Computer Science/Ocean Engineering
CS767/867 Interactive Data Visualization
Research Ideas (2015)

Can be one or two participants — no more. It should have an evaluation component that is task and human centered. There should be a focus on a problem of visualization or interaction that can be *evaluated* in terms of how well it puts people in touch with information (i.e. the quality of the algorithm is <u>not</u> the main criterion for evaluation, unless the algorithm directly relates to visualization). It should be about mapping data to display effectively.

Project Suggestions (you can also propose a project yourself).
- Design a prototype for any application that interests you – genetics, text similarity, stock market trends. You should research this and do a task analysis to justify your design.
- Multi-step color sequences. Use saturation or lightness steps in a color sequence to get more identifiable values. Test. E.g. 4 shades or purple, 4 shades of blue, 4 shades of green, 4 shades of red, 4 shades of yellow, 4 shades of grey. (20 steps)
- Implement interactive gen draftsman's plot vs parallel coordinates. Finding clusters
- Discretized glyphs – how small can they be? **
- Visual following of linear features: what is important? –rapid exposure.
- Uncertainty representation using 3D textures and color steps. **
- Two flow layers. Spatial frequency separation using fuzzy traces.
- Animated scales for ocean flow. Use Z buffer
- Particles and runoff (might use the GPU) based on a DEM.
- Oriented animated particles. Is orthogonal better for animated conjunction. **
- Oriented animated particles. Is animation better than static for conjunction search. **
- Stepwise vs not stepwise color sequences and accuracy.
- Tight loop mixed initiative interaction (with AI?).
- Spring graph layout without node intersections.

Types of Research
1) Proof of concept prototype + discussion & description - (iterative design)
2) Proof of concept + evaluation by interviews
3) Do a comparison between different modes of interaction/representation.
4) Do a formal study. E.G. a variant on pre-attentive processing to test a theory
Evaluation criteria: originality, systematic study, scholarship, quality of system implementation, appropriateness of evaluation, quality of evaluation. Data analysis depends on design. Help available for factorial designs.

Write-up – like a short conference paper/ intro/ method/results discussion
Dates:
1) Project Topic selected March 25. (your name, title, a 200 wd statement: email delivery)
2) Meet with Prof March 26-27
3) In class presentations. April 14, onward. ***Partly*** about project
4) Meet with Prof 2 April TBD
5) Project Due: December 16 [th].

March 5, 2015