

Project Group Bull's Eye Installationguide of Unity and Pupil Capture

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1 Installation of Unity

Estimated time for installation: 1 hour 30 minutes

1.1 Unity

Unity is a 3D engine for multi-platform game development. It's a tool to create 3D and 2D games with a focus on easy entry area for developers. We use Unity to build Virtual Reality and Augmented Reality applications.

- 1. Download Unity version 5.5.1f and install it.
- 2. In the next step create a new project. Click on the "NEW" button (Fig. 1.1.1) and fill in the details of the project (Fig. 1.1.2). The project name and its location are up to your personal preference.
- 3. Import the provided unitypackage "PGBullsEye" into the newly created project. To do this choose Assets \rightarrow Import Packages \rightarrow Custom Packages \rightarrow PGBullsEye (Fig. 1.1.3). This import might take up to several minutes.

Unity 5.5.1f1 Projects	Getting started
On Disk	PGBullsEye Path: C\Users\Schule\Documents\Vorlesungen\2MSemester\Projektgruppe\Projekt\git\Code\Unity\PGBullsEye Unity version: 5.5.1
in The Cloud	PGBullsEye Path: C:\Users\Schule\Documents\Vorlesungen\2MSemester\Projektgruppe\Projekt\Unity Unity version: 5.5.1
	BullsEye Path: C\Users\Schule\Documents\Vorlesungen\2MSemester\Projektgruppe\Projekt\Unity Unity version: 5.5.1 pgbullseye

Figure 1.1.1: Launch menu of Unity: The red circle marks the button for creating a new project.

4 Unity 5.5.1f1			X
Projects	Getting started	NEW DPEN	MY ACCOUNT
	Project name* New Unity Project	• 3D O 2D Add Asset Package	
	Location* C:\Users\Schule\Documents\Vorlesun	ON Enable Unity Analytics (?)	
	Organization*		
	~		
		Cancel Create project	

Figure 1.1.2:



Figure 1.1.3: Import the Unity package "PGBullsEye"

1.2 Android SDK setup

The Android Software Development Kit (SDK) is required to build applications for Android smartphones. Unfortunatly you can't download the Android SDK seperatly, it can be only downloaded along with the Integrated Development Environment (IDE) Android Studio.

1. First download Android Studio, install and start it. Click on Configure \rightarrow SDK Manager to open the SDK Manager (see figure 1.2.1).



Figure 1.2.1: Launch menu of Android Studio

- 2. Under Android SDK \rightarrow SDK Platforms select Android 7.0 Api 24 (Figure 1.2.2). This Android version is required to build the android application with Unity 5.5.1f.
- 3. For SDK Tools select the three elements (Figure 1.2.3) and click on apply. The specified items are downloaded. This may take some time. Note the path of the AndroidSDKLocation.
- 4. Open unity as described above. Go to File \rightarrow Build Settings select Android as a platform and click Switch Platform.

		Default Preferences					
Q Search	Appearance & Behavio	or > System Settings > And	roid SDK				Res
Appearance & Behavior	Manager for the Android	d SDK and Tools used by An	ndroid Studio				
Appearance	Android SDK Location:	/Users/amatviienko/Libra	ary/Android/s	dk		Edit	
Manus and Toolbars							
- Contras Continues		SDK Platforms	SDK Tools	SDK Update	e Sites		
System Settings	Each Android SDK Pla	atform package includes the	e Android pla	tform and so	urces perta	ining to	
Passwords	an API level by defau	It. Once installed, Android	Studio will au	tomatically c	heck for up	odates.	
HTTP Proxy	Check "show packag	e details" to display individ	ual SDK comp	oonents.			
Updates		Name		API Level	Revision	Status	
Usage Statistics	Androi	d 8.0 (O)	26		1	Not installed	
Android SDK	Androi	id 7.1.1 (Nougat)	25		3	Not installed	_
Android SDK	📥 🗹 Androi	d 7.0 (Nougat)	24		2	Not installed	
Notifications	Androi	d 6.0 (Marshmallow)	23		3	Not installed	
Quick Lists	Androi	d 5.1 (Lollipop)	22		2	Not installed	
Path Variables	Androi	d 5.0 (Lollipop)	21		2	Not installed	
Keyman	Androi	d 4.4W (KitKat Wear)	20		2	Not installed	
Keymap	Androi	d 4.4 (KitKat)	19		4	Not installed	
Editor	Androi	d 4.3 (Jelly Bean)	18		5	Not installed	
Plugins	Androi	d 4.2 (Jelly Bean)	17		5	Not installed	
Build, Execution, Deployment	Androi	d 4.1 (Jelly Bean)	16			Not installed	
Tools	Androi	d 4.0.3 (IceCreamSandwich)	15		>	Not installed	
10013	Androi	d 4.0 (IceCreamSandwich)	14		•	Not installed	
	Androi	d 3.2 (Honeycomb)	13		1	Not installed	
	Androi	d 3.1 (Honeycomb)	12		5	Not installed	
	Androi	d 3.0 (Honeycomb)	11		2	Not installed	
	Androi	d 2.3.3 (Gingerbread)	10		2	Not installed	
	Androi	d 2.3 (Gingerbread)	9		2	Not installed	
	Aboros	n 7 7 leman	Ŷ			Show Package D	etails
•					Cano	Show Package D Apply	eta 0

Figure 1.2.2: Selection of Android 7.0 in the SDK Manager

- 5. Go to Unity \rightarrow Preference \rightarrow External Tools and enter the previously noted AndroidSDKLocation (Note that this is JDK8).
- 6. Unzip the file "tools_r25.2.5" and overwrite the path from the old SDK version with the unzip file.

