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GATE 2015

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August 4, 2014

View Discussion Improve Article Save Article Like Article ReadDiscussView Discussion Improve Article Save Article Like Article OpenCV is the huge open-source library for computer vision, machine learning, and image processing and now it plays a major role in real-time operation which is very important in today's systems. By using it, one can process images and videos to identify objects, faces, or even the handwriting of a human. When it integrated with various libraries, such as Numpy, python is capable of processing the OpenCV array structure for analysis. To identify image patterns and their various features we use vector space and perform mathematical operations on these features. OpenCV is a library used for real-time image processing through a camera. It is used to do various image processing operations like image capturing, applying real-time filters like Snapchat and Instagram, cropping of images and many more. There are lots of applications that are solved using OpenCV, some of them are listed belowface recognitionAutomated inspection and surveillancenumber of people - count (foot traffic in a mall, etc)Vehicle counting on highways along with their speedsInteractive art installationsAnomaly (defect) detection in the manufacturing process (the odd defective products)Street view image stitchingVideo/image search and retrievalOpenCV FunctionalitiesImage/I/O, processing, display (core, improc, highgui)Object/feature detection (objdetect, features2d, nonfree)Geometry-based monocular or stereo computer vision (calib3d, stitching, videostab)Computational photography (photo, video, superres)Machine learning & clustering (ml, flann)CUDA acceleration (GPU)Steps Required to Add OpenCV library into Android Application Here are the steps required to perform in the same way to add OpenCV library:First of all, go to the official website of OpenCV i.e here you will see various releases with the version name mention above it. You need to download the same version of OpenCV as your android studio version. Here download the android package you will see the android package option there as shown in the image below:Just click on the android option there and you will be redirected to the page where the download will start automatically.After downloading the android package with the version same as with your android studio you have to extract the zip folder to your desired location.Now open Android Studio and create a new project.After creating a new project go to File > New > Import-ModuleNow click on Import-Module as you will see a dialog box like below:Now, import the module of OpenCV. So open the location where you extracted the OpenCV library so go to that location. In this case download location was This PC > downloads.Go to the location > OpenCV > SDK > java and done, the android studio will automatically fetch the module from there.Click on Next > finish. Now you have to modify the project structure also.So go to File > Project Structure > Dependencies in All Dependencies folder click on the + icon then add the module dependency. Click on the app and then select the OpenCV dependency and then next then OK.Now, some files are needed for the android project.So go to app > New > folder > JNI folderThen check the Change Folder Location then rename src/main/jni to src/main/jniLibs then finish.Then go to the android studio and the paste all the copied folder into the newly created JNI folder. And all done!Now OpenCV is added into the android project. If one wants to check that whether it is added successfully he/she can do this by writing the below code into the MainActivity.static{ if(OpenCVLoader.initDebug()){ Log.d("Check","OpenCv configured successfully"); } else{ Log.d("Check","OpenCv doesn't configured successfully"); } } Menú Esta web usa cookies para mejorar la experiencia de usuario.Aceptar Leer másPrivacy & Cookies Policy I am new to android development, and I have been using the command line tools to create an android project. I followed all the instructions given in the tutorial at android developers. However, they are focused more on IDE users. When I tried extending my MainActivity class from ActionBarActivity instead of just Activity, it threw the following error. error: package android.support.v7.app does not exist It was complaining about this import statement. import android.support.v7.app.ActionBarActivity; I made sure to visit the SDK manager, and it says Android Support Library is installed. I am truly stumped on this one, and I would really appreciate any help you guys could give me. This might help: History of the mobile operating system Android by Google The version history of the Android mobile operating system began with the public release of the Android beta on November 5, 2007. The first commercial version, Android 1.0, was released on September 23, 2008. Android is developed by Google in which new major releases are announced at Google I/O along with its first public beta to supported Google Pixel devices and its stable version released later in the year. Overview See also: Android software development The development of Android started in 2003 by Android, Inc., which was purchased by Google in 2005.