Visualisierung Medizinischer Daten 2

VORBESPRECHUNG

Alexey Karimov
Haichao Miao
Viktor Vad
Tobias Sippl (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*
Introduction

- Visualisierung medizinischer Daten 2
- VU, 3 ECTS
- Mandatory for the master study Medizinische Informatik

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

Visualisierung medizinischer Daten 2
VU, 3 ECTS
Mandatory for the master study Medizinische Informatik

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!
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)
Implementation | Example

- Analysis of tumors
- Segmentation with hysteresis thresholding (C1, 5 pts)
- Visualization with MIP or slices (C1, 5 pts)
- Region growing (C2, 10 pts) to obtain tumor object
- Measurements of segmented tumor object (C2, 10 pts)
- MIDA or DVR (C3, 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&lt;sup&gt;st&lt;/sup&gt; Submission (registration) deadline</td>
<td>08.11.2016</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Submission deadline</td>
<td>17.01.2017</td>
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<tr>
<td>Presentations</td>
<td>18.01.2017</td>
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<td></td>
<td>25.01.2017*</td>
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<tr>
<td>Oral exam &amp; review of results</td>
<td>26.01.2017</td>
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<td>27.01.2017</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/](https://lva.cg.tuwien.ac.at/vismed2/)
Grading

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

<table>
<thead>
<tr>
<th>Points</th>
<th>Description</th>
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<tbody>
<tr>
<td>5 pts</td>
<td>Summary of the topics and implementation outlook</td>
</tr>
<tr>
<td>40 pts</td>
<td>Results of the implementation</td>
</tr>
<tr>
<td>5 pts</td>
<td>Presentation of the results</td>
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- **50 pts** for the practical part, **BUT at least 25 pts**

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- **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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