How to create humans for HuNavSim

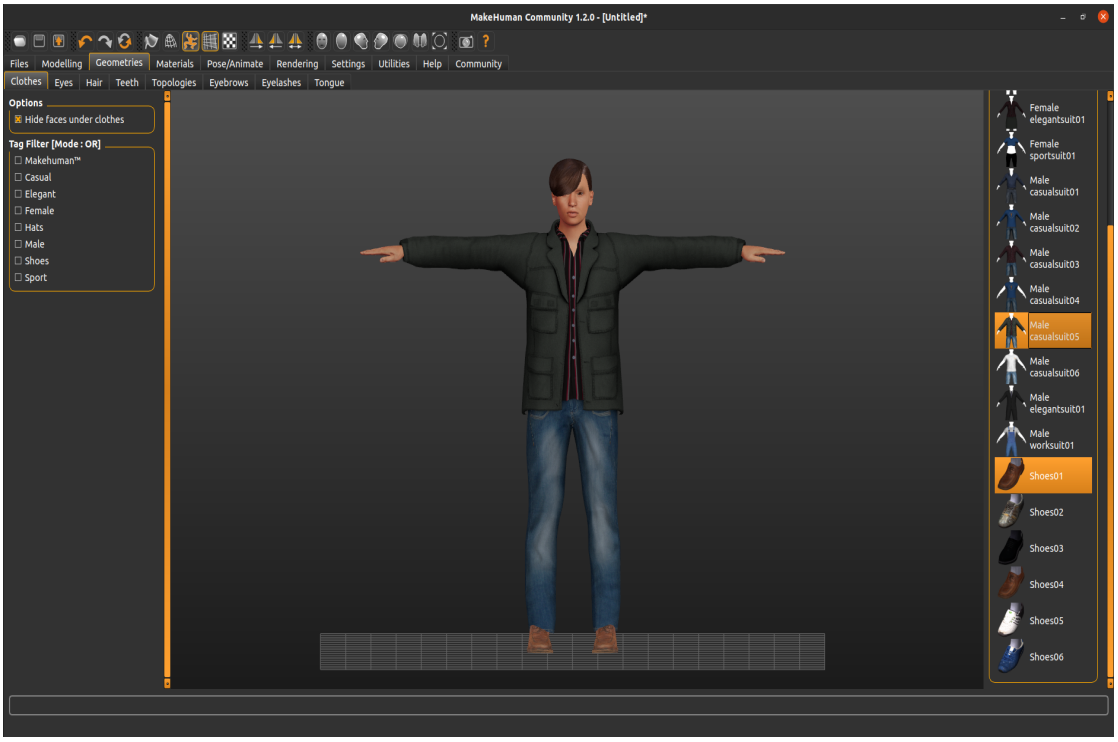
Software needed:

- MakeHuman (http://www.makehumancommunity.org/content/downloads.html)
- Blender 3.X.X (https://www.blender.org/download/)

