# Installing and Using OpenCV

Made to work with the following programs:

- 1. OpenCV 2.3.1
- 2. CMake 2.8
- 3. TBB 4.0 08-09-2011
- 4. Visual Studio 2010

### • Install OpenCV

- Download <u>OpenCV-2.3.1-win-superpack.exe.</u>
  - http://sourceforge.net/projects/opencvlibrary/files/opencv-win/2.3.1/
- Run the executable and install to "C:\OpenCV2.3".
  - NOTE: From this point, the root directory for OpenCV will be called "\$(CVROOT)".
- Open the new folder and the inside folder "opencv". Cut all folders from inside "opencv" and move them back a folder to "\$(CVROOT)". You can remove the opencv folder.

								x
<b>G</b>	:\OpenC	CV2.3	_			<b>- 4</b>	Search Ope	<u>P</u>
Organize 🔻	Include	in library 🔻	Share with 🔻	Burn	New folder			?
🔆 Favorites		Name	^		Date m	odified	Туре	
🧮 Desktop	:	📄 🔋 🔋 🔋			8/17/20	11 3:36 AM	File folde	er
\rm 😺 Download	ds							
Dropbox								
🖳 Recent PI	aces							
<b>B</b>								
Cibraries								
Documer	nts							
📄 Download	ds .							
N s.s								
1 ite	em							

C:\OpenCV2	2.3\opencv	✓ 4 <sub>2</sub> S	earch ope 🔎	
Organize 🔻 🛛 😭 Open	Burn New folder	:== ▼		
Downloads	Name	Date modified	Туре 🔺	
J Music	3rdparty	8/17/2011 3:36 AM	File folder	
Pictures	🌗 android	8/17/2011 3:36 AM	File folder	
	퉬 build	8/17/2011 3:36 AM	File folder	
Videos	🌗 data	8/17/2011 3:36 AM	File folder	
A Hamagraun	🍌 doc	8/17/2011 3:36 AM	File folder	
Romegroup =	🌗 include	8/17/2011 3:36 AM	File folder	
Computer	🍌 modules	8/17/2011 3:36 AM	File folder	
	🍌 samples	8/17/2011 3:37 AM	File folder	
PD_POM Drive (	cmake_uninstall.cmake.in	8/12/2011 9:35 AM	IN File	
RECOVERY (E:)	CMakel ists	8/17/2011 1-43 PM	Text Docume	
27 items selected Show more details				

	a farte Tearre		
C:\OpenCV2	8	<b>-</b> 49	Search Ope 🔎
Organize 🔻 🛛 🛜 Open	Burn New folder	:== •	- 🗌 🔞
Downloads	Name	Date modified	Туре
IViusic     Distance	\mu 3rdparty	8/17/2011 3:36 AM	File folder
	🕕 android	8/17/2011 3:36 AM	File folder
School	🌗 build	8/17/2011 3:36 AM	File folder
Videos	🌗 data	8/17/2011 3:36 AM	File folder
	🌗 doc	8/17/2011 3:36 AM	File folder
😽 Homegroup	🌗 include	8/17/2011 3:36 AM	File folder
	🌗 modules	8/17/2011 3:36 AM	File folder
Computer	🌗 opencv	10/3/2011 11:08 AM	File folder
	🌗 samples	8/17/2011 3:37 AM	File folder
BD-ROM Drive (L	Comake uninstall comake in	8/12/2011 9·35 ΔM	TN File
RECOVERY (E:) 🔻	•		, F
27 items select Show more deta	ted ills		

### Install TBB

• Download TBB (Threading Building Blocks)

http://threadingbuildingblocks.org/ver.php?fid=175.

- Unzip the downloaded "TBB" to the directory "\$(CVROOT)\build\common".
- Remove the "tbb" folder from "\$(CVROOT)\build\common" folder.



- Rename the unzipped folder tbb.
  - NOTE: From this point, "\$(CVROOT)\build\common\tbb" will be called "\$(TBBROOT)"

#### Install CMake

- o Download CMake <u>http://www.cmake.org/cmake/resources/software.html</u>.
- Choose the option, "Add Make to the system PATH for all users".

