Labs of the Department of Image Processing and Computer Graphics

The main task of the Department of Image Processing and Computer Graphics is research and education in the scientific fields regarding visual (image) information. Our members work in various fields of medical image processing and computer vision (e.g., image reconstruction, segmentation, registration and fusion, shape representation) in collaboration with national and international research groups, and industrial partners, and publish their results in leading forums. Topics of image processing and computer graphics is represented in all levels of our higher education curricula in the form of mandatory courses, elective and special courses, as well as a complete specialization block of courses and PhD research topics. Our laboratories mainly support teaching, but can be also used in research projects.

Contacts

**Department:**
Department of Image Processing and Computer Graphics
University of Szeged
H-6720, Szeged, Árpád tér 2. [1]
Postal address: H-6701 Szeged, PO.Box 652.
Tel.: +36 62 546-396
Fax: +36 62 546-397
See a [detailed description](http://www.inf.u-szeged.hu) how to find us.

**Lab address:**
University of Szeged,
Irinyi Building
H-6725, Szeged, Tisza Lajos körút 103.

<table>
<thead>
<tr>
<th>Lab</th>
<th>Room</th>
<th>Tel.</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image Processing Class Room</td>
<td>IR-012</td>
<td>4428</td>
<td>16</td>
</tr>
<tr>
<td>Mobile Image Processing Lab</td>
<td>IR-012A</td>
<td>4428</td>
<td>9</td>
</tr>
<tr>
<td>3D Lab</td>
<td>IR-012B</td>
<td>4428</td>
<td>3</td>
</tr>
<tr>
<td>Computer Vision Lab</td>
<td>IR-012C (entrance from 012A)</td>
<td>4428</td>
<td>2</td>
</tr>
</tbody>
</table>

**Rules**

- [Labour Safety (in Hungarian)](http://www.inf.u-szeged.hu)
- [Fire Safety (in Hungarian)](http://www.inf.u-szeged.hu)

---

Future students | Current students | Staff | Visitors

About the Institute | Education | Research | Co-operation

SZTE TTIK, Institute of Informatics
Address: 6720 Szeged, Árpád tér 2.     Tel.: +36 62 546-396   Fax: +36 62 546-397
Copyright © 2014, Institute of Informatics, University of Szeged

---
Attandance Register Sheets

- Fire Safety Training (in Hungarian) [6]
- Working Rules Training (in Hungarian) [7]
- Labour Safety Training (in Hungarian) [8]
- Attandance register sheet (in Hungarian) [9]

Equipments

Image Processing Class Room

Hardware equipments:

<table>
<thead>
<tr>
<th>Name</th>
<th>Model, descriptions</th>
<th>Piece(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>Intel Core i7-2600 CPU 3.4 GHz, 8 GB RAM, NVidia Quadro 600 videókártya, 500 GB HDD Windows 7 Enterprise Ubuntu 16.04 LTS 64 bit OS</td>
<td>15</td>
</tr>
<tr>
<td>PC</td>
<td>Intel Core i7-2600 CPU 3.4 GHz, 8 GB RAM, double NVidia Quadro 600 video card, 500 GB HDD Windows 7 Enterprise Ubuntu 16.04 LTS 64 bit OS</td>
<td>1</td>
</tr>
<tr>
<td>Displays</td>
<td>Dell U2410 display</td>
<td>14</td>
</tr>
<tr>
<td>NVidia 3D Wireless Glasses Kit</td>
<td>Quick Start Guide</td>
<td>3</td>
</tr>
</tbody>
</table>

Softwares:

<table>
<thead>
<tr>
<th>Software name</th>
<th>Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adobe Creative Suite CS3 [14]</td>
<td>Windows</td>
</tr>
<tr>
<td>Android Development Tools [16]</td>
<td>Linux</td>
</tr>
<tr>
<td>Blender 2.77a [17]</td>
<td>Windows/Linux</td>
</tr>
<tr>
<td>FreeGLUT + devel [18]</td>
<td>Windows/Linux</td>
</tr>
<tr>
<td>Freemind 0.9.0 [19]</td>
<td>Windows/Linux</td>
</tr>
<tr>
<td>FFTW (Fast Fourier Transform)</td>
<td>Windows/Linux</td>
</tr>
<tr>
<td>GlIMP [21]</td>
<td>Windows/Linux</td>
</tr>
<tr>
<td>GhostScript [22]</td>
<td>Windows/Linux</td>
</tr>
<tr>
<td>GSView [22]</td>
<td>Windows/Linux</td>
</tr>
<tr>
<td>Image + plugins, Fiji [23]</td>
<td>Windows/Linux</td>
</tr>
<tr>
<td>Inkscape [25]</td>
<td>Windows/Linux</td>
</tr>
<tr>
<td>Lapack [26]</td>
<td>Windows/Linux</td>
</tr>
</tbody>
</table>
Mobile Image Processing Lab

The computing capacity, graphics, imaging, and sensor capabilities of current smartphones opened new horizons for the practical use of image processing. Since the creation of our mobile image processing laboratory in the fall of 2010, we continuously seek to follow the rapidly changing trends and keep our collection of devices up-to-date. Besides their use in the classroom, students can borrow devices for their work at home. Relevant facilities of the lab are: smartphones and tablets running Android and iOS systems, 2 MacBook Pro laptops, 2 autostereoscopic 3D devices with stereo cameras, Google Cardboard, specialized textbooks, possibility to join the Apple 'iOS Developer University Program'.

Hardware equipments:

<table>
<thead>
<tr>
<th>Name</th>
<th>Model, description</th>
<th>Piece(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTC Legend</td>
<td>Smart phone with Android OS [User's Guide (in Hungarian)] [35]</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Memory: ROM: 512 MB, RAM: 384 MB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Camera: 5 Mp, autofocus, flash</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CPU: 600 MHz</td>
<td></td>
</tr>
<tr>
<td>HTC Evo3D</td>
<td>Smart phone with Android OS [User's Manual] [36]</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Memory: 1 GB (internal)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Camera: Double 5 Mp, autofocus. (2D photos available with 5 Mp, 3D photos available with 2 Mp), HD video 720p</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CPU: 1,2 GHz Duo Core Qualcomm MSM8260</td>
<td></td>
</tr>
<tr>
<td>HTC Hero</td>
<td>Smart phone with Android OS [User's Manual (in Hungarian)] [37]</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Memory: ROM: 512 MB, RAM: 288 MB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Camera: 5 Mp, autofocus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CPU: Qualcomm MSM7200, 528 MHz</td>
<td></td>
</tr>
<tr>
<td>HTC HD2</td>
<td>Windows Mobile Smart phone [User's Manual (in Hungarian)] [38]</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Memory: ROM: 512 MB, RAM: 448 MB</td>
<td></td>
</tr>
<tr>
<td>Device</td>
<td>Specifications</td>
<td>Count</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
</tbody>
</table>
| **iPhone 4** | Camera: 5 Mp, autofocus, double LED flash  
CPU: 1 GHz  
iOS Smart phone  
*User's Guide (iOS4.2,iOS4.3)* [39],  
*User's Guide (iOS5)* [40]  
Memory: 16 GB  
Camera: 5 Mp  
CPU: 1 Core 1 GHz Cortex-A8 processor | 3     |
| **LG Optimus 3D** | Smart phone with Android OS  
*User's Guide (in Hungarian)* [41]  
Memory: 8 GB (belső)  
Camera: Dual 5MP, autofocus, image stabilizer, LED flash (no flash for 3D)  
CPU: 1 GHz Cortex-A9 CPU | 1     |
| **Nokia E52** | Smart phone with Symbian OS  
*User's Guide (in Hungarian)* [42]  
Memory: 60 MB  
Camera: 3.2Mp, fixed focus, LED flash  
CPU: 600 MHz ARM 11 | 1     |
| **Nokia N97 Mini** | Smart phone with Symbian OS  
*User's Guide (in Hungarian)* [43]  
Memory: 8 GB storage, 128 MB RAM  
Camera: 5 Mp, Carl Zeiss Lens, autofocus, Dual LED flash  
CPU: 434 MHz ARM 11 | 1     |
| **Nokia 5230** | Smart phone with Symbian OS  
*User's Guide (in Hungarian)* [44]  
Memory: 128 MB (SDRAM)  
Camera: 1.2 Mp  
CPU: ARM 11, 443 MHz | 1     |
| **Samsung Galaxy S** | Smart phone with Android OS  
*User's Guide (in Hungarian)* [45]  
Memory: 8 GB  
Camera: 5 Mp, autofocus  
CPU: 1 GHz | 2     |
| **Samsung Galaxy 3** | Smart phone with Android OS  
*User's Guide (in Hungarian)* [46]  
Memory: 170 MB  
Camera: 3 Mp, autofocus  
CPU: ARM11, 667 MHz | 1     |
| **Samsung Omnia II** | Windows Mobile Smart phone  
*User's Guide (in Hungarian)* [47]  
Memory: 2 GB /8 GB / 18GB  
Camera: 5 Mp, autofocus, Dual power LED | 1     |
The devices found in our computer vision laboratory are mostly used in teaching, but could be also used in industrial applications. They can be used for visual inspection of small objects, e.g., shape inspection, visual measurements, inspection of surface defects. We also have special optics to connect to our industrial color image camera, such as a telecentric lens with minimal perspective distortion, a pericentric lens that can map the top and side surfaces of objects into a single image, a hole inspection lens, and a rigid borescope. For visual measurements and imaging we can use structured pattern projector, background lighting and a diffuse light for uniform illumination.