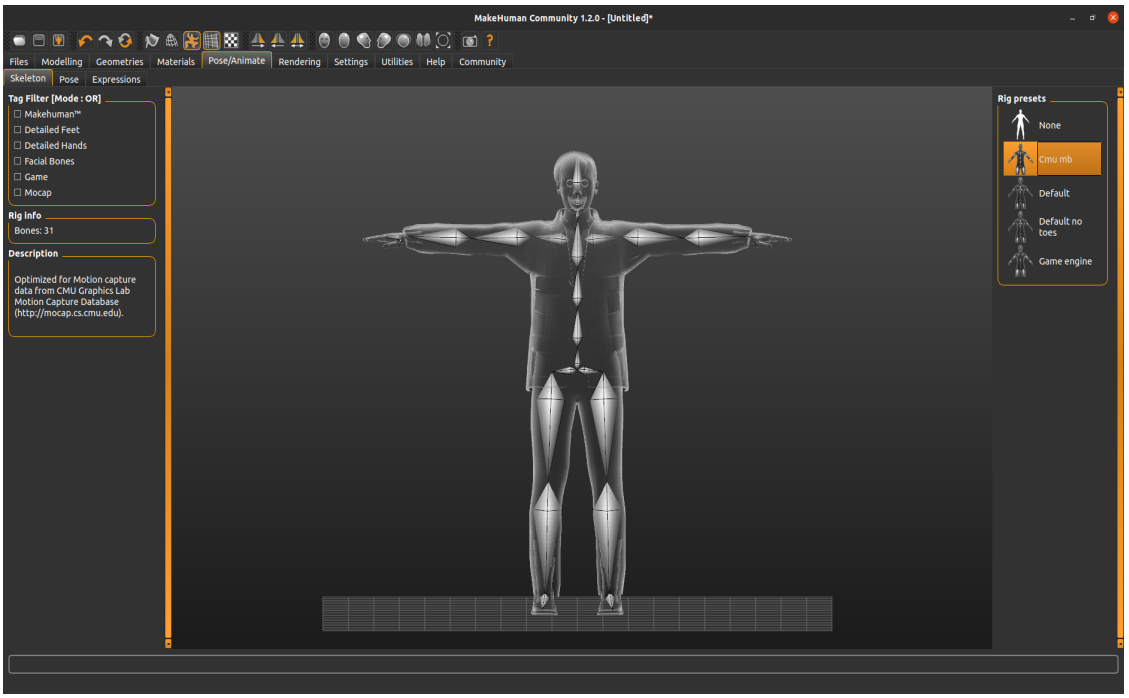
We want to clarify that we are not experts in modeling, we have basic knowledge about Blender. If anyone knows an easier method, please, contact us.
The following steps are the ones that worked for us.

Steps:

1. Create your own human in MakeHuman. Select clothes, hair style, tooths, etc.

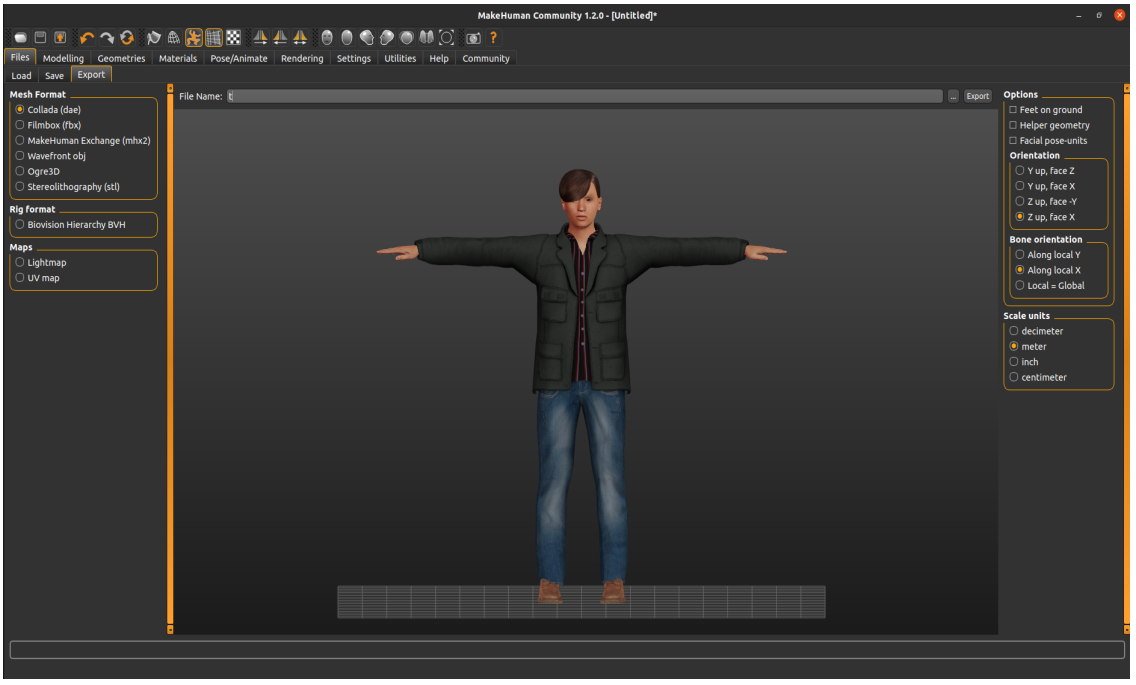


2. In the Pose/Animate tab, select the “**CMU MB**” skeleton (although we will remove the skeleton later) and “**T Pose**” pose so it’s easier to align the skeleton later.