A CMake 2.8 Setup		×				
	Install Options Choose options for installing CMake 2.8					
By default CMake 2.4	By default CMake 2.8 does not add its directory to the system PATH.					
<ul> <li>Do not add CMak</li> <li>Add CMake to the</li> <li>Add CMake to the</li> </ul>	e to the system PATH e system PATH for all users e system PATH for current user					
🔽 Create CMake De	sktop Icon					
Nullsoft Install System v	2,46 < Back Next :	Cancel				

• If an error is returned, follow the special path addition under "Setting the path variables" section below.



- Setting the path variables
  - WARNING: Be careful when changing path variables. This can severely cripple your computer if you delete the paths that are already in the list.
  - Go to the Start Menu and right click on "Computer". Choose properties.
  - Go to "Advanced System Settings".
  - o Go to "Environment Variables".
  - Under "System Variables" scroll and find Path. Choose Edit.

puter Name   Hard	ware Advanced System Protection Remote	•		
vironment Variables				
Edit System Varia	ble 🗾	ĸ		
Variable name:	Path			
Variable values				
variable value:	PENCV2, 3 (puild (common (tab (pin (a 52 (vc )			
	OK Cancel			
	OK Cancel			
	OK Cancel			
System variables	OK Cancel			
System variables Variable	OK Cancel Value			
System variables Variable OS	OK Cancel Value Windows_NT			
System variables Variable OS Path	OK Cancel Value Windows_NT C:\Program Files (x86)\MiKTeX 2.9\mikt			
System variables Variable OS Path PATHEXT	OK Cancel Value Windows_NT C:\Program Files (x86)\MiKTeX 2.9\mikt .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;			
System variables Variable OS Path PATHEXT PROCESSOR_A	OK Cancel Value Windows_NT C:\Program Files (x86)\MikTeX 2.9\mikt .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS; . AMD64	<b>^</b>		
System variables Variable OS Path PATHEXT PROCESSOR_A	OK Cancel Value Windows_NT C:\Program Files (x86)\MiKTeX 2.9\mikt .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS; . AMD64 New Edit Delete	· ·		

- Add the following paths to the end of the list. **Remember between each path there should be a semicolon.** 
  - C:\Program Files (x86)\CMake 2.8\bin
  - \$(CVROOT)\build\x86\vc10\bin
  - \$(TBBROOT)bin\ia32\vc10
  - IF CMAKE HAD AN ERROR: C:\Program Files (x86)\CMake 2.8\bin
- Run CMake. This will create a library solution for OpenCV.
  - Locate the source code using the "Browse Source" Button. This is where you installed OpenCV or "\$(CVROOT)"
  - Locate where you want to install the library using the "Browse Build" button. I used:
    - "\$(CVROOT)\Build"

A CMake 2.8.5 - C:/OpenCV2.3/build					
<u>F</u> ile <u>T</u> ools <u>O</u> ptions	<u>H</u> elp				
Where is the source code:	C:/OpenCV2.3/		Browse Source		
Where to build the binaries:	C:/OpenCV2.3/build		▼ Browse <u>B</u> uild		
Search:		Grouped Advanced	Add Entry		
Name		Value			
Press Config	ure to update and display new values in re	ed, then press Generate to gene	erate selected build files.		
Configure Generat	e Current Generator: None				

- Click Configure to create the folders and files needed.
- It will ask for you to specify the generator for the project. Choose the version of Visual Studio that you are using.

▲ CMake 2.8.5 - C:/OpenCV2.3/build						
<u>File Tools Options H</u> elp						
Where is the source code: C:/OpenCV2.3/ Browse Source						
Where to build the binaries: C:/OpenCV2.3/build	Browse <u>B</u> uild					
Search:	2 Remove Entry					
Name						
Specify the generator for this pr	oject					
Visual Studio 10						
<ul> <li>Use default native compilers</li> </ul>						
Specify native compilers						
Specify toolchain file for cross	ss-compiling					
<ul> <li>Specify options for cross-cor</li> </ul>	npiling					
Pr	fies.					
Configure						
	Finish Cancel					

- o Click Finish
- $\circ$  Check the "BUILD\_EXAMPLES" option.
- $\circ$  Check the "WITH\_TBB" option.

