D. resources, tools & technology

<FORM align=right ACTION="http://www.google.com/search?hl=en" METHOD="GET"> <INPUT TYPE="hidden" NAME="q" value="+site:www.cs.vu.nl/~eliens/media "> <INPUT TYPE="text" NAME="q" SIZE=40> <INPUT TYPE="submit" VALUE=" "> </FORM>

What do you need to have to start working on your multimedia project? that depends, naturally, on what you want to do. In the following, I will give a brief overview of resources, tools and technolgies that you might find useful or that you might want to explore. This overview consists mainly of urls and a brief characterization and in some cases an indication of a price range.

This overview is definitely not meant to be complete, and is only included for your convenience, so that you don't have to *google*[1] it yourself. In the online version of the book more (online) resources are given, as well as a (clickable) list of all urls that appear (as a footnote) in the book.

resource(s)

This section contains a variety of itmes, including a selection of online tutorials and thesauri. Some examples are given of online museum tours and listings are included of the media art and cultural heritage institutes mentioned in the book. But we will start with introducing briefly with what you need for 3D authoring and rendering, since this is what we have primarily focused on in theis book.

3D authoring & conversion

- vrmlpad – www.parallelgraphics.com/products/vrmlpad
- polytrans – www.okino.com/products.htm
- maya – www.alias.com
- 3dsmax – www.discreet.com
- sketchup – sketchup.google.com/download.html
- flux studio – www.mediamachines.com/products.html

[1] www.google.com

The *polytrans* tool from Okino has been included, since it allows you to convert almost any format into you format of choice, which is a great asset for (re) using models.

3D rendering

- blaxxun – www.blaxxun.com/en/products/contact
- virtools – www.virtools.com
- flux web3d – sourceforge.net/projects/flux
- mediamachines flux – www.mediamachines.com/products.html

As concerns price, VRML-based solutions for authoring and rendering are clearly low-cost, whereas tools such as *Maya* and *Studio Max* require more investment, not only in money but also in learning time. Also *Virtools* is in the higher price range.

tutorials

- html – www.mcli.dist.maricopa.edu/tut
- javascript – www.javascriptkit.com
- php – www.php.net/docs.php
- rdf – www.w3.org/TR/rdf-primer
- vrml – web3d.vapourtech.com/tutorials/vrml97
- java – java.sun.com/docs/books/tutorial
- 3D modeling – www.raph.com/3dartists/tutorials/t-3dsmax.html
- games in VRML – www.3dezine.com/3DEZine/gamestory.html
- ria – www.macromedia.com/resources/business/rich_internet_apps/whitepapers.html

In many cases it is (more) convenient to have working examples at hand. Personally, I advice my students to learn using HTML, VRML, Javascript and the like from one of the online tutorials, which do provide such examples. The *php* documentation is not really a tutorial but does provide useful help and examples.

visual design

- collage – www.artlex.com/ArtLex/c/collage.html
- storyboard – www.thestoryboardartist.com/links.html
- drawing – www.thestoryboardartist.com/tutorial.html

For *visual design* it might be worthwhile to look at some examples, or even take a complete course in drawing.

museum

- van gogh – www.vangoghmuseum.nl
- rijksmuseum – www.rijksmuseum.nl
- canada – www.virtualmuseum.ca/English/index_flashFT.html

- zkm – www.zkm.de
- tate – www.tate.org.uk
- louvre – www.louvre.fr

More inspiration can perhaps be obtained from looking at what musea have to offer. It also gives you an opportunity to update your knowledge of the history of art.

media art

- montevideo – www.montevideo.nl
- V2 – www.v2.nl
- electronic arts intermix – www.eai.org/eai
- cinemanet – www.cinemaneteurope.com
- variable media – www.variablemedia.net
- net art – wwwwwwwww.jodi.org/100cc/index.html
- mediamatic – www.mediamatic.net

Listed above are institutions that play a role in the preservation and dissemination of contemporary media art. Not an institution, but an early pioneer of art on the internet, is *jodi* from *net art*.

virtual tours

- amsterdam – www.channels.nl
- panoramic amsterdam – www.panoramsterdam.nl
- rijksmuseum – www.rijksmuseum.nl/collectie/meesterwerken/?lang=en
- groningen – www.kalamiteit.nl/world/no_cache/museum/vrml/connect.html
- mondriaan – www.artmuseums.harvard.edu/mondrian

Many cities nowadays have virtual tours. And also many musea allow the (online) visitor to have a look at their collection.