3. To export the human, it has to be exported as a collada (.dae) file with the following options:

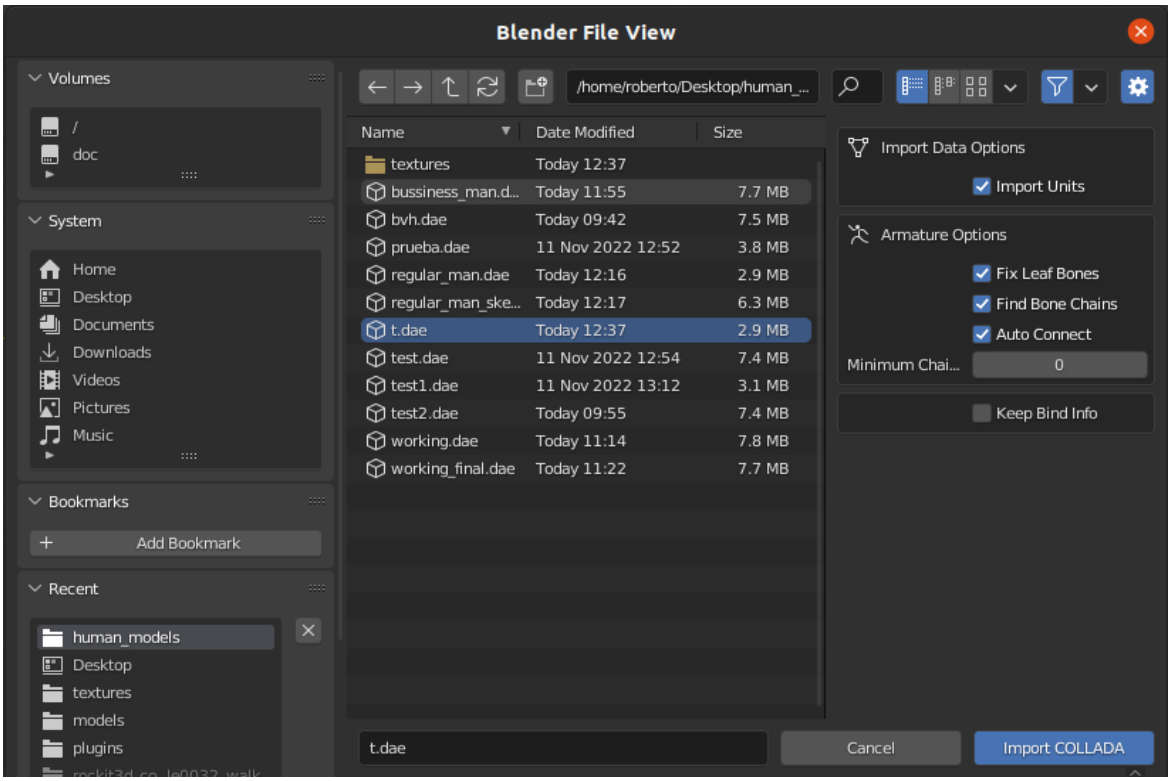
    - Uncheck feet on ground
    - Select Z up and face X as orientation
    - Select along local X as bone orientation
    - Select meter as scale units



