

## What's New in Version 2.23

1. Added 'Foreground texture'-setting to the Background-removal-manager & 'Background texture'-setting to the Background-color/user components, to copy their outputs to render textures.
2. Added Opaqueness-setting to the background-image components, to set image transparency.
3. Updated blob detector (BlobDetectionDemo-scene), to work more consistently across frames.
4. Updated SimpleGestureListener-component (1<sup>st</sup> avatar demo-scene), to make gesture testing easier.
5. Fixed 'Keep last pose' behavior in AvatarController-component.

## What's New in Version 2.22.x

1. Added 'Dont destroy across scenes'-setting to KM (by default KM is destroyable now).
2. Added OnUserAdded & OnUserRemoved-events to the KinectManager-component.
3. Added IsInitFailed()-method to KM, to provide information if the sensor initialization has failed.
4. Removed KinectDataServer & KinectDataClient-scripts and scenes, to avoid deprecation errors.
5. Fixed AvatarController repositioning issue for some models, when 'Apply muscle limits' is utilized.
6. Fixed and improved the feet detection in AvatarController, when 'Grounded feet' is utilized.
7. Fixed scene restart in KM, to prevent endless waiting for sensor start-up.
8. Upgraded the K2-asset to Unity 2021.3.0f1.
9. (2.22.1) Updated AvatarController to better handle muscle limits and offset nodes.
10. (2.22.1) Added 'Keep last pose'-setting to AvatarController, to keep avatar's pose after the user gets lost.

## What's New in Version 2.21

1. Added 'Fixed step indices' to the user detection orders, to allow user detection in adjacent areas.
2. Added 'Central position'-setting to the KinectManager, to allow user detection by distance, according to the given central position.
3. Added 'Users face backwards'-setting to the KM, to ease the backward-facing setups.
4. Updated NuiTrack-sensor interface, to support the newer NuiTrack SDKs (thanks to Renjith P K).
5. Cosmetic changes in several scenes and components.

## What's New in Version 2.20

1. Added blob detection demo scene, to show how to detect blobs in the depth image.
2. Added mocap-animator scene, to demonstrate saving of Kinect-captured motion into Unity animation.
3. Updated body recorder to save k4b-files, compatible with the K4A-asset.
4. Updated body player to play both kb & k4b body data recordings.
5. Upgraded the K2-asset to Unity 2019.1.0.

## What's New in Version 2.19.2 & 2.19.3

1. Added 'Horizontal offset'-setting to the ModelSelector-component of FittingRoomDemo1.
2. Added 'Show as points'-setting to the SceneMeshVisualizer-component.
3. Commented out GUI-texture related code (removed in Unity 2019.x).
4. Improved UserBlendShader & UserBodyBlender-component (big thanks to Berkay Daver).
5. Fixed i18n-issue in recording & replaying body data (big thanks to Claus Helfenschneider).
6. Updated the AvatarController-component to allow zero-rotations of the leg joints.
7. Updated the PoseDetectorScript-component to detect moving poses, as well.
8. Replaced 'Standard Assets'-folder with Kinect2UnityWrapper library.
9. (2.19.3) Added MoveLeft and MoveRight gestures, fixed and updated various components.
10. (2.19.3) Fixed KinectManager compilation errors in Unity 2020.

## What's New in Version 2.19.0 & 2.19.1

1. Updated 4<sup>th</sup> face-tracking demo scene to animate blend shapes instead of rigged model (big thanks to Chris Phyffer).
2. Added NuiTrack face-tracking to the NuiTrack-interface (limited, compared to Kinect).
3. Added face-properties API to the sensor interfaces and face-tracking manager.
4. Fixed upper-arm orientations, when Kinect-v1 interface is used (big thanks to Jorge Negreiros).
5. Various smaller fixes in multiple scenes and script components.
6. (2.19.1) Added 'Horizontal offset'-setting to the AvatarController-component (big thanks to r618).
7. (2.19.1) Quick-fix for missing NetworkBehaviour-component in Unity 2019.1.

