1. Introduction
This work proposes an automatic pipeline that allows ordinary users to capture and reconstruct a textured 3D model of themselves (Virtual Human Avatars) using low-cost RGB-D cameras, such as Microsoft Kinect. We aim at solving for a realistic 3D model by dealing with the non-rigidity problem associated to the human body. We also provide correction to the noisy data from the sensor and compensation for user motion in front of the camera. Our method builds and adapts a skeleton to the final 3D avatar which allows to capture user’s movement and generate new poses for animation purpose.

2. Multi-sensor 3D Reconstruction Pipeline
Two process are required in our solution:
1) Offline process for **camera calibration**
   - Geometric calibration is performed in order to estimate the cameras positions and their intrinsic parameters [1] to correct distortions.
   - Depth calibration is performed to correct depth distortions
2) Online process for **avatar 3D reconstruction**
   - Performed in two steps: (A) Data capturing and (B) 3D Reconstruction
   - The 3D mesh avatar can be applied in 3D virtual environments and for animation purpose.

3. Conclusion
This is an ongoing work and our pipeline produces, so far, a real-time 3D virtual human avatar that is embedded in REVERIE virtual environment. Our work presents some limitations, mainly associated to the quality of the final 3D model. Therefore, we are working on improvements for refining the water-tight 3D model. Also, our registration method causes some artefacts during the pre-registration phase. We aim at solving this issue by providing a more robust local registration refinement. Finally, in order to use our 3D human avatar in a real-time environment, we need to provide improvements to the implementation of our global and local registration so that it can take advantage of parallel computation. For this purpose, we’ll provide partial implementation in GPU processor.

4. References