4. Open blender and select -> File/Import/Collada (.dae)

5. Select your file and check the following options:

    - Import units
    - Find Bone Chains
    - Auto connect



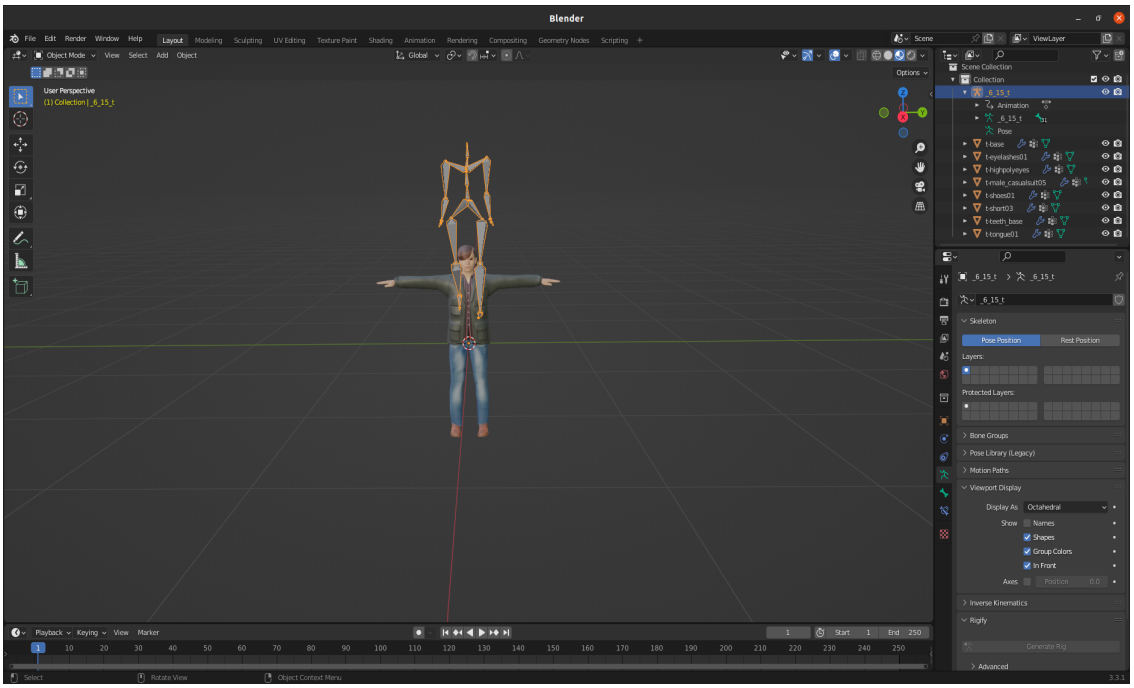
6. Do the same, but instead of importing the MakeHuman model, import the **walk.dae** file (This file is located in the hunav_gazebo_wrapper media/models directory. It's an actor that is included in Gazebo).

7. Remove the **walk.dae skin** and the **MakeHuman skeleton**. We only need the walk.dae skeleton because it is the only one which works for us with the CMU's Motion Capture Database files.
(To see the bones in front of the skin, select the skeleton and check "**In front**" in the viewport display section)

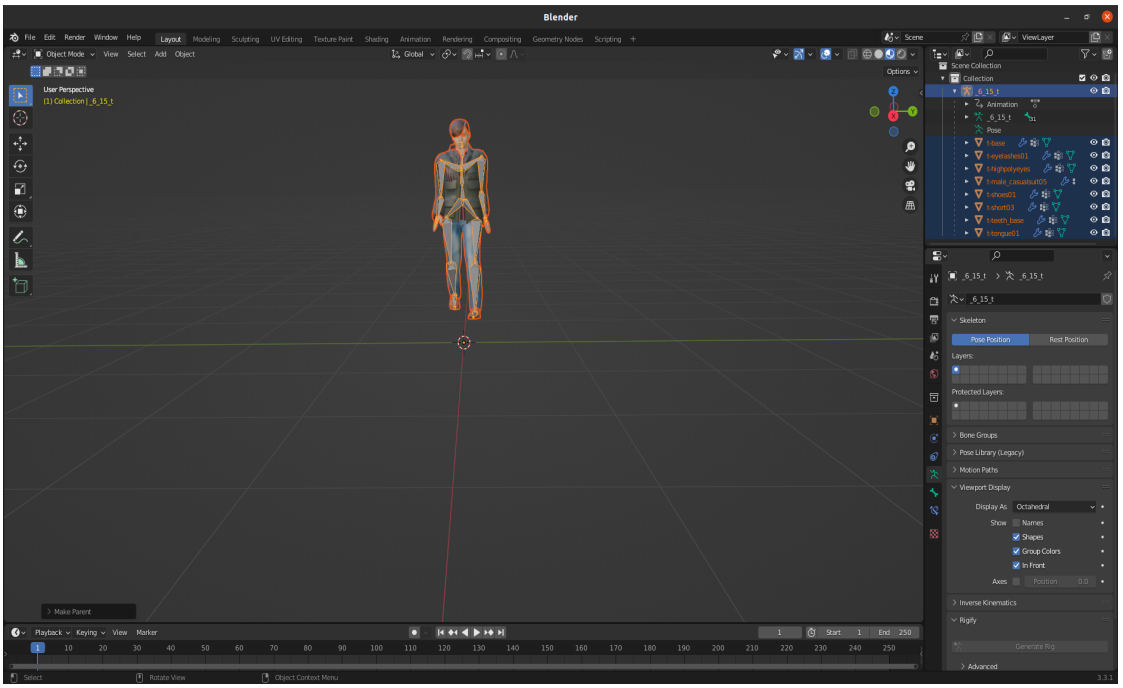
8. Select the skeleton and click on “**Edit mode**” in the **upper left corner**.