## What's New in Version 2.18.x

1. Added 'Body blur filter'-setting to the Background-removal-manager, to allow finer control over body silhouette blurring in the process of background removal.
2. Added 'Erode iterations 0'-setting to the Background-removal-manager, to allow initial erode of the body silhouette, before the dilate-filter.
3. Added 'Body contour color'-setting to the Background-removal-manager, to allow the color of the resulting body contour to be adjusted for the target environment (thanks to N. Naydenov).
4. Added new gesture-poses – TouchRightElbow & TouchLeftElbow (thanks to N. Naydenov).
5. Updated Model-selector-component to allow single dressing menu to be reused by multiple model selectors in the Fitting-room-demo1 scene (thanks to Arhan).
6. Updated KinectManager to check for existing KinectGestures-component, when there are gesture listeners in the scene.
7. Moved Plugins & Standard-Assets-folders to the K2Examples-folder, to meet the Asset-store requirement for a single-folder asset.
8. (2.18.1) Updated arm and leg orientation estimation, to improve the clothing-model poses in fitting room demo scenes (thanks to Alay M).

9. (2.18.1) Updated avatar scaler to avoid model scaling, when the user is too close (thanks to r618).

## What's New in Version 2.17.3

1. Updated NuiTrack-interface to utilize the depth-to-color coordinate mapping for RealSense D400-series (thanks Hyeon Myeong Park).
2. Fixed shoulder-joints orientations, when the body is turned (thanks to Victoria Bloom).
3. Fixed hand-cursor position in InteractionManager, when 'Screen space - Camera' is used for UI (thanks to Marcelo Roca).
4. Added hand-to-fist tracking in AvatarController for non-Kinect sensors (thanks to Francesco Peciarolo).
5. Added 'Standard user distance'-setting to KinectHolographicViewer-scene (thanks to Taha Farooq).
6. Fixed color-image orientation in scene-mesh visualizer for different sensors (thanks to Leo Yoon).
7. Added left & right foot emulation to the NuiTrack body tracking (thanks to Luca Boro).
8. Fixed the NuiTrack-interface scripts not to break the UWP-builds.

## What's New in Version 2.17.1 & 2.17.2

1. Fixed NuiTrack-interface to work with Realsense D415/D435 & Orbbec Persee (thanks to Juha Kauppinen & Batuhan Yapanoglu).
2. Added NetworkAvatarDemo2-scene, to demonstrate first-person avatar control over the network.
3. Fixed UserAvatarMatcher-component used by KinectAvatarsDemo4, to track correctly incoming and outgoing users (thanks to Xiaoyang Zhu).
4. (2.17.2) Fixed detection and removal of multiple users in NuiTrack-interface & Orbbec-Astra-interface (many thanks to Young-Gi Yoon).
5. (2.17.2) Updated NuiTrack-interface to process the color stream of Orbbec Astra-Pro.

## What's New in Version 2.17

1. Added support for NuiTrack body tracking SDK, in means of depth, color, body & hand streams (thanks to Juha Kauppinen).
2. Added SkeletonCollider-component and SkeletonColliderDemo-scene, to demonstrate user collisions with virtual objects (thanks to Sean Carmichael).
3. Fixed pixel issues of User-body-blender in the 1<sup>st</sup> Fitting-room demo scene (thanks to Stanislav Chuvi).
4. Fixed face-tracking issues in the network-client setup (thanks to Arturo Simon Garcia Jimenez).
5. Postponed interface to Astra SDK 2.0, due to insufficient features and lack of support from Orbbec.

