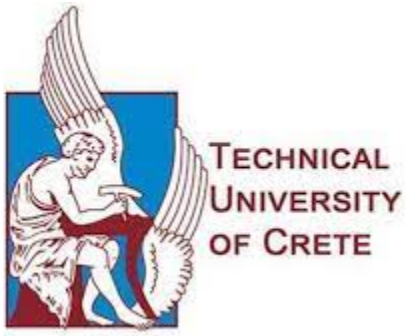


# Generative Artificial Inteligence

## Assignment 1 : Surface Generation from Point Clouds

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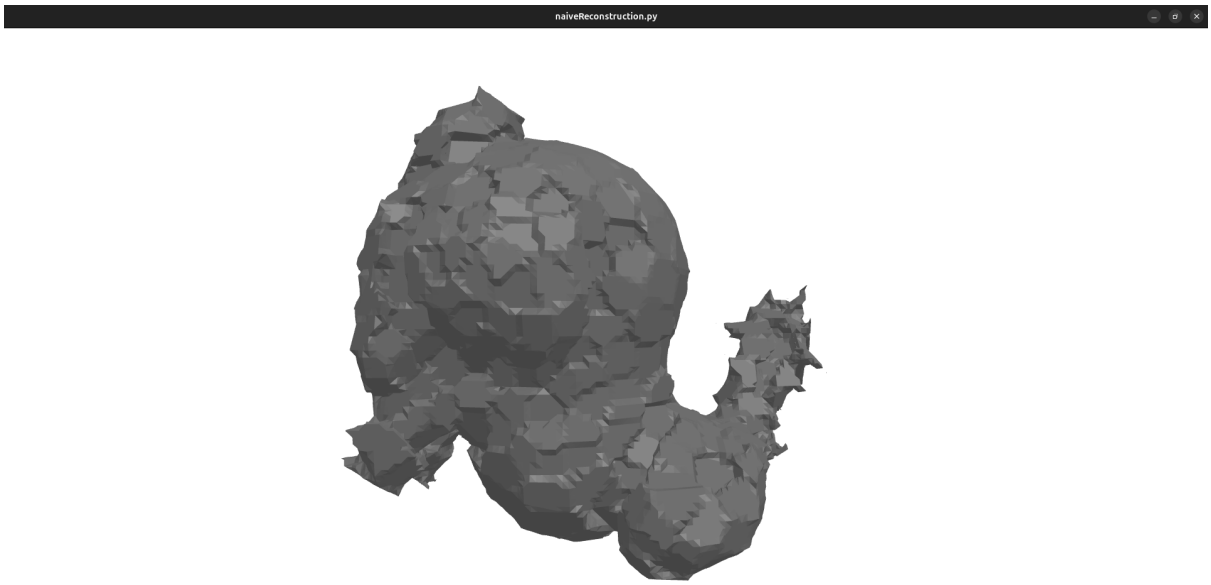
**Abstract**