9. Align the skeleton to the skin.

10. Once it’s aligned, go again to the **upper left corner** and select “**Object mode**”.

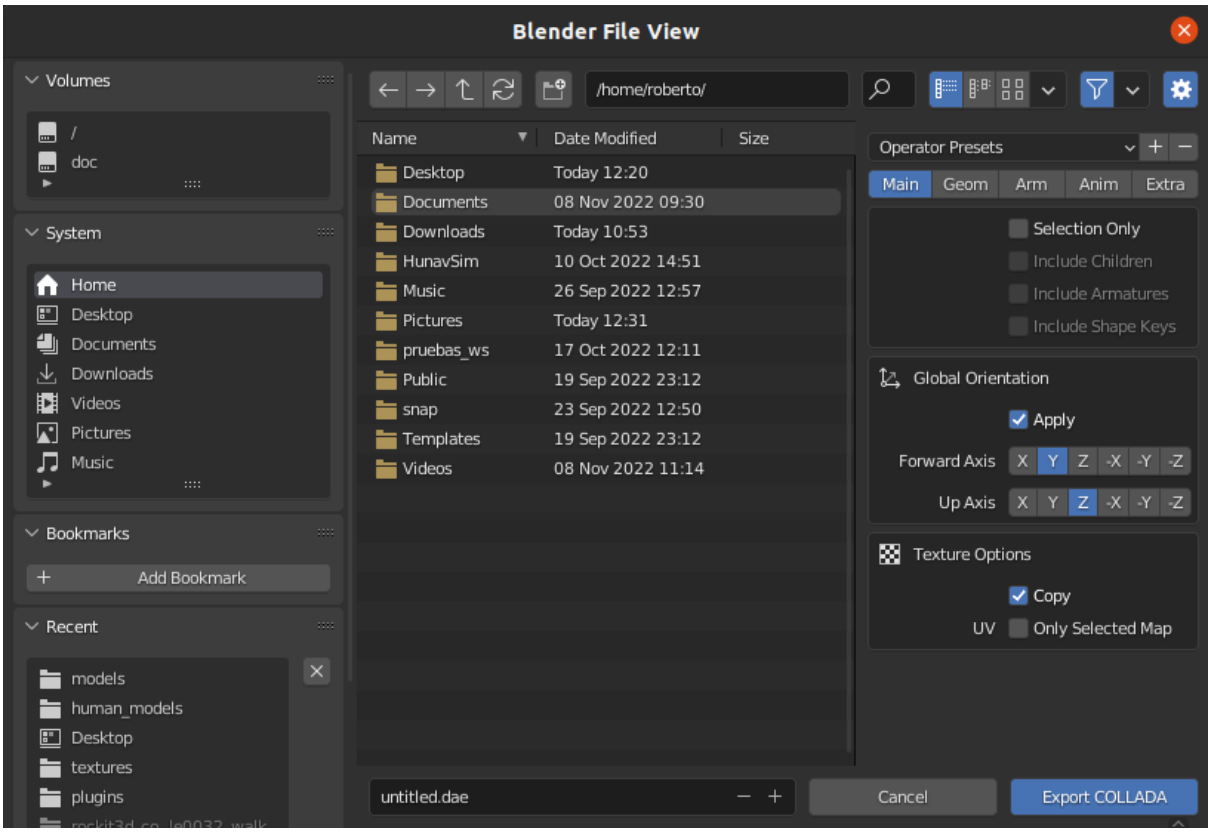


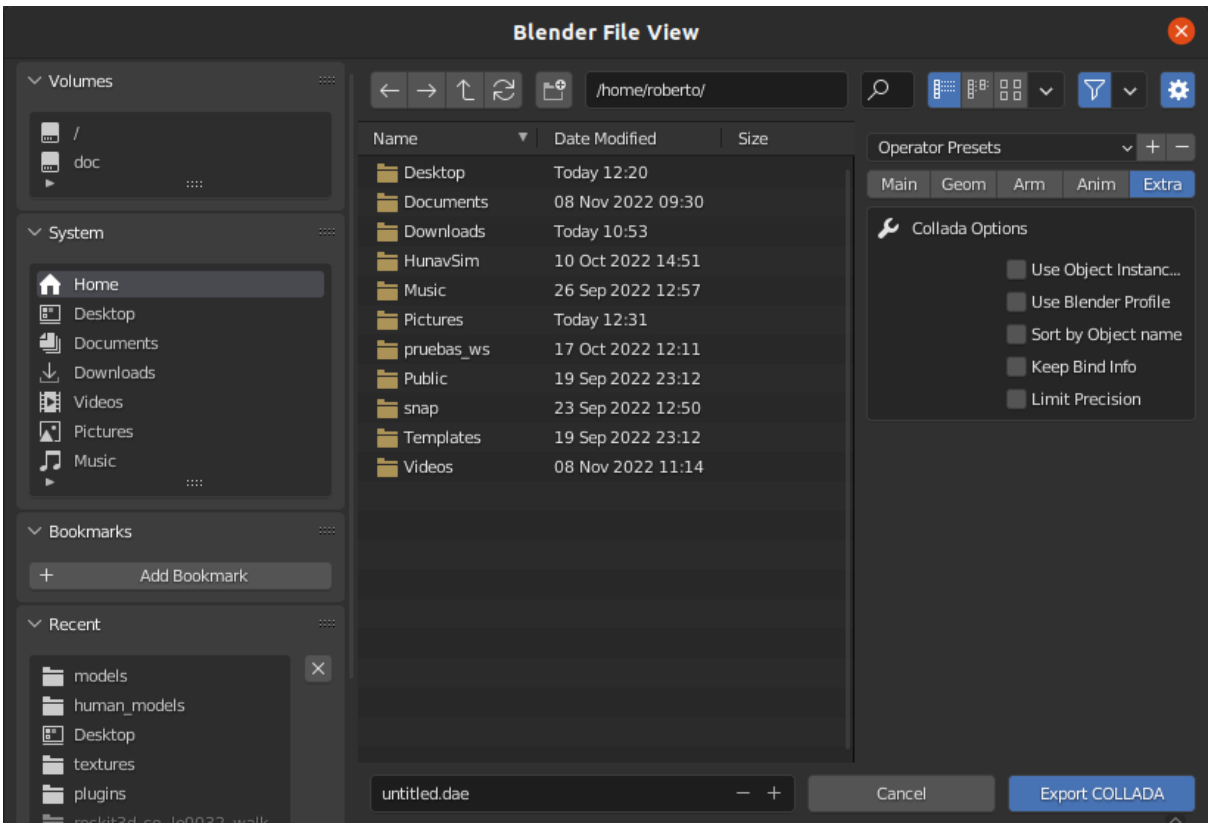
11. Select the skin and the skeleton and go to **Object/Parent/** and select **Armature Deform With Automatic Weights**. This will merge the skin and the skeleton.



12. Select **Object/Apply/Scale**.

13. The final step is to export the new model. Select File/Export/Collada (.dae) and select this options:
    - In the **Main tab**, check Apply and select Y as Forward Axis and Z as Up Axis.
    - In the **Extra tab**, uncheck everything.





14. When the export is finished, copy the collada file and the textures exported to the **media/models** directory in the **hunav_gazebo_wrapper**.

15. Next, open your code editor to modify the WorldGenerator.cpp. You will find this code in the **src** folder of the **hunav_gazebo_wrapper**. Add the name of the collada file that you have just exported to the **skin_filename** array in the **processXML** method.

```
bool WorldGenerator::processXML() {
  // std::cout << base_world_ << std::endl;

  std::string skin_filename[] = {"elegant_man.dae", "casual_man.dae", "elegant_woman.dae",
                                 "regular_man.dae", "stand.dae"};
```

16. **Build** and launch HuNavSim.