This appendix contains a list of some resources for computer vision and imaging, including commercial products, open-source projects, organizations, and standards bodies.

## Commercial Products

<table>
<thead>
<tr>
<th>Name</th>
<th>Matlab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Industry standard math package with many scientific package options for various fields including imaging and computer vision. Includes a decent software development environment, providing add-on libraries for computer vision, image processing, visualization, more. Suited well for code development.</td>
</tr>
<tr>
<td>Library API</td>
<td>Extensive API libraries Internal to the SDE.</td>
</tr>
<tr>
<td>SDE</td>
<td>Includes software development environment for coding.</td>
</tr>
<tr>
<td>Open Source</td>
<td>Not for the product, but possibly for some code developed by users.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Mathematica</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Industry standard math package with many scientific package options for various fields, including image processing and computer vision. Excellent for creation of publication-ready visualizations and math notebooks. Add-on libraries for computer vision, image processing, visualization, more.</td>
</tr>
<tr>
<td>Library API</td>
<td>Extensive API libraries Internal to the SDE.</td>
</tr>
<tr>
<td>SDE</td>
<td>Includes a default function-based script development environment, and some code development add-ons.</td>
</tr>
<tr>
<td>Open Source</td>
<td>Not for the product, but possibly for code developed by users.</td>
</tr>
</tbody>
</table>
### Intel TBB, Intel IPP, Intel CILK++

**Name**: Intel TBB, Intel IPP, Intel CILK++

**Description**: Intel provides libraries, languages, and compilers optimized for the IA instruction set. Intel TBB is a multi-threading library for single and multi-core processors, Intel IPP provides imaging and computer vision performance primitives optimized for IA and SIMD instructions and in some cases GPGPU, and Intel CILK++ is a language for writing SIMD/SIMT parallel code.

**Library API**: Extensive API libraries.

**SDE**: No, but Intel CILK++ is a programming language.

**Open Source**: No.

**Link**

### Open Source

**Name**: OpenCV

**Description**: Industry standard computer vision and image processing library, used worldwide by major corporations and others.

**Library API**: Extensive API library.

**SDE**: No.

**Open Source**: BSD license.

**Link**
- [http://opencv.org/](http://opencv.org/)

**Name**: ImageJ - FIJI

**Description**: Application for image processing, visualization, and computer vision. Developed by the USG National Institutes of Health, available for public use. Extensive. FIJI is a distribution of ImageJ with many plug-ins submitted by the user community.

**Library API**: No.

**SDE**: No.

**Open Source**: Public domain use.

**Link**
- [http://fiji.sc/Fiji](http://fiji.sc/Fiji)
<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLFEAT</td>
<td>C library containing a range of common computer vision algorithms for feature description, pattern matching, and image processing.</td>
</tr>
<tr>
<td>VTK</td>
<td>C++ library containing a range of common image processing, graphics, and data visualization functions. Includes GUI widgets. VTK also provides consulting.</td>
</tr>
<tr>
<td>Meshlab</td>
<td>Application for visualizing, rendering, annotating, and converting 3D data meshes such as point clouds and CAD designs. Extensive. Uses the VCG library from ISTI - CNR.</td>
</tr>
<tr>
<td>PfeLib</td>
<td>Library for image processing and computer vision acceleration.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Library API</th>
<th>SDE</th>
<th>Open Source</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLFEAT</td>
<td>Yes</td>
<td>No</td>
<td>BSD license.</td>
<td><a href="http://vlfeat.org">http://vlfeat.org</a></td>
</tr>
<tr>
<td>VTK</td>
<td>Yes</td>
<td>No</td>
<td>BSD license.</td>
<td><a href="http://vtk.org/">http://vtk.org/</a></td>
</tr>
<tr>
<td>PfeLib</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>See reference[495].</td>
</tr>
</tbody>
</table>
### Point Cloud Library (PCL)

**Description**  
Extensive open-source library for dealing primarily with 3D point clouds, including implementations of many cutting-edge 3D descriptors from the latest academic research and visualization methods.

**Library API**  
Yes.

**SDE**  
No.

**Open Source**  
Yes.

**Link**  
http://pointclouds.org/downloads/  
http://pointclouds.org/documentation/  
http://docs.pointclouds.org/trunk/a02944.html

### Shogun Machine Learning Toolbox

**Description**  
Library for machine learning and pattern matching. Extensive.

**Library API**  
Yes.

**SDE**  
No.

**Open Source**  
GPL.

**Link**  
http://shogun-toolbox.org/page/features/

### Halide High-Performance Image Processing Language

**Description**  
C++ language classes optimized for SIMD, SIMT, and GPGPU.

**Library API**  
Yes.

**SDE**  
No.

**Open Source**  
Open-source MIT license.

**Link**  
http://halide-lang.org/

### REIN (Recognition Infrastructure) Vision Algorithm Framework

**Description**  
Framework for computer vision in robotics; uses ROS operating system. See references[397,503].

**Library API**  
Yes.

**SDE**  
No.

**Open Source**  
Open-source MIT license.

**Link**  
http://wiki.ros.org/rein
<table>
<thead>
<tr>
<th>Name</th>
<th>ECTO –Graph Network Construction for Computer Vision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Library for creating directed acyclic graphs of functions for computer vision pipelines, supports threading. Written in a C++/Python framework. Can integrate with OpenCV, PCL and ROS.</td>
</tr>
<tr>
<td>Library API</td>
<td>Yes.</td>
</tr>
<tr>
<td>SDE</td>
<td>No.</td>
</tr>
<tr>
<td>Open Source</td>
<td>Apparently.</td>
</tr>
</tbody>
</table>

**Organizations, Institutions, and Standards**

**Microsoft Research**

http://academic.research.microsoft.com/

Microsoft Research has one of the largest staff of computer vision experts in the world, and actively promotes conferences and research. Provides several good resources online.