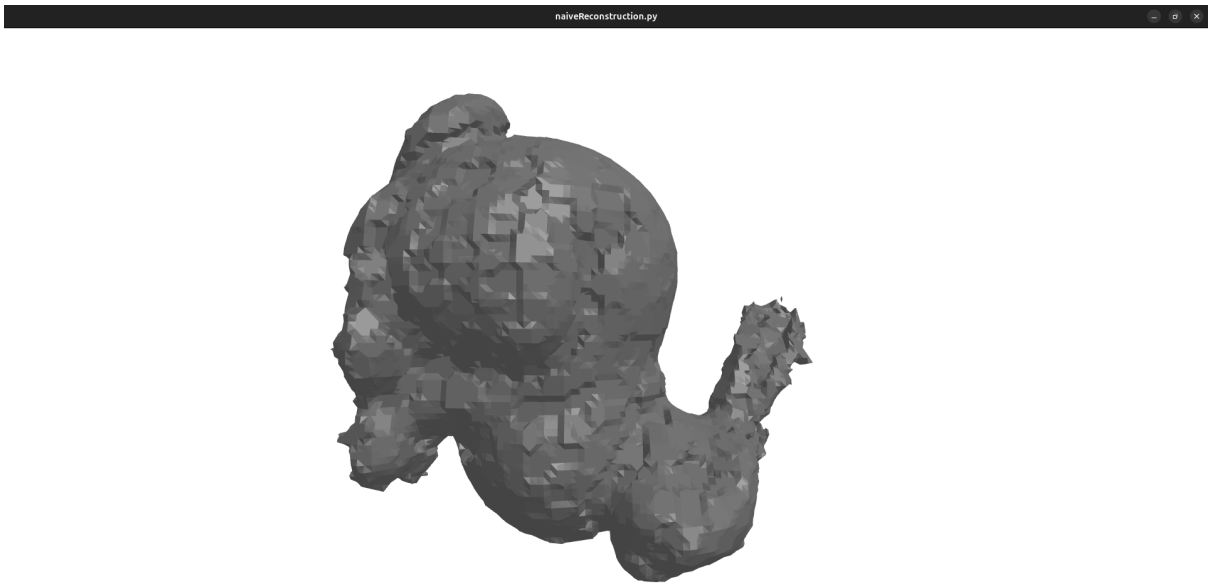
This report presents surface reconstruction results using both naive tangent plane approximation and neural network-based approaches. The results can be observed below.

# 1 Naive Reconstruction

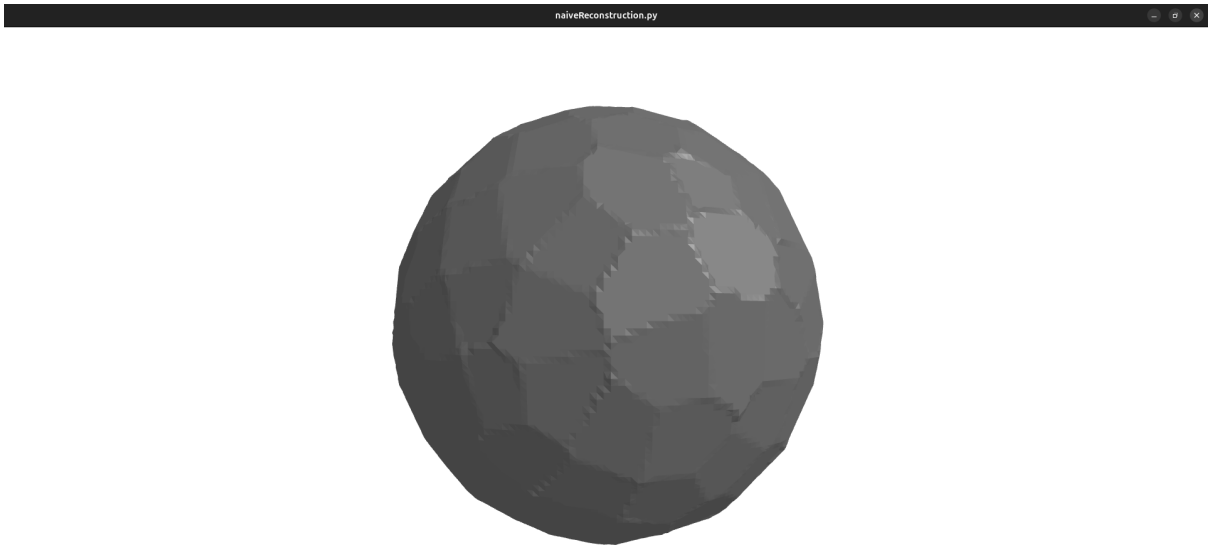
First, we can see the the screenshot of the bunny implemented with 500 point clouds.




After that, the implementation of the bunny with 1000 point clouds.