[1] There were at least two internal releases of the software inside Google and the Open Handset Alliance (OHA) before the beta version was released.[2][3] The beta was released on November 5, 2007.[4][5] while the software development kit (SDK) was released on November 12, 2007.[6] Several public beta versions of the SDK were released.[7] These releases were done through software emulation as physical devices did not exist to test the operating system. The first public release of Android 1.0 occurred with the release of the T-Mobile G1 (aka HTC Dream) in October 2008.[8] Android 1.0 and 1.1 were not released under specific code names.[9] The code names "Astro Boy" and "Bender" were tagged internally on some of the early pre-1.0 milestone builds and were never used as the actual code names of the 1.0 and 1.1 releases of the OS.[10] The project manager, Ryan Gibson, conceived using a confectionery-themed naming scheme for public releases, starting with Android 1.5 Cupcake. Google announced in August 2019 they were ending the confectionery theming scheme to use numerical ordering for future versions.[11] The first release under the numerical order format was Android 10, which was released September 2019. In 2017, Google announced that Google Play would begin to target a recent Android version.[12] The current target API level that new apps and app updates must target is Android 11 (API level 30).[13] New apps must target Android 12 (API level 31) in August 2022. App updates will be required to target API level 31 in November 2022. Name Internal codename[9] Version number(s) APILevel Initial stablerelease date Latest security patch date[14] Latest Google Play Services version[15](release date) Android 1.0 — Old version, no longer maintained: 1.0.1 September 23, 2008 — — Android 1.1 Petit Four Old version, no longer maintained: 1.1.2 February 9, 2009 Android Cupcake Old version, no longer maintained: 1.5.3 April 27, 2009 Android Donut Old version, no longer maintained: 1.6.4 September 15, 2009 Android Eclair Old version, no longer maintained: 2.0.1 October 27, 2009 Old version, no longer maintained: 2.0.1.6 December 3, 2009 Old version, no longer maintained: 2.1.7 January 11, 2010[16] Android Froyo Old version, no longer maintained: 2.2 — 2.2.3.8 May 20, 2010 3.2.25 (October 2014) Android Gingerbread Old version, no longer maintained: 2.3 — 2.3.2.9 December 6, 2010 10.0.84 (November 2016) Old version, no longer maintained: 2.3.3 — 2.3.7.10 February 9, 2011 Android Honeycomb Old version, no longer maintained: 3.0 11 February 22, 2011 Old version, no longer maintained: 3.1 12 May 10, 2011 Old version, no longer maintained: 3.2 — 3.2.6.13 July 15, 2011 Android Ice Cream Sandwich Old version, no longer maintained: 4.0 — 4.0.2.14 October 18, 2011 14.0.49 (February 2019) Old version, no longer maintained: 4.0.3 — 4.0.4.15 December 16, 2011 Android Jelly Bean Old version, no longer maintained: 4.1 — 4.1.2.16 July 9, 2012 21.35.56 (September 2021) Old version, no longer maintained: 4.2 — 4.2.2.17 November 13, 2012 Old version, no longer maintained: 4.3 — 4.3.1.18 July 24, 2013 Android KitKat Old version, no longer maintained: 4.4 — 4.4.4.19 October 31, 2013 October 2017 22.26.15 (July 2022) Old version, no longer maintained: 4.4W — 4.4W.2.20 June 25, 2014 4 Android Lollipop Old version, no longer maintained: 5.0 — 5.0.2.21 November 4, 2014[17] November 2017 Old version, no longer maintained: 5.1 — 5.1.1.22 March 2, 2015[18] March 2018 Android Marshmallow Macadamia Nut Cookie Old version, no longer maintained: 6.0 — 6.0.1.23 October 2, 2015[19] August 2018 Android Nougat New York Cheesecake Old version, no longer maintained: 7.0 24 August 22, 2016 August 2019 Old version, no longer maintained: 7.1 — 7.1.2.25 October 4, 2016 October 2019 Android Oreo Oatmeal Cookie Old version, no longer maintained: 8.0 26 August 21, 2017 January 2021 Old version, no longer maintained: 8.1 27 December 5, 2017 October 5, 2017 October 2021 Android Pie Pistachio Ice Cream[20] Old version, no longer maintained: 9 28 August 6, 2018 January 2022 Android 10 Quince Tart[21] Older version, yet still maintained: 10 29 September 3, 2019 August 2022 Android 11 Red Velvet Cake[21] Older version, yet still maintained: 11 30 September 8, 2020 Android 12 Snow Cone Old version, yet still maintained: 12 31 October 4, 2021 Android 12L Snow Cone v2 Older version, yet still maintained: 12.1[a] 32 March 7, 2022 Android 13 Tiramisu[23] Current stable version: 13 33 August 15, 2022 Legend: Old versionOlder version, still maintainedLatest versionLatest preview versionFuture release history The following tables show the release dates and key features of all Android operating system updates to date, listed chronologically by their official application programming interface (API) levels. Android 1.0 Android 1.0 (API 1) Applications. Expanded Gesture Framework and a new GestureBuilder development tool. Android 1.6 home screen Android 2.0 Eclair Android 2.0 Eclair (API 5) On October 27, 2009, the Android 2.0 SDK was released, based on Linux kernel 2.6.29 and codenamed Eclair.