactive video, using XML configuration files.

### prerequisites

CA1, CS1, NM1, MA1

### goals and attainment targets

During the course students are expected to learn the skills to create complex media applications, involving animation, visualization, and information presentation.

**learning target(s)** With regard to the programming skills, the actual **topics** treated in *interactive visualization* will to a large extent on what has been covered in the earlier **programming course(s)** However, taking a **technology-agnostic view** our learning goals can be summarized as:

- skill(s) – scripting, XML-based configuration
- knowledge – interactive animation & visualization
- theory – dynamic systems, information presentation
- experience(s) – medium scale interactive visual application(s)
- attitude – explorative, problem-finding, aesthetics

In particular, students must gain an **intuition** on how to create **visualizations using computational means**, and how to approach visualization issues by iteratively, as outline in Ben Fry's book on **visualizing data**, going through the following steps: *acquire, parse, filter, mine, represent, refine* and *interact*. No need to emphasize that an **exploratory attitude** is essential, as well as a (to be developed) sense of **(computational) aesthetics**

In addition to the technical and practical aspects of the realization of rich media applications, attention will be given to the principle(s) underlying animation and visualization as well as issues of information presentation and user interaction.

### place in curriculum

NM2 is meant to be an intermediate course, required for both ST and NM students. The course will enable students to apply their knowledge of dynamic systems and mathematics in a (media-rich) context, as a preparation for more advanced projects in interactive narratives and game development.

### application area, motivating examples

The course will be built around a collection of (online) examples and reference materials, partly drawn from the references listed below.

### lesson material(s)

Apart from the highly recommended book *Visualizing Data* by Ben Fry, all material(s) will be online, including a (large) number of examples, as well as reference material, and challenging targets, that examples that may serve as a target for students' accomplishments.

- canonical example(s) – *animation* / draw / [www.processing.org](http://www.processing.org)
- (online) reference material(s) – resource(s) / adobe live docs: *actionscript* / *flex*
- challenging target(s) – [labs.adobe.com](http://labs.adobe.com) / *flash art* / sample(s) / [www.processing.org](http://www.processing.org)

During the course this list will be extended, and dependent on circumstances, particular aspects of **inter-active visualization** will be emphasized, in particular visualization techniques that use **physics-based animations** as a means of conveying relationships between data, examples of which are given in the online resources below.

In addition, representative examples from the area of art and design will be discussed to serve as inspiration for student projects.

## teaching methods

The course will be organized around lectures in which both technical and conceptual issues, related to animation and visualization, are dealt with.

## course structure

The course does require active participation of the student(s), not only in exploring the technology by making the assignments, but also by presenting **solutions and problems** in class.

session(s)

1. introduction of (rich) media platform(s)
2. basic assignment(s) – animation (1)
3. essentials of animation and visualisation
4. basic assignment(s) – visualization (2)
5. principles of interactive information presentation
6. basic assignment(s) – interaction (3)
7. elements of data-driven information systems
8. presentation of final assignment(s)

At this stage it is not clear whether to enforce the use of one particular technology, **flex/as3** or **processing**, to use multiple technologies, or to allow students a choice of technologies, which would then also include **javascript**, **Ch** and **C++**.

The lectures will include student presentations, in which explorations and solutions of students are discussed, on technical as well as aesthetic merits.

## nr of participants

20

## special facilities

computer lab & presentation facilities, installation of flex 3 SDK.

## reference(s)

As said before, a highly recommended reference for interactive data visualization is **Visualizing Data** by Ben Fry, not in the least because the approach described is tightly connected with **processing** and its underlying philosophy of creative intuitive understanding by computational means. However, also the **flex/as3** related references are worthwhile because they give access to the display environment of **flash**, which is the dominant media technology for (business-related) web-applications.

1. *Visualizing Data: Exploring and Explaining Data with the Processing Environment*, by Ben Fry
2. *Foundation Actionscript 3.0 Animation: Making Things Move!* by Keith Peters
3. *Professional Adobe Flex 2 (Programmer to Programmer)* by Rich Tretola, Simon Barber, and Renaun Erickson
4. *Foundation Flash 8 Video (Foundation)* by Jordan L Chilcott and Tom Green
5. *Visualizing the Semantic Web: XML-based Internet and Information Visualization* by Vladimir Geroimenko
6. Eliëns A., Wang Y. van Riel C. and Scholte T. (2007), 3D Digital Dossiers – a new way of presenting cultural heritage on the Web, In *Proc. Web3D 2007, ACM SIGGRAPH*, pp. 157-160

7. A. Eliëns, topical media & game development – [media.eliens.net](http://media.eliens.net)

A wealth of material and references can be found at my **topical media & game development** site, including tutorials and examples.