Computer Vision Lab

The devices found in our computer vision laboratory are mostly used in teaching, but could be also used in industrial applications. They can be used for visual inspection of small objects, e.g., shape inspection, visual measurements, inspection of surface defects. We also have special optics to connect to our industrial color image camera, such as a telecentric lens with minimal perspective distortion, a pericentric lens that can map the top and side surfaces of objects into a single image, a hole inspection lens, and a rigid borescope. For visual measurements and imaging we can use structured pattern projector, background lighting and a diffuse light for uniform illumination.

### Hardver equipments:

<table>
<thead>
<tr>
<th>Name</th>
<th>Model, description</th>
<th>Piece</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAI CB-140GE color camera [54]</td>
<td>Datasheet [55]</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>User's Manual [56]</td>
<td></td>
</tr>
</tbody>
</table>
In our 3D laboratory our students can learn about various 3D image acquisition techniques. Our lab has a MESA SR4000 time-of-flight camera, an example for a range-camera, which is the basis for the SLAM technology. This ToF camera can be used to “map” a smaller room or corridor. We also have a NextEngine 2020i 3D scanner that uses structured light to “digitize” in 360° objects fitting in a 20x20x20 cm volume. Both devices produce point cloud data that can be exported to various formats and thus can be further used in 3D modelling and/or CAD software. Our lab is also equipped with 3D monitors and glasses for 3D visualization to aid stereo perception and working with 3D objects.

### 3D Lab

*/*

Future students | Current students | Staff | Visitors
---|---|---|---
About the Institute | Education | Research | Co-operation

---

### Softwares:

<table>
<thead>
<tr>
<th>Software</th>
<th>Operating system</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAI SDK and Control Tool [76]</td>
<td>Windows</td>
</tr>
</tbody>
</table>