A CMake 2.8.5 - C:/Open(	CV2.3/build		
<u>File Tools Options </u>	<u>H</u> elp		
Where is the source code:	C:/OpenCV2.3/		Browse Source
Where to build the binaries:	C:/OpenCV2.3/build		▼ Browse <u>B</u> uild
Search:		Grouped Advanced	Add Entry
Name		Value	·
WITH_CUDA WITH_EIGEN WITH_JPP WITH_JPEG WITH_OPENEXR WITH_OPENNI WITH_OPENNI WITH_PNG WITH_QT WITH_QT_OPENGL WITH_TIFF WITH_TIFF WITH_VIDEOINPUT WITH_XIMEA			E
Press Config	ure to update and display new values in re	d, then press Generate to genera	ate selected build files.
<u>C</u> onfigure <u>G</u> enerati	e Current Generator: Visual Studio 10		
	C./OpenCV2.5/But		
Configuring done	III		▼     4

- Press Configure.
- Configure the "TBB\_INCLUDE\_DIR" option with the path to TBB, "\$(CVROOT)/build/common/tbb/include"

CMake 2.8.5 - C:/OpenCV2.3/build						
<u>File T</u> ools <u>O</u> ptions <u>H</u> elp						
Where is the source code: C:/OpenCV2.3/	Browse Source					
Where to build the binaries: C:/OpenCV2.3/build	▼ Browse <u>B</u> uild					
Search:	Grouped Advanced Add Entry Remove Entry					
Name	Value					
TBB_INCLUDE_DIR	TBB_INCLUDE_DIR-NOTFOUND					
BUILD_DOCS						
BUILD_EXAMPLES						
BUILD_NEW_PYTHON_SUPPORT						
BUILD_PACKAGE						
BUILD_SHARED_LIBS						
BUILD_TESTS						
BUILD_WITH_DEBUG_INFO						
CMAKE_BACKWARDS_COMPATIBILITY	2.4					
CMAKE_INSTALL_PREFIX	C:/OpenCV2.3/build/install					
CMAKE_VERBOSE						
CODA_BUILD_CUBIN						
CUDA_BUILD_EMULATION	CUDA CRK ROOT DIR NOTFOUND					
Press Configure to update and display new values in re	d, then press Generate to generate selected build files.					
Configure Generate Current Generator: Visual Studio 10						
evening.n is in. c./openevz.s/bui	evening.n 15 in. c./openevi.5/build					
Configuring done	Configuring done					
<	Þ					

- Press Configure again.
- Press Generate.
- Navigate to the "C:\OpenCV2.3\build" directory. Move through the list and find the "OpenCV" project solution file for Visual Studio.

	+ ED400704	and a state of the				
	C:\OpenCV2.3\build - 4 Search build P					
Organize 🔻 🗙 Oper	Organize 🔻 😖 Open 👻 Burn New folder 🛛 📰 💌 🗍 🔞					
🌒 Music 🔺	Name	Date modified	Туре			
Pictures	n cvconfig	10/3/2011 11:32 AM	C/C++ Heade			
School	📳 INSTALL	10/3/2011 11:32 AM	VC++ Project			
Videos	INSTALL.vcxproj	10/3/2011 11:32 AM	VC++ Project			
	💹 OpenCV	10/3/2011 11:32 AM	Microsoft Visu			
🔣 Homegroup	OpenCVConfig.cmake	10/3/2011 11:24 AM	CMAKE File			
-	OpenCVConfig-version.cmake	10/3/2011 11:24 AM	CMAKE File			
🖳 Computer	🐉 package_source	10/3/2011 11:32 AM	VC++ Project			
🏭 OS (C:)	🚰 package_source.vcxproj	10/3/2011 11:32 AM	VC++ Project			
🕑 BD-ROM Drive (E	🐉 uninstall	10/3/2011 11:32 AM	VC++ Project			
RECOVERY (E:)	🚰 uninstall.vcxproj	10/3/2011 11:32 AM	VC++ Project 👻			
🙀 MEMORYCARD ( 🔻	< III		+			
Image: Note of the second se						

- Watch the bottom left side for messages. Wait to proceed until the messages stay a constant "Ready".
- In Visual Studio, go to Build>Build Solution to create the library. This may take some time. You should not get any failures.



# **STARTING A PROJECT**

- Open Visual Studio
- Either choose "New Project" on the welcome page, or go to File > New > Project
- Choose Win32 Console Application
- Name the project.
- Click OK.
- Click Next.