[42] Changes include the ones listed below [43] Version Release date Features Image(s) 2.0 October 27, 2009[44] Expanded Account Sync, allowing users to add multiple accounts to a device for synchronization of an email and contacts. Microsoft Exchange email support, with a combined inbox to browse an email from multiple accounts in one page. Bluetooth 2.1 support. Ability to tap a contacts photo and select to call. SMS, or email the person. Ability to search all saved SMS and MMS messages, with the added ability to delete the oldest messages in a conversation automatically detected when a defined limit is reached. Numerous new camera features, including flash support, digital zoom, scene mode, white balance, color effect and Macro focus. Improved typing speed on a virtual keyboard, with a smarter dictionary that learns from word usage and includes contact names as suggestions. Refreshed browser UI with bookmark thumbnails, double-tap zoom and support for HTML5. Calendar agenda view enhanced, showing attending status for each invitee, and the ability to invite new guests to events. Optimized hardware speed and revamped UI. Support for more screen sizes and resolutions, with better contrast ratio. Improved Google Maps 3.1.2. MotionEvent class enhanced to track multi-touch events.[45] Pressure-sensitive touch support in API, even though no according hardware existed at that time.[46][47] Addition of live wallpapers, allowing the animation of home-screen background images to show movement. Android 2.0.1 Eclair (API 6) Version Release date Features Image(s) 2.0.1 December 3, 2009[48] Minor API changes, bug fixes and framework behavioral changes. Android 2.1 Eclair (API 7) Version Release date Features Image(s) 2.1 January 11, 2010[49][16] Minor amendments to the API and bug fixes. Android 2.1 home screen Android 2.2 Froyo (API 8) On May 20, 2010, the SDK for Android 2.2 (Froyo, short for Frozen yogurt) was released, based on Linux kernel 2.6.32.[50] Version Release date Features Image(s) 2.2 May 20, 2010 Speed, memory, and performance optimizations.[51] Additional application speed improvements, implemented through JIT compilation.[52] Integration of Chrome's V8 JavaScript engine into the Browser application. Support for the Android Cloud to Device Messaging (C2DM) service, enabling push notifications. Improved Microsoft Exchange support, including security policies, auto-discovery, GAL look-up, calendar synchronization and remote wipe.[53] Improved application launcher with shortcuts to Phone and Browser applications. USB tethering and Wi-Fi hotspot functionality[54] Option to disable data access over a mobile network. Updated Market application with batch and automatic update features.[51] Quick switching between multiple keyboard languages and their dictionaries. Support for Bluetooth-enabled car and desk docks. Support for numeric and alphanumeric passwords. Support for remote view fields in the Browser application.[55] The browser now shows all frames of animated GIFs instead of just the first frame only. Support for installing applications to expandable memory. Adobe Flash support.[56] Support for high-PPI displays (up to 320 ppi), such as four-inch 720p screens.[57] Gallery allows users to view picture stacks using a zoom gesture. Android 2.2 home screen 2.1 September 27, 2010[58] Bug fixes, security updates and performance improvements. 2.2.2 January 21, 2011[59] Minor bug fixes, including SMS routing issues that affected the Nexus One.[60] 2.2.3 November 21, 2011[61] Two security updates. Android 2.3 Gingerbread (API 9) On December 6, 2010, the Android 2.3 (Gingerbread) SDK was released, based on Linux kernel 2.6.35.[62][63] Changes included:[62] Version Release date Features Image(s) 2.3 December 6, 2010[63] Updated user interface design with increased simplicity and speed. Support for extra-large screen sizes and resolutions (WXGA and higher).[57] Native support for SIP VoIP internet telephones. Faster, more intuitive text input on a virtual keyboard, with improved accuracy, better suggested text and voice input mode. Enhanced copy/paste functionality, allowing users to select a word by pressing-holding, copying, and pasting. Support for Near Field Communication (NFC), allowing the user to read an NFC tag embedded in a poster, sticker, or advertisement. New audio effects such as reverb, equalization, headphone virtualization, and bass boost. New Download Manager, giving users easy access to any file downloaded from the browser, email, or another application. Support for multiple cameras on the device, including a front-facing camera, if available. Support for WebM/VP8 video playback, and AAC audio encoding. Improved power management with a more active role in managing applications that are keeping the device awake for too long. Enhanced support for native code development. Switched from YAFFS to ext4 on newer devices.