## What's New in Version 2.16

1. Added initial version of Orbbec Astra interface, in means of depth, color & body streams.
2. Added NetworkAvatarsDemo-scene, to show client side of body data transfer over the network.
3. Added 4<sup>th</sup> avatars demo scene, to show the avatars of all currently detected users.
4. Added 5<sup>th</sup> face-tracking demo scene, to demonstrate face-point overlays.
5. Updated PortraitBackground-component, to support various screen aspect ratios.
6. Fixed the app-pause/resume issue on UWP platform.
7. Other little fixes and updates of various scenes and components.
8. Fixed Orbbec Astra interface to process correctly the color streams of Astra & Astra-Pro (v2.16.1).
9. Added Orbbec Astra & Astra-Pro coordinate mapping (v2.16.2).
10. Added face-tracking support to KinectDataServer & KinectDataClient (v2.16.2).

## What's New in Version 2.15

1. Updated all demo-scenes to use UI-texts and textures instead of deprecated GUI-text & texture.
2. Updated 2<sup>nd</sup> fitting-room demo to allow background image behind the user and clothing models.
3. Added 'Background plane'-setting to AvatarController and AvatarScaler-components, to allow humanoid model to overlay plane-rendered background.
4. Added 'Apply median filter'-setting to the BackgroundRemovalManager-component.
5. Added HeadMover-script component, to allow moving the avatars by the head-tracking VR systems.
6. Added BlendShapeFaceController-sample component, to be used by face models with blend shapes.
7. Updated the user-texture in KinectManager to render-texture, to improve scene performance.

## What's New in Version 2.14

1. Updated 1<sup>st</sup> fitting-room demo to allow background image behind the user and clothing models.
2. Updated 1<sup>st</sup> background-removal demo to show the user image on background layer.
3. Updated 'Allow turn arounds'-setting, to allow user processing when turned around (experimental).
4. Added KinectDataClient-component, K2-dummy sensor interface & support for multiple platforms.
5. Added 'External hand rotations'-setting to AvatarController, to allow external hand control.
6. Added 'Process cursor movement'-setting to InteractionInputModule, to allow UI elements hovering.
7. Added SequentialGestureListener-sample, to demonstrate sequential gesture processing.
8. Added RefreshAvatarUserIds() and 2<sup>nd</sup> GetJointPosColorOverlay()-functions to KinectManager's API.
9. Upgraded K2-asset to require Unity editor v5.5.0 or later.
10. Fixes and updates of several scenes and components (v2.14.1).

## What's New in Version 2.13

1. Added speech recognition support to the Windows Universal-10 builds.
2. Added KinectProjectorDemo scene based on RoomAliveToolkit calibration, to demonstrate 3D overlays over the real users, from projector point of view.

3. Added 'Apply muscle limits'-setting to the AvatarController-component, to limit the avatar bone rotations to the muscle limits, as set-in-Unity avatar definitions.
4. Added support for application pause & resume in Windows Universal-10 builds.
5. Added 'Skip remote avatars' and 'Estimate joint velocities'-settings to KinectManager (courtesy of Andrew/Andrzej W).
6. Added 'External head rotation'-setting to the AvatarController-component (courtesy of Andrzej W).
7. Added 'Raised right horizontal left hand' and 'Raised left horizontal right hand'-poses to the KinectGestures-component (courtesy of Andrzej W).
8. Added UserHandVisualizer-script component, to allow 3d visualization of the user's hands.
9. Updated FacetrackingManager-component, to optimize the HD face-model updates.
10. Fixed KinectHolographicViewer-scene, when the user moves forwards or backwards.

## What's New in Version 2.12.x

1. Added DepthColliderDemo2D-scene, to demonstrate user interaction possibilities in 2D mode.
2. Added Kinect movie demo, to show how to achieve cinematic effect when the user moves.
3. Added inverse background-removal demo, where the user's silhouette is transparent.
4. Added 3d background-removal demo, to take the distance to the user into account.
5. Added hand object checker-scene, to demonstrate how to detect object in user's hands.
6. Updated interaction manager and input module to support hand clicks and presses.
7. Updated 1<sup>st</sup> fitting room demo to use the new GUI, and option to detect the user gender or not.
8. Updated KinectSceneVisualizer-demo to overlay the constructed mesh over the real environment.
9. Updated KinectDataServer-scene to v1.4, and added the option to be websocket host.
10. Many other little changes and fixes in various demo scenes and components.
11. (v2.12.1) Fixed the upside/down issue in FittingRoomDemo1, as well as some smaller issues.
12. (v2.12.2) Added initial support for Windows-store Universal-10 builds.