New Project	and inter		Chevron Latert News		? ×
Recent Templates		.NET Fra	mework 4    Sort by: Default	- III III	Search Installed Templates
Installed Templates		<b>C</b> 5	Wie22 Canada Application	Viewel Co	Type: Visual C++
▲ Visual C++			winsz console Application	Visual C++	A project for creating a Win32 console
ATL		M	MFC Application	Visual C++	application
General		r v			
MFC			Win32 Project	Visual C++	
Test Win32		*	Empty Project	Visual C++	
Other Languages		*	inpy roject	visual et a	Ξ
Other Project Type	s	ATL	ATL Project	Visual C++	
Database Modeling Projects		M 63			
<ul> <li>Test Projects</li> </ul>		FC	MFC DLL	Visual C++	
Online Templates			Windows Forms Application	Visual C++	
		۵ <u>،</u>	CLR Console Application	Visual C++	
		*	CLR Empty Project	Visual C++	
		<b>*</b>	Class Library	Visual C++	
		** **	Custom Wizard	Visual C++	*
<u>N</u> ame:	ColorTrack				
Location:	c:\users\josh\do	cuments\	visual studio 2010\Projects	•	Browse
Solution name:	ColorTrack				✓ Create directory for solution
					Add to source control
					OK Cancel

- Choose the "Console application".
- Uncheck the "Precompiled Header" option.

Win32 Application Wizard - Color	Win32 Application Wizard - ColorTrack					
C:\_	on Settings					
Overview Application Settings	Application type:	Add common header files for:          ATL         MFC				

- Click Finish
- Under Solution Explorer, remove the following files (this step is not required):
  - o stdafx.h
  - o targetver.h
  - {name of project}.cpp
  - o stdafx.cpp
  - o ReadMe.txt
- Under the Solution Explorer > Source Files, right click and choose Add > New Item.
- Make a C++ file with the name "main.cpp".
- Under the Solution Explorer, right click the name of the project and choose Properties.

👓 ColorTrack - Microsoft Visu	ual Studio	-	_		
File Edit View Project I	Build Debug Team Data Tools	Architecture Te	est Analyze Window	Help	
🔁 • 🔤 • 💕 🛃 🥔 🗡	< 1 四 四 一 約 - 代 - 第 - 単   )	Debug •	Win32	- M thresholded	
□ ℃ ‱ № 作  連登	I 2   🗆 🖓 🖓 🖓 🖓	چ 🖓 🖕			
Bolution Explorer	▼ ₽ × main.cpp × ColorTrack.	:pp*			-
ế 🕒 🗿 🖧	(Global Scope)			•	-
Solution 'ColorTrack	k' (1 prc 🔺				÷
Extern	Build		1		-
🔊 🕟 🛄 Heade	Rebuild				
Resou	Clean				
	Project Only	•			
Solu 🏹 Te	Calculate Code Metrics				
Properties	Profile Guided Optimization	+			
ColorTrack Projec	Build Customizations				
2 21 2	Add	•			
▲ Misc	References				
(Name) C 🛍	Class Wizard	Ctrl+Shift+X			
Proiect Dept 🖧	View Class Diagram				
Specifies the proje	Set as StartUp Project				*
	Debug	•			• •
Output	Add Solution to Source Control				<del>-</del> ‡ ×
Show output from	Cut	Ctrl+X Ctrl+V	📣 🖳   🛒 🖃		
×	Remove	Del			
	Rename	F2			
	Unload Project				
	Rescan Solution				
ជ	Open Folder in Windows Explorer				
	Properties				
Ready					

- Under C/C++ > General add the following to "Additional Include Directories":
  - \$(CVROOT)\build\include\opencv
  - \$(CVROOT)\build\include\opencv2
  - o \$(CVROOT)\build\include
  - o \$(TBBROOT)\include\tbb

Configuration: Active(Debug)	Platform: Active(Win32)	• Ca	onfiguration Manager
<ul> <li>Common Properties         <ul> <li>Configuration Properties</li> <li>General</li> <li>Debugging</li> <li>VC++ Directories</li> <li>C/C++</li> <li>General</li> <li>Optimization</li> <li>Preprocessor</li> <li>Code Generation</li> <li>Language</li> <li>Precompiled Headers</li> <li>Output Files</li> <li>Browse Information</li> <li>Advanced</li> <li>Command Line</li> <li>Linker</li> <li>Manifest Tool</li> <li>XML Document Generator</li> <li>Browse Information</li> <li>Build Events</li> <li>Custom Build Step</li> <li>Code Analysis</li> </ul> </li> </ul>	Additional Include Directories Resolve #using References Debug Information Format Common Language RunTime Support Suppress Startup Banner Warnige Level Treat Additional Include Directories Multi- Use Ui C:\OpenCV2.3\build\include\openc C:\OpenCV2.3\build\include\o	Program Database for Edit And Co Yes (/nologo) Level2 (AM2) V v2 include\tbb vults Macros>>	ntinue (/ZI)
4	pecifies ( I[path])	OK Cancel	iore than one.

