Integrating Writing and Computer Graphics to Improve Technical Communication Across Disciplines

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Computer Graphics

(Geri’s Game, Pixar 1998)  
(Debevic et al. 2004)  
(ivlab.cs.umn.edu)
Possible Career Paths for Students

- Movies (e.g., Pixar)
- Computer Games
- Surgical simulators for training
- Data visualization (biology, chemistry, engineering, …)
- Amazon.com, Oracle, Medtronic, Microsoft, Intel, Nokia, Tech. Startups
Research question

To what extent can *reinterpreting and supporting* important modes of communication in our field (e.g., posters, talks, demos) as important forms of *writing* improve students’ abilities to communicate with broad interdisciplinary audiences?
Outline

• Key types of writing in computer science
• Current writing support
• Re-envisioned role of writing
• Writing in Computer Graphics Wiki and other efforts to engage with writing
• Future work
Types of writing in Computer Science

- Papers.

- Especially important for Computer Graphics:
  - Communicating with reference to imagery.
  - Communicating across disciplines.
  - Papers with AWESOME figures, Posters, Videos, Talks, Demos.
A DESIGNER’S APPROACH TO SCIENTIFIC VISUALIZATION: VISUAL STRATEGIES FOR ILLUSTRATING MOTION DATASETS


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3 Rehabilitation Research and Training Center on Spinal Cord Injury, VA Minnesota Health Care System

ABSTRACT

The goal of this project is to create an animation that visualizes the movement of a specific joint. The animation will be created using Adobe Illustrator, and will be displayed during a poster presentation. The animation will be based on data obtained from mocap.cs.cmu.edu, which is funded by the NSF (CAREER award and REU supplement IIS-1054783).

PROCESS OF CREATION

1. Introductory session to specific problem
2. Questions & areas of interest clarified for designer
3. Designer uses current visualizations as reference for illustrations
4. Designer uses Adobe Illustrator to produce visualizations
5. Group critiques sketches and determines one
   example sketch that would be interesting to explore

CONCLUSIONS & FUTURE WORK

The animation will be presented at the poster session, and will be available for viewing during a brief demonstration. The animation will highlight the current opportunities and reports on the potential for expanding the area of scientific visualization. The animation will be displayed using Adobe Illustrator, and will be available for viewing online.

FIG 1 - Current visualizations done by programmers, accompanied data...
Visualizing Surgical Training Databases: Exploratory Visualization, Data Modeling, and Formative Feedback for Improving Skill Acquisition

Abstract

We present a design study and application of visualization in surgical training: an exploration of interactively enhanced surgical training environments. The application uses visualizations to explore, position, and manipulate video data from the surgical training environment. The data is enhanced by a variety of visualizations, including 3D and 2D representations of the environment. The goal is to provide surgeons with a more intuitive understanding of their training environment and to facilitate more effective training.

Figure 1: An interactive visualization for exploring multidimensional data collected during laparoscopic procedures. The visualization includes a 3D model of the surgical environment and a 2D map of the surgical area. The map provides an overview of the surgical area and highlights key features, such as the location of surgical instruments.

1. Introduction

Minimally invasive surgical techniques, such as laparoscopic surgery, have become increasingly popular in recent years. The use of surgical simulation can be beneficial in improving the outcomes of these minimally invasive procedures. The goal of this study is to explore the potential of using visualization techniques to enhance surgical simulation and training.

2. Methods

The visualization system was developed using a variety of techniques, including 3D modeling, 2D mapping, and interactive manipulation. The system was designed to support surgeons in their training and to facilitate more effective training.

3. Results

The visualization system was tested in a variety of surgical training scenarios. The results indicated that the use of visualization techniques can improve the outcomes of surgical training and can help surgeons to achieve better surgical outcomes.

4. Discussion

The results of this study suggest that the use of visualization techniques can improve the outcomes of surgical training and can help surgeons to achieve better surgical outcomes. The visualization system was found to be effective in improving the understanding of surgical training environments and in facilitating more effective training.

5. Conclusion

The results of this study suggest that the use of visualization techniques can improve the outcomes of surgical training and can help surgeons to achieve better surgical outcomes. The visualization system was found to be effective in improving the understanding of surgical training environments and in facilitating more effective training.
Talks
Videos

Video not yet published
Writing for Videos

• Overview
  ○ We present a linked-window visualization system for visualizing surgical training data. This system visualizes data captured as part of the Surgical Genome Project. We will examine the various elements of the system and then demonstrate how this system can enable new discoveries.
We present a system for visualizing multidimensional surgical performance data collected from robotic surgical devices. This dataset captures 300 laparoscopic block-transfer training tasks performed by more than 50 surgeons. Specific variables recorded... If watched in sequence, it would take almost 4 hours to watch all of the video data.
Demos


Thank you Dane Coffey (one of our VERY BEST demoers) for being the guinea pig...
Current writing support

- Mentoring.
- Word of mouth.
- Trial and error.
- Copy an example.
Re-envisioned role of writing

- **Reinterpreting**: Conceive of these important modes of communication as forms of writing and use this to inform teaching, learning resources, feedback, etc.