[64][65] Audio, graphical, and input enhancements for game developers. Concurrent garbage collection for increased performance. Native support for more sensors (such as gyroscopes and barometers). First Android version to feature an Easter egg. It was an image of the Bugdroid standing next to a zombie gingerbread man, with many more zombies in the background. Android 2.3 home screen 2.3.1 December 22, 2010[66] Improvements and bug fixes for the Nexus S. 2.3.2 January 21, 2011[67] Improvements and bug fixes for the Nexus S. Android 2.3.3 Gingerbread (API 10) Version Release date Features Image(s) 2.3.3 February 9, 2011[68] Several improvements and API fixes.[69] 2.3.4 April 28, 2011[70] Support for voice or video chat using Google Talk.[71] Open Accessory Library support. Open Accessory was introduced in 3.1 (Honeycomb) but the Open Accessory Library grants 2.3.4 added support when connecting to a USB peripheral with compatible software and a compatible application on the device.[72] Switched the default encryption for SSL from AES256-SHA to RC4-MD5.[73][74] Fixed a spontaneous reboot on Samsung Galaxy S Plus. 2.3.5 July 25, 2011[75] Improved network performance for the Nexus S 4G, among other fixes and improvements. Fixed a Bluetooth bug on Samsung Galaxy S. Fixed a Wi-Fi crash on Samsung Galaxy S Plus. Improved the Gmail application. Shadow animations for list scrolling. Camera software enhancements.[76] Improved battery efficiency. 2.3.6 September 2, 2011[77] Fixed a voice search bug.[b] 2.3.7 September 21, 2011 Google Wallet support for the Nexus S 4G. Android 3.0 Honeycomb (API 11) On February 22, 2011, the Android 3.0 (Honeycomb) SDK – the first tablet-only Android update – was released, based on Linux kernel 2.6.36.[80][81][82][83] The first device featuring this version, the Motorola Xoom tablet, was released on February 24, 2011.[84] The update's features included:[80] Version Release date Features Image(s) 3.0 February 22, 2011[82] Optimized tablet support with a new "holographic" user interface (removed again the following year with version 4.2).[85] New Easter egg, an image of a Tron-themed bumblebee. Added System Bar, featuring quick access to notifications, status, and soft navigation buttons, available at the bottom of the screen. Added the Action Bar, giving access to contextual options, navigation, widgets, or other types of content at the top of the screen. Simplified multitasking – tapping Recent Applications in the System Bar allows users to see snapshots of the tasks underway and quickly jump from one application to another. Redesigned the keyboard, making typing fast, efficient and accurate on larger screen sizes Simplified, more intuitive copy/paste interface. Multiple browser tabs replacing browser windows, plus form auto-fill and a new "incognito" mode allowing somewhat anonymous browsing. Quick access to camera exposure, focus, flash, zoom, front-facing camera, time-lapse, and other camera features. Ability to view albums and other collections in full-screen mode in Gallery, with easy access to thumbnails for other photos. New two-pane Contacts UI and Fast Scroll to let users easily organize and locate contacts. New two-pane Email UI to make viewing and organizing messages more efficient, allowing users to select one or more messages. Hardware acceleration. Support for multi-core processors. Ability to encrypt all user data. HTTPS tact improved with Server Name Indication (SNI). Filesystem in Userspace (FUSE; kernel module). Disallows applications from having to write access to secondary storage (memory cards on devices with internal primary storage) outside of designated, application-specific directories. Full access to primary internal storage is still allowed through a separate application-level permission.[86][87] Android 3.0 home screen Android 3.1 Honeycomb Android 3.1 Honeycomb (API 12) Version Release date Features Image(s) 3.1 May 10, 2011[88] UI refinements. Connectivity for USB accessories (USB On-The-Go). Expanded Recent Applications list. Resizable Home screen widgets. Support for external keyboards and pointing devices. Support for joysticks and gamepads. Support for FLAC audio playback.[89][90] High-performance Wi-Fi lock, maintaining high-performance Wi-Fi connections when the device screen is off. Support for HTTP proxy for each connected Wi-Fi access point. Android 3.2 Honeycomb Android 3.2 Honeycomb (API 13) Version Release date Features Image(s) 3.2 July 15, 2011[91] Improved hardware support, including optimizations for a wider range of tablets. Increased ability of applications to access files on the SD card, e.g. for synchronization. Compatibility display mode for applications that have not been optimized for tablet screen resolutions. New display support functions, giving developers more control over display appearance on different Android devices.[92] 3.2.1 September 20, 2011 Bug fixes

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