- Under Linker > General add the following to "Additional Library Directories":
  - o \$(CVROOT)\build\x86\vc10\lib
  - o \$(TBBROOT)\lib\ia32\vc10

ColorTrack Property Pages		? 🛛
Configuration: Active(Debug)	Platform: Active(Win32)	Configuration Manager
<ul> <li>Configuration Properties General Debugging VC++ Directories</li> <li>C/C++ General Optimization Preprocessor Code Generation Language Precompiled Heade Output Files Browse Information Advanced Command Line</li> <li>Linker General Input Manifest File Debugging System Optimization Embedded IDL Advanced Command Line</li> <li>Linker General Input</li> <li>Linker General Input</li> <li>Linker General Input</li> <li>Manifest File Debugging</li> <li>System Optimization Embedded IDL Advanced</li> <li>Command Line</li> </ul>	Output File         Show Progress         Version         Enable Incremental Linking         Suppress Startup Banner         Ignore Import Library         Register Output         Per-user Redirection         Additional Library Dependencies         Use Library Dependency Input         Link Status         Prevent DII Binding         Treat Linker Warning As Errors         Force File Output         Create Hot Patchable Image         Specify Section Attributes    Inherited values          Additional Library Directories	S(OutDir)S(TargetName)S(TargetExt) Not Set Yes (/INCREMENTAL) Yes (/NOLOGO) No No No No No No No No No No No No No

- Under Linker > Input add any required libraries for the program you are making to "Additional Dependencies". If you do not know the name of the libraries, you can look in the \$(CVROOT)\build\x86\v10\lib\" Folder. The TBB libraries must be added.
  - opencv\_core231d.lib
  - opencv\_highgui231d.lib
  - opencv\_video231d.lib
  - opencv\_ml231d.lib
  - opencv\_legacy231d.lib
  - opencv\_imgproc231d.lib
  - opencv\_haartraining\_engined.lib
  - opencv\_objdetect231d.lib
  - tbb\_debug.lib
  - o tbb.lib

onfiguration: Acti	ve(Debug)		Platform: Active(Win32)	•	Configuration Manager
<ul> <li>Configuration Pri General Debugging VC++ Directo</li> <li>C/C++ General Ontimizal</li> </ul>	operties  ories	Add Igny Igr Mc Ad Em	Ititional Dependencies Additional Dependencies opency_core231d.lib opency_video231d.lib opency_video231d.lib	kernel32.lib;user32.lib;gdi32.li	b;winspool.lib;comdlg32.lib;
Preproces Code Ger Languago Precomp Output Fi Browse Ir Advanced	isor heration e lied Heade ≡ formation d Line	Foi De As:	opencv_ml231d.lib opencv_legacy231d.lib opencv_imgproc231d.lib opencv_objdetect231d.lib tbb_debug.lib tbb_lib tbb.lib		
<ul> <li>Linker</li> <li>General</li> <li>Input</li> <li>Manifest</li> <li>Debuggir</li> <li>System</li> <li>Optimiza</li> <li>Embedde</li> </ul>	File 1g tion d IDL		kernel32.lib user32.lib gdi32.lib winspool.lib comdlg32.lib advapi32.lib shell32.lib ole32.lib ole32.lib oleaut32.lib		
Advanced Comman	d Line	<b>Additi</b> Specifi	☑ Inherit from parent or project defaults	OK Cancel	

## Setting up IP Webcam

- Install software for camera. This is useful for your own debugging purposes and connecting to the camera to see if it works. You can use the software to also find the IP address for the camera.
- Most cameras have a feed that you can watch in the following form.
  - "http://{Camera IP Address}/img/video.mjpeg"
- Use this address for file capturing in OpenCV. You can use the command
  - o capture = cvCreateFileCapture("http://192.168.1.102/img/video.mjpeg");