## What's New in Version 2.11.1

1. Implemented detection of user gender and age in the 1<sup>st</sup> fitting-room demo (cloud-face-detection).
2. Added InteractionInputModule to be used with Unity UI-system. See KinectInteractionDemo1-scene.
3. Added speech listener interface to SpeechManager and applied it to BotControlScript.
4. Added 'Forward offset'-setting to the AvatarScaler and ModelSelector-components.
5. Added LeanForward and LeanBack gestures to the KinectGestures-component.
6. Updated KinectDataServer-scene to v1.3.
7. Various little changes and fixes in other components and scenes.

## What's New in Version 2.11

1. Added Kinect photo-booth demo scene, as additional Kinect overlay demo. Courtesy of Sophi Siraj.
2. Added Kinect physics demo scene, to show how Kinect tracking and physics can be used together.

3. Added optional detection of user gender and age in the fitting-room demo (uses cloud-face-detection).
4. Added 'User detection order'-setting to KinectManager, to set up user to player-index assignment.
5. Fixed the user-body-blender issue in portrait mode.

## What's New in Version 2.10.2

1. Fixed Unity 5.4 shader issue in the background-removal demos and components.
2. Updated fitting-room demo components, to allow multi-model selection for one user, as well as multi-user model selections. Added more options to ModelSelector-component.
3. Updated KinectHolographicViewer-scene to avoid errors, when no user is tracked.
4. Added dilate- and erode-iteration settings to BackgroundRemovalManager, to allow fine tuning of filtering users-image artifacts.

## What's New in Version 2.10.1

1. Updated scripts and components to allow Windows-store builds.
2. Updated fitting-room demo scenes and components to allow easier model selection, multiple model categories and other improvements.
3. Updated height-estimator demo to allow estimation of body widths at different levels.

## What's New in Version 2.10

1. Added new KinectAvatarsDemo3 scene, to demonstrate how to use the AvatarControllerClassic-component, as well as the OffsetNode-setting of AvatarController-component.
2. Added holographic-viewer demo scene, to show how to setup a simple holographic view of an object.
3. Added user height-estimator demo scene, to detect the user height from depth buffer data.
4. Added optional user-blending shader to the fitting-room demos, to allow visibility of body parts and real object in front of the virtual clothing.
5. Updated 3rd face-tracking demo, to show user's head above avatar's body.
6. Updated interaction manager to support interaction listeners, to simplify the detection of hand grips.
7. Updated gesture listeners to work for specific user index, instead of the primary user only.
8. Updated estimation of Kinect forearm and wrist orientations, for all 'Allowed hand rotations' modes.

## What's New in Version 2.9

1. Added KinectUserVisualizer demo-scene, to present how to show the user personally in the scene, along with first-person interaction with the available scene objects.
2. Added KinectPoseDetector scene, to demonstrate how to solve the common pose-detection problem.
3. Updated background removal shaders to provide better, blurred edges.
4. Extended 2<sup>nd</sup> background removal demo with one more camera level - a halo behind user's head.

5. Added 3<sup>rd</sup> background removal demo, to show how images, objects and effects can be displayed behind the user's silhouette.
6. Added 'Textured model mesh'-setting of FacetrackingManager, to allow texturing of the face mesh, either from color camera image or from the faceMaterial's own texture mapped to the face rectangle.
7. Updated 4<sup>th</sup> face-tracking demo - the face model now overlays the color camera image.
8. Updated fitting-room demos, to use overlay positions over the color camera image.
9. Added several new settings of AvatarController – to allow finger orientation tracking, color camera overlay of the base joint, and inverted-z movement.
10. Added new setting of KinectManager – 'Wait time before remove', to prevent sporadic user losses.
11. Removed references to OpenCV-libraries. Please from now on, use Direct3D-11 with this package.
12. Version 2.9.5 features Kinect-data-server, package upgrade to Unity 5.3.0 and several important fixes.

