Data Visualization for Industry: Vis 4 Biz

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Introduction: Who is Bob?

- July 2006: Joined Computer Science Dept at Swansea University
- 2001-2006: Researcher at VRVis Research Center (VRVis.at)—the bridge between academia and industry in Austria
- 2001-2006: Software Engineer at AVL (wwwavlcom), Department of Advanced Simulation Technologies (AST)
- 2005: PhD, Computer Science, Vienna University of Technology (TUWien)
- 2000: Msc., Computer Science, University of New Hampshire, Durham, NH
- 1997: BSc., Physics, University of Massachusetts (ZooMass), Amherst, MA
- Research in
  - Data visualization
  - Software Engineering
  - Human-computer interaction
Vis 4 Biz: Motivation

- Does your business invest to collect and store vast quantities of complex data?
- Is your ability to derive information and knowledge from data as good as ability to collect it?
- Are you getting your full money's worth for your data?
Visualization: Why?

Visualization:

- Tool that allows user to gain insight large, complex data sets.

- Visualization enables user
  - to gain a fast overview of data,
  - explore,
  - find patterns and trends,
  - filter important from unimportant
  - detect features

- Most important information and knowledge is captured in a computer generated image.
Visualization Strengths

Visualization is good for:

- **Exploration**
  - find the unknown, unexpected
  - hypothesis generation

- **Analysis**
  - confirm or reject hypotheses
  - information drill-down

- **Presentation**
  - communicate/disseminate results

[Seo/Shneiderman 2004]
[Doleisch et al., 2003]
[Bruckner/Gröller 2005]
Visualization: An Application

- **swirl motion:** characterized by motion about cylinder-aligned axis
  - more stable (easier)

- **tumble motion:** characterized by motion about axis orthogonal to cylinder
  - unstable, more difficult
Achieving ideal patterns of motion leads to optimal mixing (of air and fuel) conditions
- e.g., higher exhaust/gas ratio (EGR)
- decrease in fuel consumption
- lower emissions

1. Can visualization provide insight into or verify characteristic shape/behavior of flow?
2. What tools help to visualize swirl/tumble motion?
3. Where (in the combustion chamber) are ideal ideal flow pattern not being realized?
Visualization: An Application

(Show video.)
The Software Quality Laboratory belongs to the Department of Computer Science at Swansea University.

Mission

The mission of the Software Quality Laboratory is to increase our ability to develop high-quality, robust, and dependable software. We promote these goals through professional development of software engineers, quality education, research, and collaboration with industry and other practitioners. Our activities focus on:

- Foundations,
- software engineering,
- visualization,
- testing, and
- verification.

Directors

- Markus Roggenbach
- Robert S. Laramee

Projects

- 2010/11: Genetic Algorithms in Credit Card Fraud Detection, Final Year Project of Daniel Gomes, cooperation between Swansea University and Grid Tools.

Acknowledgment: The Software Quality Laboratory would like to thank Daniel Edem Kofi Klu for designing our logo.

http://cs.swansea.ac.uk/SQL/
Vis 4 Biz Summary

- Driven by strongest human sense
- Many applications
- Serves different purposes
  - Exploration, analysis, presentation
- Rapidly developing field
- Visit our new industry-lead initiative:
  - http://cs.swansea.ac.uk/SQL/
Acknowledgements

- Thank you for your attention.
- For more information please Google “Robert S Laramee”
- Any Questions?

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