AFRICAN MASTER'S FOR MACHINE INTELLIGENCE

AMMI AIMS-SENEGAL

COURSE: COMPUTER VISION/WEEK 2

REPORT: Lab 2 on Differentiable Textured Rendering

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- **Part A: Silhouette Rendering** Rendering is a processing generating a $2D$ image from a $3D$.

  1. *silhouette rendering* is just rendering the outline of the shape without the color information.

     rendering is non-differentiable because of:

     – $z-$ discontinuity;

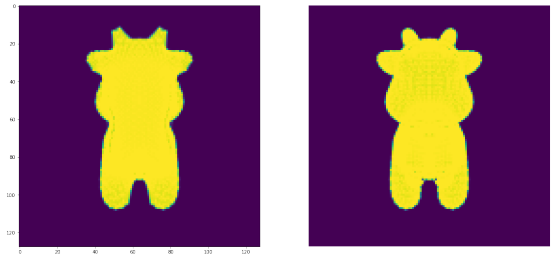
     – and $xy-$ discontinuity.

     Silhouette rendering solves $z-$ discontinuity by using *soft aggregation* (blending k closest faces in the $z-$ direction). And regarding the $xy-$ discontinuity, it solves it by consedering faces which fall within a blur radius.

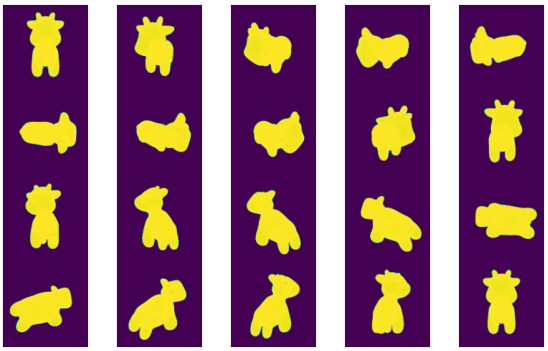
  2. What happens if you use 3 views instead of 20 views?

     When I used number of views equal to 3, I realize these three images (or views) are the same, As the figure 1a.

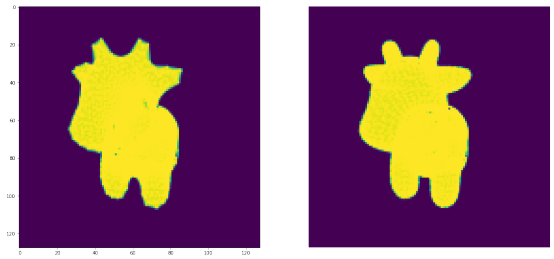
(a) Images views when number of views is equal to 3



(b) The Predicted shape quality when number of views is 3



(c) Images views when number of views is 20



(d) The Predicted shape quality when number of views is 20

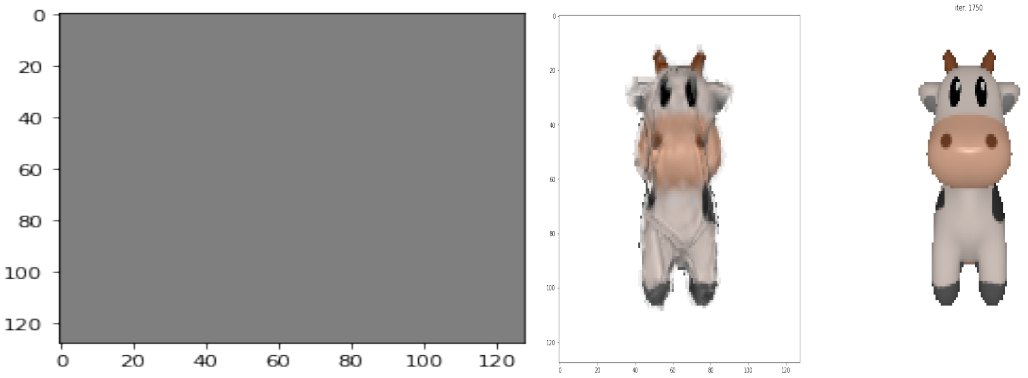
Figure 1: Views and predicted shape

The figures 1b and 1d, show that the predicted shape when number of views is 3 is more good than when number of views is 20. And the respective loss are 0.0078 and 0.01 respectively.

- **Part B: Textured Rendering**

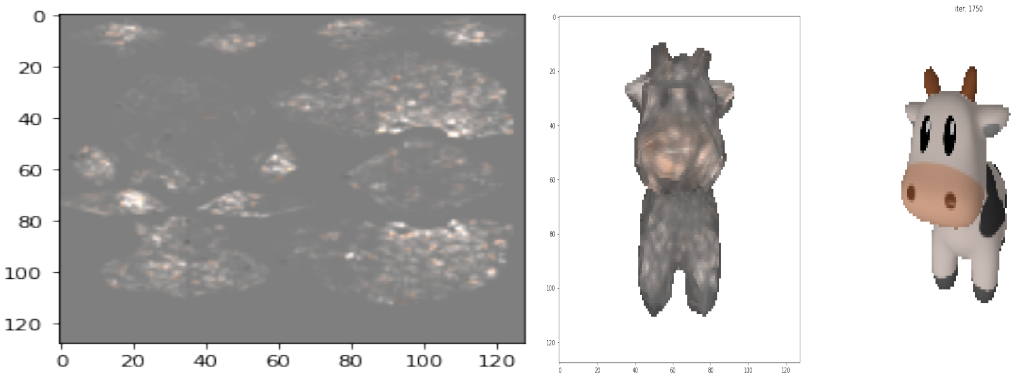
  1. *textured rendering* renders the outline and color information of the shape while *silhouette rendering* renders the outline of the shape and it didn't care about the color information.

2. In *textures UV*, textures are represented as a per mesh texture map and *UV* coordinates for each vector in each face, while *texture vertices* batched texture representation each vertex in a mesh has a $D-$ dimensional feature vector.



(a) textures map for TexturesVertex (b) Target and predicted shape

Figure 2: TexturesVertex



(a) texture map for TexturesVertex (b) Target and predicted shape

Figure 3: TexturesUV

TexturesUV provides the bad predicted shape than *TexturesVertex* because of the *texture map* that we learnt, see the figure 3b and 2b.