And finally, the sphere.



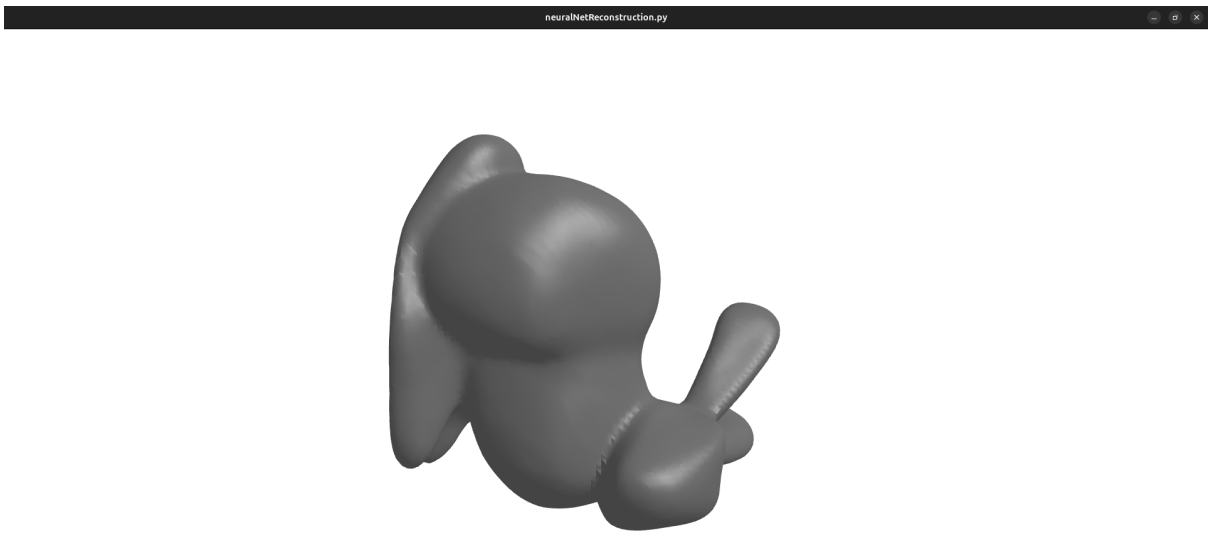

**Results**

As we can observe, the difference between the approximations with different number of point clouds can be easily identified visually, especially when observing the details (e.g. ears and legs). Also the approximation of the sphere is good but not enough.