## What's New in Version 2.8

1. Added new continuous gesture 'Run', in order to make it easier to detect running in games.
2. Added 'Max left right distance'-setting of KinectManager, to limit user tracking left and right.
3. Set primary user silhouette color to be always yellow, to be easily noticeable on the user-map.
4. Updated 'Compute user map'-setting of KM to be drop-down, providing more refined options.
5. Updated KinectGestures to be extendable gesture manager component, instead of static class.
6. Added 'Ignore Z-Coordinates'-setting of KinectManager, to provide support for 2D-scenes.
7. Added 2<sup>nd</sup> background removal demo, to show how to put 3d objects in front of the cut-out image.
8. Put back 4<sup>th</sup> face-tracking demo, to demonstrate how to use AUs, to emulate facial expressions.
9. Updated user-tracking in KinectManager, to prevent player-index changes of the same user.
10. Updated bone orientations filter, to provide better human limits for bone orientations.
11. Posted separate package for saving Kinect v2 mocap to fbx-model animation.

## What's New in Version 2.7

1. Added body recorder-and-player class and Kinect recorder demo, to allow body data recording.
2. Added 3<sup>rd</sup> overlay demo, to show how the user can draw lines on the screen with his hand.
3. Added color-collider demo to demonstrate AR interaction with scene objects.
4. Added 2<sup>nd</sup> gestures demo, to show how to use wheel and zoom-gestures to manipulate a model.
5. Added portrait-mode option to the fitting-room demos and background-removal demo.
6. Added adjusted-camera-offset setting to the fitting-room demos, to simplify offset minimization.
7. Added lean-left and lean-right gestures to the list of ready-to-use gestures.
8. Added allow-turn-arounds option to fix user tracking, when he turns around (experimental).
9. Updated avatar-controller to support model arm poses, different from the T-pose.
10. Updated user-tracking in avatar controller, to stick to the same user.
11. Updated speech-manager to always use the grammar from the Resources-folder.

## What's New in Version 2.6

1. Added second fitting-room demo scene that overlays a humanoid model over the user's image.
2. Added new face-tracking demo that overlays a hat over the user's head.
3. Added new face-tracking scene that tracks and displays user's face as a texture on screen.
4. Added second avatars-demo for tracking first-person shooters.
5. Added second interaction-demo for grabbing and turning a cube with hands.
6. Added option to show single user in the background-removal manager.
7. Added option to use dynamic grammars and rules in the speech-recognition manager.
8. Added tooltips to all public settings of the Kinect managers, scripts and samples.
9. Added code documentation to all public functions of the K. managers (demos will follow suit).
10. Added OpenNI2-sensor interface for Windows (experimental, Mac-interface will come out soon).
11. Fixed AvatarScaler-issue that scaled arms and legs disproportionately.

## What's New in Version 2.5

1. Utilized shaders in DirectX3D-mode to increase performance - 'Use DirectX 11'-player setting must be enabled. If it is disabled, no shaders are used and the image processing works the same way as before.
2. Added second face-tracking demo, to visualize the Kinect-generated face model over the user's face.
3. Added visual gesture manager for VGB gestures, and a sample VG-listener to the gestures demo.
4. Added 'Auto height angle'-setting to KinectManager, to allow auto-setup of the sensor's H&A.
5. Added 'Move rate'-setting to AvatarController, to allow faster or slower avatar movement.
6. Added 'Offset node'-setting to AvatarController, so avatar can move or rotate relative to another object.
7. Updated avatars in the AvatarsDemo to obey to physics, in means of collisions, gravity, etc.
8. Moved all demo scenes to KinectDemos-folder.