---

### Hardver equipments:

<table>
<thead>
<tr>
<th>Name</th>
<th>Model, description</th>
<th>Stock number</th>
<th>Serial number</th>
<th>Piece(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td>Dell XPS 8300, Note: 7L9H85J</td>
<td>S30249</td>
<td>16523186311</td>
<td>1</td>
</tr>
<tr>
<td>Monitor</td>
<td><strong>Samsung S23A750D [77]</strong> Note: 3D</td>
<td>S20309</td>
<td>0086H9MA00367V 1</td>
<td>1</td>
</tr>
<tr>
<td>3D glasses</td>
<td>Samsung SSG-3100GB, Megjegyzés: Monitor accessories</td>
<td>-</td>
<td>CN58BN9618236AD1 64DB745544</td>
<td>1</td>
</tr>
</tbody>
</table>
### 3D Scanner accessories:

<table>
<thead>
<tr>
<th>Name</th>
<th>Piece(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mounting spindle</td>
<td>2</td>
</tr>
<tr>
<td>alap</td>
<td>2</td>
</tr>
<tr>
<td>mounting clamp</td>
<td>2</td>
</tr>
<tr>
<td>black rubber kit (5 pieces)</td>
<td>1</td>
</tr>
<tr>
<td>orange plastic</td>
<td>1</td>
</tr>
<tr>
<td>palm tree model</td>
<td>1</td>
</tr>
<tr>
<td>connecting cable</td>
<td>1</td>
</tr>
<tr>
<td>special mounting set (3 pieces)</td>
<td>1</td>
</tr>
<tr>
<td>felt tipped pen set (4 pieces)</td>
<td>1</td>
</tr>
<tr>
<td>Setup DVDs</td>
<td>4</td>
</tr>
</tbody>
</table>


Links:
1. [http://maps.google.com/maps?q=46.24914,20.146437%28%c3%81rp%c3%a1d%20t%c3%a9r.%29&z=17&hl=hu](http://maps.google.com/maps?q=46.24914,20.146437%28%c3%81rp%c3%a1d%20t%c3%a9r.%29&z=17&hl=hu)

esKit_QuickStartGuide.pdf
[34] http://www.wxwidgets.org/

gend_hu.pdf

C_EVO3D_en.pdf
[37] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/HTC_He

ro_hu.pdf
[38] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/HTC_HD

2_hu.pdf
[39] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/iphone_i

OS4_user_guide.pdf
[40] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/iphone_i

OS5_user_guide.pdf
[41] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/LG_Opti

mus3D_hu.pdf
[42] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/Nokia_E

52_hu.pdf
[43] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/Nokia_N

97mini_hu.pdf
[44] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/Nokia_5

230_hu.pdf
[45] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/Samsung

GalaxyS_hu.pdf
[46] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/Samsung

Galaxy3_hu.pdf
[47] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/Samsung

Omniall_hu.pdf

_hu.pdf

_Mini_hu.pdf
[50] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/SE_Sati

o_hu.pdf
[51] http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/SmartPhone/SE_Viva

z_hu.pdf
[52]
http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/MacBook_Pro_13_en.pdf
http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/hardware/MacBook_Pro_15_en.pdf
http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/vision/CB-140GE.pdf
http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/vision/Manual_CB-140GE.pdf
http://www.opto-engineering.com/pericentric-lenses.html
http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/vision/PC12030HP.pdf
http://www.opto-engineering.com/boroscopic-probes.html
http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/vision/PCBP012.pdf
http://www.opto-engineering.com/hole-inspection-lenses.html
http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/vision/PCHI012.pdf
http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/vision/Telecentric_spec_56675.pdf
http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/vision/mounting_clamp_56871.pdf
http://www.edmundoptics.com/illumination/led-illumination/led-backlights/metaphase-technologies-led-backlights/83-874
http://www.usa.canon.com/cusa/consumer/products/cameras/ef_lens_lineup/ef_8_15mm_f_4l_fisheye_usm
http://www.mesa-imaging.ch/
http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/vision/SR4000_Data_Sheet.pdf
http://www.jai.com/en/support/jai_sdk_and_control_tool
http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/3Dlab/Samsung_S23A750D_Eng.pdf
http://www.inf.u-szeged.hu/en/../../sites/default/files/ipcglab/docs/3Dlab/scanner-techspecs.pdf