cultural heritage

- incca – www.incca.org
- delos – www.delos.info
- echo – echo.mpiwg-berlin.mpg.de/home
- eu – www.iue.it/ECArchives
- cidoc – www.cidoc.icom.org
- collate – www.collate.de
- cimwos – www.xanthi.ilsp.gr/cimwos
- library of congress – www.loc.gov./
- scriptorium – sunsite.berkeley.edu/scriptorium
- tei – www.tei-c.org
- open archives – www.tei-c.org

- topia – topia.telin.nl

Above is a mixed collection of references to organizations and institutions that are in some way involved in cultural heritage projects, either related to traditional art or contemporary art.

games

- gamasutra – www.gamesutra.com
- gamedev – www.gamedev.net
- developer – www.gdmag.com/resources.html
- and more – www.lostlogic.com/postnuke
- games at school – www.freewebs.com/schoolgamemaker
- gamemaker – www.gamemaker.nl/
- game learning – www.gamelearning.net
- scripting – htpp://www.lua.org
- open source – www.delta3d.org
- free source – www.thefreecountry.com/sourcecode/games.shtml

For games, there are several popular sites providing information about new upcoming games, as well as developer's resources, including software available for download.

A recommended open source game engine is *Delta3D*. This package contains a variety of open source software, well-integrated due to the efforts of a dedicated team at the Naval Postgraduate School in Monterey, CA/USA.

serious games

- play2learn – www.play2learn.nl
- nitrogenius – www.serc.nl/play2learn/products/nitrogenius
- at school – rla.oakland.edu/∼ist_699
- primary games – www.primarygames.com
- games at school – www.freewebs.com/schoolgamemaker
- arcade – www.educationarcade.org
- never winter – nwn.bioware.com

Serious games are a new brand of games. Not really new in terms of technology, but new with respect to focus and intent.

tool(s)

There is a great variety of tools, with huge differences in prize. Often, however, you can download a fully functional trial version that will last for a month, and thus may determine the length of your project. A number of tools, however, come with a free (such as Maya) or limited price (such as 3DSMax) student version.

imaging and graphics

- photoshop – www.adobe.com/products/photoshop
- illustrator – www.adobe.com/products/illustrator
- snagit – www.techsmith.com/products/snagit
- camtasia – www.techsmith.com/products/studio

Perhaps the most popular tools among designers are *photoshop* and *illustrator*. Both for capture and image catalogue maintenance I have benefited from *snagit* and *camtasia*, both from *techsmit*.

3D modeling

- vrmlpad – www.parallelgraphics.com/products/vrmlpad
- polytrans – www.okino.com/products.htm
- maya – www.alias.com
- 3dsmax – www.discreet.com
- houdini – www.sidefx.com
- bodystudio – www.reiss-studio.com
- poser – www.curious-labs.com

In addition to the modeling tools already mentioned before, there are many additonal tools and add-ons, such as *houdini* for procedural modeling, *bodystudio* for importing poser models in maya, 3dsmax and other tools, and *poser*, a somewhat outdated tool voor modeling humanoids, with a large collection of ready-made feature material.

Alias Wavefront Maya

- information – www.alias.com
- tutorials – www.alias.com/eng/community/tutorials
- community – www.alias.com/eng/community

A high end 3D modeling tool, with a respectable history and a large community of users. It is in the high end price range and requires significant effort to master.

Discreet 3D Studio Max

- information – www.discreet.com
- tutorials – www.pixel2life.com/tutorials/3dsmax.php?tut=16
- vrml – www.dform.com/inquiry/tutorials/3dsmax

Popular within the game community, *studio max* which includes *character studio* appears to be somewhat more straightforward than maya.

technology

Again, the technology overview is certainly not exhaustive. There are many commercial game engines that are well worth looking at when you engage in a real project. I have included a limited number of open source libraries and toolkits to provide you with a starting point for further exploration.

DirectX SDK 9

- information – www.microsoft.com/directx
- show + 3d – msdn.microsoft.com/library/default.asp?url=/library/en-us/dnwmt/html/vmr_d3d.asp
- SDK – msdn.microsoft.com/library/default.asp?url=/library/en-us/directx9_c/directx/directx9cpp.asp
- frames – www.jkarlsson.com/Articles/loadframes.asp
- animation controller – www.jkarlsson.com/Articles/animation.asp

Direct X is an advanced, yet complicated multimedia platform. The managed code version is significantly less powerful than the C++ version. As indicated in section 4.2 there is a great many of books about DirectX. Some helpful online tutorials are listed above.