The next step is optional and shows how you could get your android device recognized by your system

The following steps will be done on the corresponding smartphone device:

To enable USB debugging, you need to enable Developer options. To do this, find the build number in your device's Settings menu. The location of the build number varies between devices. The stock Android setting can be found by navigating to Settings \rightarrow About phone \rightarrow Build number. For different devices and Android versions, refer to your hardware manufacturer (see fig. 1.2.4).

Note: On operating systems older than Android 4.2 (Jelly Bean), the Developer options aren't hidden. Go to Settings \rightarrow Developer options, then enable USB debugging. After you have navigated to the build number using the instructions above, tap on the build number seven times. A pop-up notification saying "You are now X steps away from being a developer" appears, with "X" being a number that



Figure 1.2.3: Selection of Android SDK Tools, Build-Tools and Platform-Tools in the SDK Manager

counts down with every additional tap. On the seventh tap, Developer options are unlocked. Go to Settings \rightarrow Developer options, and check the USB debugging checkbox to enable debug mode when the device is connected to a computer via USB (see fig. 1.2.5).

About device Daseband version
Kernel version
Build number LRX21V.N9005XXUGBOK6
SE for Android status
KNOX version

Figure 1.2.4: Tipping on the build number in the phone settings

\leftarrow Developer options	
Debugging	
USB debugging Debug mode when USB is connected.	
Revoke USB debugging authorization	s
Include bug reports in power menu Include option in power menu for taking a bug report.	
Allow mock locations Allow mock locations.	
View attribute inspection	
Select debug app No debug application set.	
Wait for debugger The application you have selected will open when the debugger has attached.	

Figure 1.2.5: Enable USB debugging in the developer options

2 Installation of Pupil Capture

Estimated time for installation: 30 minutes

Pupil Capture is an eye tracking software by Pupil Labs and is used by our framework. It's open source and you can easily expand it with own plugins. This chapter describes all the steps for installing the PyUVC driver on Windows, which is neccessary to use a camera for Pupil Capture. Before the plugin can be

initialized, please refer to this webpage to find the correct version which matches your OS. Preferably v0.9.12.

2.1 PyUVC driver installation for Pupil Capture

- 1. Download and install the driver libusbk 3.0.7.0.
- 2. Next download Zadig.
- 3. Connect your camera with the computer.
- 4. Run Zadig and open Options. You can see all currently selected option. Select and deselect the options according to figure 2.1.1.
- 5. Now you should see a list of all connected USB devices. Select your device, which is marked with the addition 'composite parent'. A possible selection is shown on the figure 2.1.2.
- 6. Set the driver of your device on 'libusbK (v3.0.7.0)' and press 'replace driver' (Fig. 2.1.3)
- 7. Start Pupil Capture and verify that the driver installation was successful by selecting the camera as the USB device. If this is not the case, please run the driver installation again.

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Device	Opt	ions	Help						
HD US	~	List Ign	All Devices ore Hubs or Composite Parents				~	Edit	
Driver	× ×	Cre Sigr	ate a Catalog File n Catalog & Install Autogenerated Certificate		•	More I WinUSB	nformati (libusb)	ion	
USB II WCID		Adv Log	vanced Mode Verbosity	>		libusb-w libusbK WinUSB	<u>iin32</u> (Microsof	Ð	
10 device	es fou	ind.					Zadig 2.2	.689	

Figure 2.1.1: Selected options

🔀 Zadig	—		\times
Device Options Help			
HD USB Camera (Interface 0)		~	Edit
HD USB Camera (Interface 0) Gaming Keyboard G105 (Composite Parent) Gaming Mouse G502 (Composite Parent) Generic USB Hub Gaming Mouse G502 (Interface 1) Gaming Mouse G502 (Interface 0) Caming Keyboard G105 (Interface 0)		ati)	ion
Gaming Reyboard G105 (Interface 0) HD USB Camera (Composite Parent) Gaming Keyboard G105 (Interface 1) Generic USB Hub		<u>sof</u>	<u>t)</u>
10 devices found.	7	Zadig 2.2	.689

Figure 2.1.2: Example USB camera

🔀 Zadig	– 🗆 🗙
Device Options Help HD USB Camera (Composite Parent)	→ □ Edit
Driver usbccgp (v10.0.15063.0) IbusbK (v3.0.7.0) USB ID 05A3 9320 WCID ² Replace Driver	More Information WinUSB (libusb) libusb-win32 libusbK WinUSB (Microsoft)
10 devices found.	Zadig 2.2.689

Figure 2.1.3: Driver selection

2.2 Plug-In Integration

Once the Pupil Capture software and the drivers are installed, the last step will be integrating our plugin for video streaming. Just follow these few steps:

- 1. If you haven't done it yet, run Pupil Capture once. This should create a directory called "pupil_capture_settings" in your home directory e.g. < root > /Users/ < username > (Windows), /Users/ < username > (Mac).
- 2. Locate the directory called "plugins" in this folder and drop our python file "unity_streaming_plugin" here.
- 3. After restarting Pupil Capture the software should load the plugin automatically, and an additional capture source for streaming video data from an Unity application should appear in the capture selection selector in the world window.