- **Supporting**:
  - Writing in Computer Graphics Wiki
  - Weekly writing group meetings
  - Weekly interdisciplinary talks series
  - Activities designed with C4W staff
Created support system

ivlab.cs.umn.edu/writing
Standard Writing Guidelines

Some guidelines apply to virtually all English writing. One of the most commonly cited is Strunk and White's *Elements of Style*, which is a very short book that covers English grammar and style.

There are also references which focus primarily on technical writing. Donald Knuth et al. wrote a book titled *Mathematical Writing*, in which the first several pages briefly cover important topics in technical writing. If you are in need of suggestions, ask almost anyone with a Ph.D., as writing skills are required to successfully get a Ph.D.

The following guidelines should generally be followed for all pieces of writing.

### Contents

1. Be honest
   1.1 Cite your sources
   1.2 Admit shortcomings
2. Use proper English
   2.1 Have correct spelling
   2.2 Have correct grammar
   2.3 Be careful with computer terms
2.4 Watch for common problems
   2.4.1 there/their/they're
   2.4.2 its/it's
   2.4.3 than/then
   2.4.4 infer/imply
   2.4.5 e.g. and i.e.
   2.4.6 And more
3. Use proper math notation
4. Edit well
5. Use appropriate style
   5.1 Use clear language
      5.1.1 Avoid words like 'large' and 'fast'
   5.2 Be self-consistent
   5.3 Use active voice (when possible)
6. References
Talk Guidelines

The goal of an academic talk is to communicate your ideas, and to convince others that your approach has merit.[1]

Doing the following will generally help you give a more effective talk.

Contents [hide]

1 General talk advice
   1.1 Be prepared
   1.2 Don’t just read
   1.3 Practice with an audience and time yourself
   1.4 Know takeaway message
   1.5 Finish strong
      1.5.1 “Thank you”
   1.6 Make eye contact
   1.7 Smile
   1.8 Be excited
   1.9 Be audible
   1.10 Know when to be silent
   1.11 Handle problems well
   1.12 Stay calm
2 Presentation software advice
   2.1 Make your slide text legible
   2.2 Make your figures legible
   2.3 Make your slides visually appealing
   2.4 Put key points on slides
   2.5 Make slides as simple as possible
   2.6 Have no unnecessary slides
   2.7 Have all the slides you need
   2.8 Pause when switching slides
   2.9 Use a remote
   2.10 Have backups
3 References

General talk advice
Created support system
Created support system

An Application for Analyzing Stone Tool Artifacts

Added by Lane Phillips, Vamsi Konchada, Matthew Hunstiger, Daniel F. Keefe

View file: An Application for Analyzing Stone Tool Artifacts

Status: This work is not yet finished. Feedback is welcome.

Author's notes

No notes yet.

Comments

Please add comments and feedback below. Be sure that you leave useful feedback.
Writing in Computer Science

Take a look at general writing guidelines, or advice specific to a certain type of writing.

- **Talks**
  - Talk Guidelines: Guidelines for what makes a good talk good.
  - Talk Examples: Examples of talks that illustrate either desirable or undesirable aspects of talks.

- **Demos**
  - Demo Guidelines: Guidelines for how to give an effective software demo.
  - Demo Examples: Examples of demos that either went well or poorly, and discussion on how to give effective demos and handle when things go wrong.

- **Posters**
  - Poster Guidelines: Guidelines for creating a poster that grabs attention and communicates your ideas effectively.
  - Poster Examples: Examples of various posters.

- **Papers**
  - Paper Guidelines: Guidelines for how to create an effective research paper, and how to help it get accepted.
David’s Demo

Demo Examples

Drawing with the Flow

BioWim

Categories: Demos | Examples
Drawing with the Flow (demo)

Drawing with the Flow

Added by David Schroeder

View file: Drawing with the Flow (demo)

Status: This work is not yet finished. Feedback is welcome.

Author's notes

No notes yet.

Comments

Please add comments and feedback below. Be sure that you leave useful feedback.
Example Points of Emphasis / Guidelines

- Begin by introducing yourself.
- Like an elevator pitch, get to the most important point (and visuals or interactive techniques) quickly.
- Learn the right balance of getting the viewers involved (this may change depending on the state of your software).
- The same demo will change dramatically depending upon the audience and purpose.
- Videotape these and review them – you will learn things like we did yesterday!
Future work

• Culture building

• Content accumulation and feedback
  • e.g., similarity to storytelling

• Wider dissemination
  • initial positive feedback from the SIGGRAPH community

• Incorporating into class and research group activities
Thank you