Wild Tangent

- information – www.wildtangent.com
- developers – www.wildtangent.com/developer

Wild Tangent is very appropriate for developing games. It provides conveniece layer around DirectX 7, and enables applications to be run via a Web browser, by deploying the COM interfaces for DirectX. It allows for authoring content and dynamics in Javascript and Java. However, also the original X meshes, the file format for DirectX, can be used.

Virtools Software Suite

- information – www.virtools.com

Virtools is announced to be a *comprehensive development platform, for games, virtual reality/simulations and marketing/multimedia applications.*

OpenML

- information – www.khronos.org/openml

OpenML might be the candidate platform for those that wish to develop platform-independent (read non Microsoft windows-tied) multimedia applications. It is *a royalty-free, cross-platform programming environment for capturing, transporting, processing, displaying, and synchronizing digital media - including 2D/3D graphics and audio/video streams. OpenML 1.0 defines professional-grade sample-level stream synchronization, OpenGL extensions for accelerated video processing, the MLdc professional display control API and the ML framework for asynchronous media streaming between applications and processing hardware.*

open source technology

- plib – plib.sourceforge.net
- OpenSceneGraph – www.openscenegraph.org
- OpenSound – www.cnmat.berkeley.edu/OpenSoundControl
- ARToolkit – artoolkit.sourceforge.net
- Mixed Reality Toolkit – www.cs.ucl.ac.uk/staff/rfreeman
- OpenNap – opennap.sourceforge.net
- ImageMagick – www.imagemagick.org
- *cygwin* – www.cygwin.com

There are many open source software toolkits and libraries. My experience with these is mixed. Anyway, when you start working with these make sure that you have sufficient programming skills, and patience. But then the results might be better than you could obtain with more expensive commercial technology. If you run Linux, then open source is probably the only way to go. For windows users, with a unix background, there is *cygwin*, which is a linux-like environment for windows.

XML

- XML Entities – tech.irt.org/articles/js212
- W3C – www.w3.org/Style/XSL
- resources – www.xml.org/xml/resources_cover.shtml
- saxon – saxon.sourceforge.net
- online tutorial – www.zvon.org/HTMLonly/XSLTutorial/Books/Book1/index.html
- Xeena XML editor – www.alphaworks.ibm.com/tech/xeena
- X3D Edit setup – sdk.web3d.org/spring2002disk2/tools/X3D-Edit/index.html

For XML there is a number of generic editors, such as Xeena, which has been adapted for X3D, see appendix B. There are also XSLT processing tools, such as *saxon*, which is the only one I have experience with.

Java

- information – http://www.javasoft.com
- art with Java – http://java.khm.de
- java media framework – http://java.sun.com/products/java-media/jmf/2.1.1/guide/JMFTOC.html
- slide show – http://developer.java.sun.com/developer/technicalArticles/Threads/applet/index.html
- basics – http://developer.java.sun.com/developer/onlineTraining/Programming/BasicJava1/compile.html
- tutorial – http://java.sun.com/docs/books/tutorial/index.html
- advanced – http://developer.java.sun.com/developer/onlineTraining/Programming/JDCBook/
- sound API – http://java.sun.com/products/java-media/sound/samples/JavaSoundDemo
- imaging – http://developer.java.sun.com/developer/technicalArticles/Media/AdvancedImage

Java is the programming language of choice for many computer science curricula. It is a well-documented, relatively easy to use language and the java framework provides a rich collection of libraries. There is also a version for mobile platforms.

student multimedia facilities

To conclude this overview of resources, tools and technologies, I have included a brief description of the student facilities we have for multimedia work at the Vrije Universiteit, spring 2005.

computers 14 fujitsu siemens scenico P320, AMD64 3400+ MHz, 1G memory, 80 GB serial ATA disk, 6 x USB, XFX Geforce 6600 GT 128 Mb AGP, dual display, 2 LCD monitors.

software

- Parallel Graphics VrmlPad – site license
- Alias Maya Complete (5.0 & 6.0) – 10 floating licenses
- 3D Studio Max 7 – 15 floating licenses
- DirectX9c SDK – www.microsoft.com/directx
- WildTangent WebDriver & SDK – www.wildtangent.com/developer
- CG Toolkit – developer.nvidia.com/page/tools.html
- RenderMonkey & SDK – www.ati.com/developer/rendermonkey
- Illustrator & Photoshop CS – www.adobe.com

There is no need to say that this is not the end of the story. More software will be installed, among which *virtools*, hopefully soon. And whenever the opportunity is there, we will no doubt upgrade to more powerful hardware as well!