## What's New in Version 2.4

1. Added fitting-room demo scene, to demonstrate how 3d-models can overlay the color camera stream.
2. Added second overlay demo scene that includes overlaying of all skeleton joints and bones.
3. Added multi-scene demo, to demonstrate how the Kinect-related scripts might be reused across the game.
4. Updated background removal demo scene to provide a smoother background removal.
5. Added 'Late update avatars'-option to the KinectManager, to enable AvatarController updates during LateUpdate(). This is needed for integration with Mecanim animations.
6. Updated bone-orientations filter to filter out some unnatural bone orientations.
7. Multiple little updates, fixes and improvements.
8. Upgraded package to Unity 5.0.

## What's New in Version 2.3



1. Added depth-collider demo scene, to demonstrate the mapping of the Kinect space and depth coordinates to Unity world coordinates, and how this can be used for VR collisions.
2. Added simple background removal demo scene. A smoother background removal is in development.
3. Added sensor 'Hint height and angle'-setting to KinectManager, to provide information about the actual height and angle of the sensor (works only when there are users detected).
4. Added 'Gestures debug text'-setting to KinectManager, to make the development of gestures easier.
5. Added detection of four new gestures – LeanLeft, LeanRight, KickLeft and KickRight.
6. Updated detection of the available gestures, to make them more robust and easier to use.
7. Grouped native resources, depending on the supported sensor and used architecture.

## What's New in Version 2.2

1. Added speech recognition manager and speech recognition demo scene.
2. Improved head tracking, wrist/hand tracking and AllowHandRotations-option.
3. Added PointCloudView-demo script to show the Kinect camera view in 3d.
4. Updated GetJointPositionDemo-script to save the joints positions into csv-file.
5. Updated KinectOverlayer-script to mirror the joint rotation along with the position.
6. Improved Cubeman's joint orientation tracking. No more need for Ctrl-object.
7. Improved first run after standalone build. Fixed SharpZipLib-codepage issue.

## What's New in Version 2.1

1. Added face tracking manager and demo scene, working for both Kinect v2 and Kinect v1.
2. Added support for x32 and x64 architectures at run-time.
3. Added AvatarControllerClassic-component to allow manual assignment of bone transforms. Big thanks to Aaron Brooker!
4. Added automatic scan for gesture listeners in the scene.
5. Added option to AvatarController, to have offset relative to the sensor. Big thanks to Claudio Rufa!
6. Improved Zoom-in, Zoom-out, Wheel and Stop gestures. Big thanks to Shamil Bugdabayev!
7. Updated to Kinect-Unity plugin v.1410.

## What's New in Version 2.0

1. Added support for various depth sensors, currently Kinect v2 and Kinect v1.
2. Updated AvatarController to use the Mecanim configured bones. Big thanks to Mikhail Korchun!
3. Added reasonable constraints to the calculated bone orientations.
4. Added left-hand press and right-hand press detection to the InteractionManager.
5. Added function to set the primary user ID.
6. Added multi-source reader option (supported by Kinect v2 only).
7. Added parameter to set the image-map onscreen width as percent of the window width.
8. Updated KinectOverlayDemo to be full screen.

## What's New in Version 1.1

1. Added new Kinect-overlay demo scene – green ball, following user's right hand on a video wall.
2. Added simple GetJointPositionDemo-sample, as a pattern to be used in custom scripts.
3. Added sample colliders to the avatars in KinectAvatarsDemo-scene.
4. Added maxUserDistance-setting to KinectManager, as suggested by Eugene Cone. Thank you!
5. Added sensorAngle-setting to KinectManager, as required by many users.
6. Added PlaymakerKinectActions, utilizing several Kinect v2 features in Playmaker environment.
7. Several updates, improvements and fixes of bugs and issues, reported by package users.