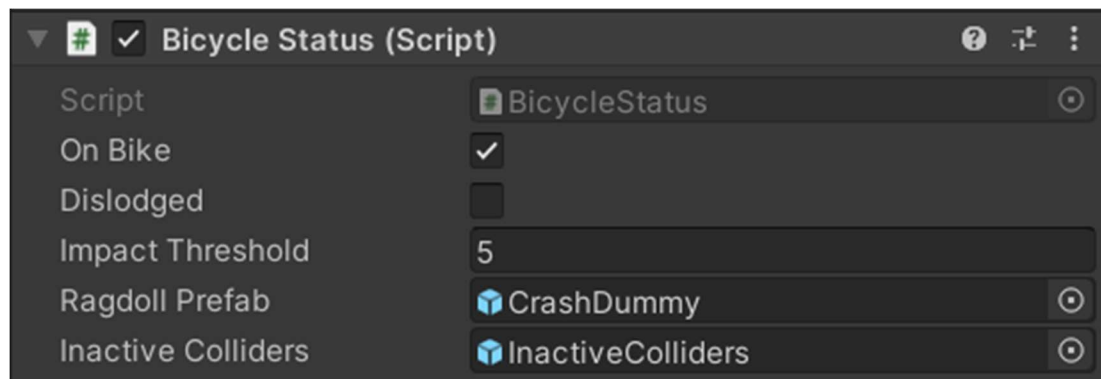


# Simple Bicycle Physics

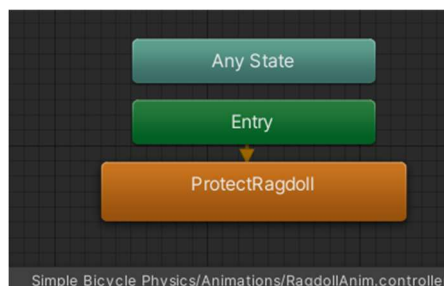
Ragdoll Physics  
Using In-Built PhysX

An Active Ragdoll is a ragdoll that can apply forces to move itself. In this case the Active Ragdoll tries to replicate animations using joints that target the rotations of an animation. In Simple Bicycle Physics, the active ragdoll is stored as a prefab and instantiated upon impact.

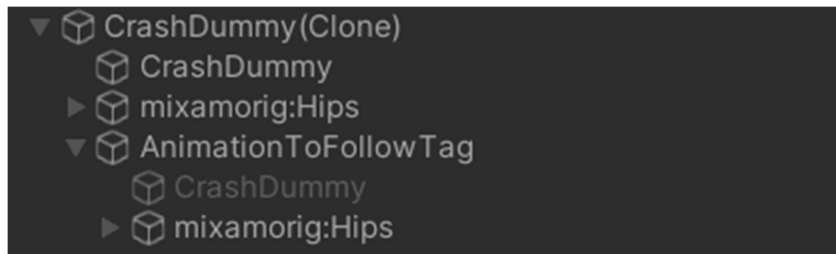
The Impact settings and the prefab instantiation can be found in the **Bicycle Status Script**:



Upon impact, the list of joints and tracked limbs are populated and the transforms are copied in a buffer. In the next fixed update, the values are transferred over to the transformation matrix and the joints are initialized with the position of impact. The active ragdoll mechanism then follows which is influenced by the ragdoll animator controller and its own physical animations.



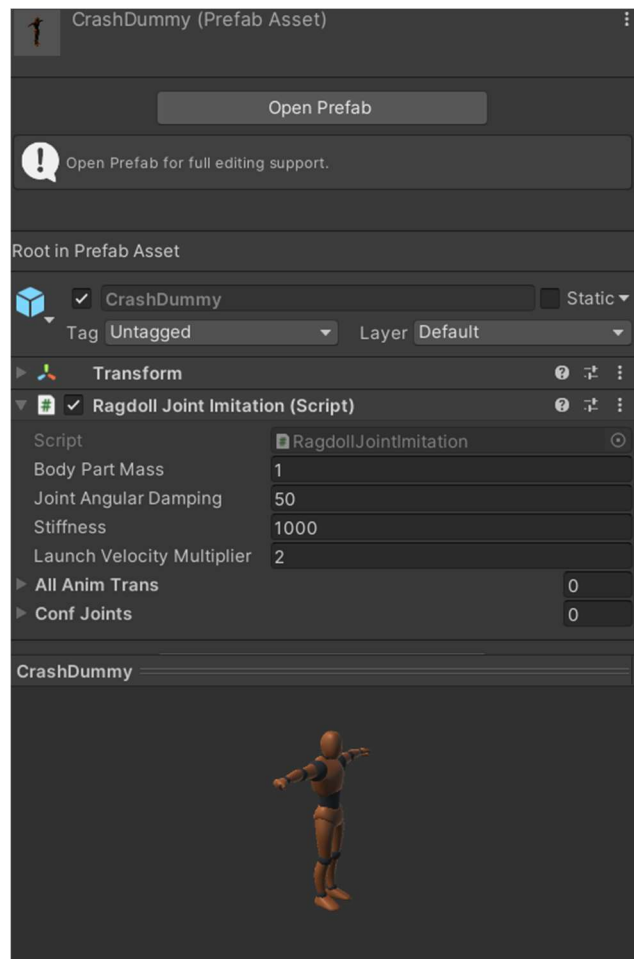
Upon impact, the hierarchy of the prefab is as follows:



Here, the CrashDummy (Clone) is the active ragdoll copying the animations running in the AnimationToFollowTag gameobject.

As soon as 'R' is pressed, the ragdoll is reset and the gameobject is destroyed. This happens in LateUpdate() and GetKeyUp respectively.

Some of the settings you can tweak:



You may directly edit the Prefabs to see the changes.

Body Part Mass refers to the `rigidbody.mass` that each active joint component has. This influences the momentum of the system. The script assumes all the body parts have the same given mass. [Liable to change in the future updates]

Joint Angular Damping refers to the damping of the joint's motion as soon as it is hit. A lower value will represent a flailing motion and a higher motion will react slower retaining the joints position as much as possible.

Stiffness refers to the adherence of the active ragdoll to the animation. Higher values will more strictly follow the animations

Launch Velocity multiplier is a fun effect where the ragdoll is thrown with a greater velocity than the vehicle is travelling at. For physical accuracy, the velocity should be 1 as the player inherits the vehicle's momentum.

We are still in the process of developing the active ragdoll mechanism and easing the process of making one work with a custom character with editor scripts. If you want to take a look at how it may be done for a custom character, we have a small tutorial for one of our other assets that has the same active ragdoll feature :

[https://www.youtube.com/watch?v=H\\_itWk6bkNw](https://www.youtube.com/watch?v=H_itWk6bkNw)

If you have any queries, please contact us at [info@aikodex.com](mailto:info@aikodex.com) and we'd be glad to respond.