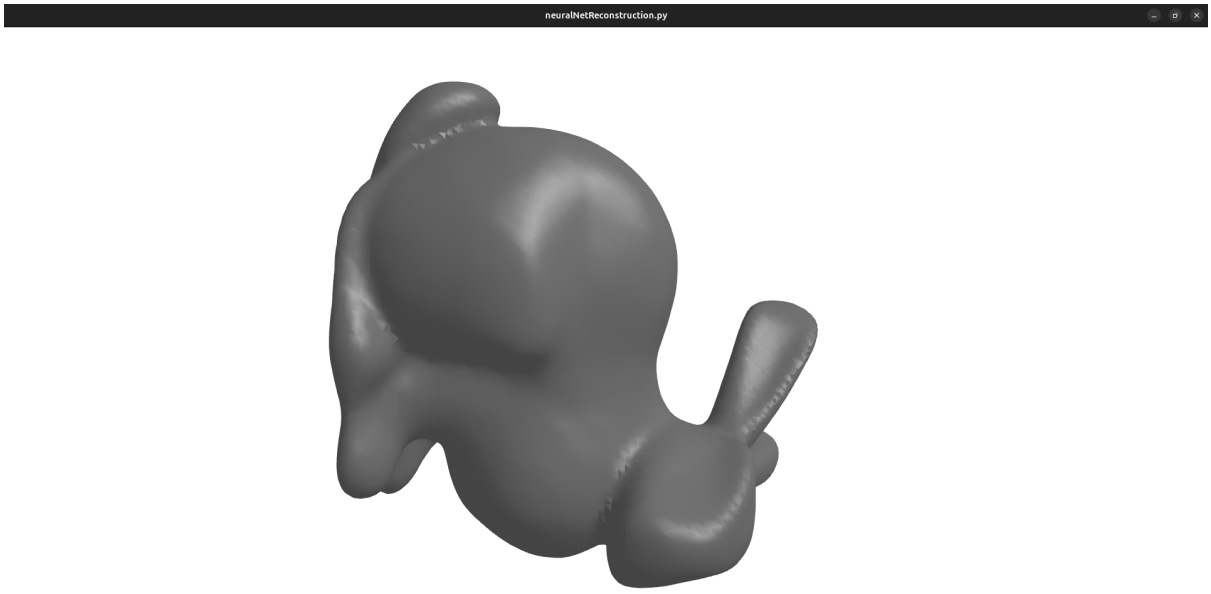
# 2 Neural Network

After the first part we implement a neural network to do the same job as before and compare the results.

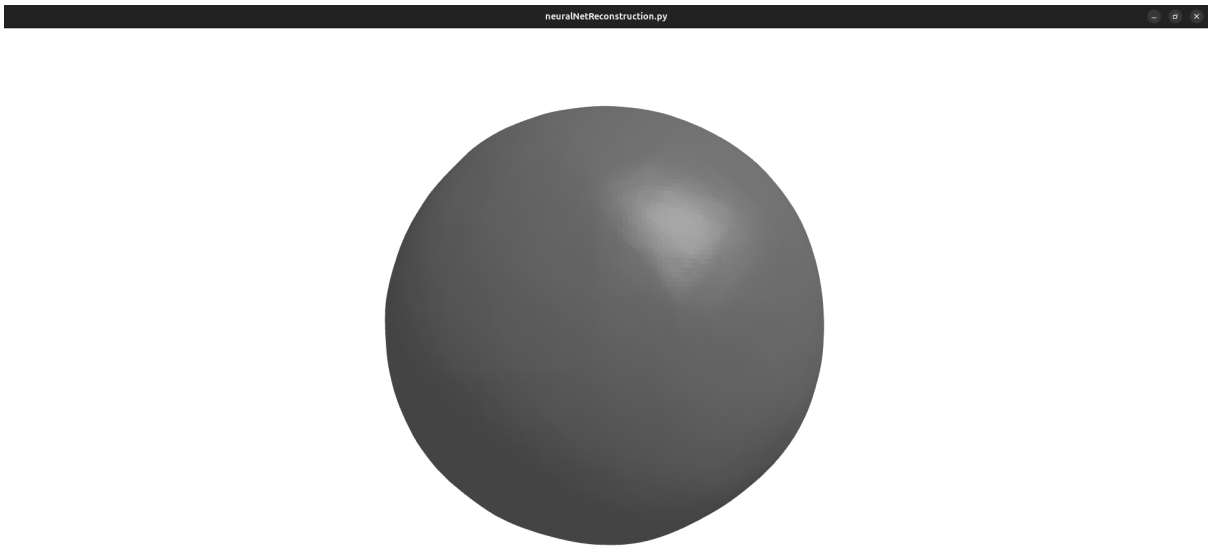
So, the bunny with 500 point clouds.



The bunny with 1000 point clouds.




And finally, the sphere.




## Results

This time the difference between the two bunnies is less visible and it can be identified only by observing really small details because both bunnies look really smooth. The same observations are made for the sphere.

# 3 Conclusion

Both methods successfully reconstruct surfaces, with the neural network showing better smoothness and detail preservation, that the naive reconstruction. This exersice was a good way to show the advantages of a neural network approximation in image reconstruction from point clouds and also works as a reminder, that the things that can be achieved though neural networks are many and important.