**CIE**

http://www.cie.co.at/

International Commission on Illumination, abbreviated CIE after the French name, provides standard illuminant data for a range of light sources as it pertains to color science, as well as standards for the well-known color spaces CIE XYZ, CIE Lab and CIE Luv.

**ICC**

http://www.color.org/index.xalter

International Color Consortium provides the ICC standard color profiles for imaging devices, as well as many other industry standards, including the sRGB color space for color displays.

**CAVE Computer Vision Laboratory**

http://www.cs.columbia.edu/CAVE/

Computer Vision Laboratory at Columbia University, directed by Dr. Shree Nayar, provides world-class imaging and vision research.

**RIT Munsel Color Science Laboratory**

http://www.rit.edu/cos/coloursience/

Rochester Institute of Technology Munsel Color Science Laboratory is among the leading research institutions in the area of color science and imaging, provides a wide range of resources, and has with strong ties to industry imaging giants such as Kodak, Xerox, and others.

(continued)
OPENVX KHRONOS
http://www.khronos.org/openvx

OPENVX is a proposed standard for low-level vision primitive acceleration, operated with the KHRONOS standards group.

SPIE
Society for Optics and Photonics
Journal of Medical Imaging
Journal of Electronic Imaging
Journal of Applied Remote Sensing
http://spie.org/

Interdisciplinary approach to the science of light, including photonics, sensors, and imaging; promotes conferences, publishes journals.

IEEE
CVPR, Computer Vision and Pattern Recognition
PAMI, Pattern Analysis and Machine Intelligence
ICCV, International Conference on Computer Vision
IP, Trans. Image Processing
http://iee.org

Society for publication of journals and conferences, including various computer vision and imaging topics.

CVF
Computer Vision Foundation
http://www.cv-foundation.org/

Promotes computer vision, provides dissemination of papers.

NIST – Image Group (USG)
National Institute Of Standards
http://www.nist.gov/itl/iad/ig/

Promotes computer vision and imaging grand challenges; covers biometrics standards, fingerprint testing, face, iris, multimodal testing, next generation test bed.

I20 - Darpa information innovation office (USG)
http://www.darpa.mil/Our_Work/I2O/Programs/

Extensive array of computer vision and related program research for military applications.
Some work is released to the public via the OpenCatalog.
Journals and Their Abbreviations

CVGIP  Graphical Models /graphical Models and Image Processing /computer Vision, Graphics, and Image Processing
CVIU  Computer Vision and Image Understanding
IJCV  International Journal of Computer Vision
IVC  Image and Vision Computing
JMIV  Journal of Mathematical Imaging and Vision
MVA  Machine Vision and Applications
TMI - IEEE Transactions on Medical Imaging

Conferences and Their Abbreviations

3DIM  International Conference on 3-D Imaging and Modeling
3DPVT  3D Data Processing Visualization and Transmission
ACCV  Asian Conference on Computer Vision
AMFG  Analysis and Modeling of Faces and Gestures
BMVC  Biologically Motivated Computer Vision
BMVC  British Machine Vision Conference
CRV  Canadian Conference on Computer and Robot Vision
CVPR  Computer Vision and Pattern Recognition
CVRMed  Computer Vision, Virtual Reality and Robotics in Medicine
DGCI  Discrete Geometry for Computer Imagery
ECCV  European Conference on Computer Vision
EMMCVPR  Energy Minimization Methods in Computer Vision and Pattern Recognition
FGR  IEEE International Conference on Automatic Face and Gesture Recognition
ICARCV  International Conference on Control, Automation, Robotics and Vision
ICCV  International Conference on Computer Vision
ICCV Workshops
ICVS  International Conference on Computer Vision Systems
ICWSM  International Conference on Weblogs and Social Media  
ISVC  International Symposium on Visual Computing  
NIPS  Neural Information Processing Systems  
Scale-Space  Scale-Space Theories in Computer Vision  
VLSM  Variational, Geometric, and Level Set Methods in Computer Vision  
WACV  Workshop on Applications of Computer Vision

### Online Resources

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVONLINE</td>
<td>Huge list of computer vision software and projects, indexed to Wikipedia</td>
<td><a href="http://homepages.inf.ed.ac.uk/rbf/CVonline/environ.htm">http://homepages.inf.ed.ac.uk/rbf/CVonline/environ.htm</a></td>
</tr>
<tr>
<td>Annotated Computer Vision Bibliography</td>
<td>Huge index of links to computer vision topics, references, software, more</td>
<td><a href="http://www.visionbib.com/bibliography/contents.html">http://www.visionbib.com/bibliography/contents.html</a></td>
</tr>
<tr>
<td>The Computer Industry (David Lowe)</td>
<td>Includes links to major computer vision and imaging product companies</td>
<td><a href="http://www.cs.ubc.ca/~lowe/vision.html">http://www.cs.ubc.ca/~lowe/vision.html</a></td>
</tr>
</tbody>
</table>