Visualisierung Medizinischer Daten 2

VORBESPRECHUNG

Gabriel Mistelbauer
Matthias Labschütz (Tutor)

Institute of Computer Graphics and Algorithms
TU Wien, Vienna, Austria

Webpage:
http://cg.tuwien.ac.at/courses/MedVis2/VU.html

Abgabesystem:
https://lva.cg.tuwien.ac.at/vismed2/
Introduction

- Visualisierung medizinischer Daten 2
- VU, 3 ECTS
- Mandatory for the master study Medizinische Informatik
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Theoretical goals:
- Get a specialized knowledge in the field of medical visualization study
- Be able to study a state-of-the-art topic
Introduction

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**Theoretical goals:**
- Get a specialized knowledge in the field of medical visualization study
- Be able to study a state-of-the-art topic

**Practical goals:**
- Understand medical imaging data
- Implement basic visualization techniques
- **Solve common medical visualization topics**
Roadmap

- A series of lectures throughout the semester
- Solve a typical topic using common visualization and image processing techniques
Roadmap

- A series of lectures throughout the semester
- Solve a typical topic using common visualization and image processing techniques

- Find a colleague *(group of 2 is preferred)*
- Choose a topic *(list on the webpage)*
- Choose sufficient techniques *(list on the webpage)*
- Choose technologies for the implementation
- Write a short summary *(official registration)*
- Solve the problem using the techniques, or others
- Submit the results with the source code
- Present your results
Address relevant & common tasks in medicine
Address relevant & common tasks in medicine

Examples:

- Analysis of tumors
- Analysis of blood vessels (e.g., lung, brain)
- Segmentation of organs (e.g., lung, liver, heart, brain)
- Segmentation of bones and blood vessels (e.g., lower extremities runoffs)
- Metal artifact correction in CT data sets
- ... or choose a custom topic!
Techniques

- Cover a wide spectrum of medical visualization
- Divided into three categories: easy, medium, hard
- **At least** one technique per category
- Every technique is worth a certain amount of points
- Choose others to reach **at least** 40 points
Techniques

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Examples:
- 2D visualizations (e.g., slices)
- 3D visualizations (e.g., MIP, DVR)
- Segmentation
- ... or choose a custom technique!
Implementation

- Use your own framework, tools, libraries
- VolumeShop (provided on the webpage)
- Techniques **must** be implemented by yourself!
- Matlab: E.g. `imfilter` is not allowed!
- Implementations not necessarily interactive
- CPU implementations sufficient
- For all 3D visualizations (MIP, LMIP, MIDA, DVR) axis-aligned viewing directions are sufficient
+5 for any GPU implementation
+5 for arbitrary viewing directions (e.g., camera)
+5 for interactive 3D rendering (MIP, LMIP, MIDA, DVR, CPR, Iso-surface)
+5 for nice user interface widgets (e.g., 1D or 2D transfer function widgets)
Analysis of tumors

Segmentation with hysteresis thresholding (5 pts)

Visualization with MIP or slices (5 pts)

Region growing (10 pts) to obtain tumor object

Measurements of segmented tumor object (10 pts)

MIDA or DVR (10 pts)
Useful Links

- Dates on the webpage

http://cg.tuwien.ac.at/courses/MedVis2/VU.html

- Choose a specific topic
- Choose a certain set of techniques solving the topic
- Implement the techniques and present the solution
- Oral exam at the end of the semester
## Important Dates

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>1\textsuperscript{st} Submission (registration) deadline</td>
<td>27.10.2015</td>
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<tr>
<td>2\textsuperscript{nd} Submission deadline</td>
<td>12.01.2016</td>
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<tr>
<td>Presentations</td>
<td>13.01.2016</td>
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<tr>
<td></td>
<td>20.01.2016*</td>
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<tr>
<td>Oral exam &amp; review of results</td>
<td>27.01.2016</td>
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<tr>
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<td>28.01.2016</td>
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*At this date the BEST RESULTS will be awarded!

Submissions done via the ABGABESYSTEM
https://lva.cg.tuwien.ac.at/vismed2/
Grading

- VU consists of a practical & theoretical part
- Being negative in one means negative in total

5 pts  Summary of the topics and implementation outlook
40 pts Results of the implementation
5 pts  Presentation of the results

50 pts for the practical part, BUT at least 25 pts

50 pts  Oral exam

50 pts for the theoretical part, BUT at least 25 pts
First Steps

1. Register to the course in TISS
2. Form a group (1-2 members) via Abgabesystem
3. Choose topic, techniques, implementation technologies
4. Submit a short summary
   ▶ About one A4 page (PDF)
   ▶ Topic and list of techniques
   ▶ If custom topic or technique, describe them
   ▶ Technologies used for the implementation

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Thank you!
Questions?

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