VR Project

2D Cartoon Sketches to 3D Models: A Mobile AR Application

Akarsha Sehwag (2015010)

Sanidhya Singal (2015085)

Problem Statement

Design a system to create 3D scene using 2D objects synthesized from paper drawings and sketches

Image Source: [1]

Disney Color and Play

Teddy

Sketchaser

Images Source: [1]

Related Works

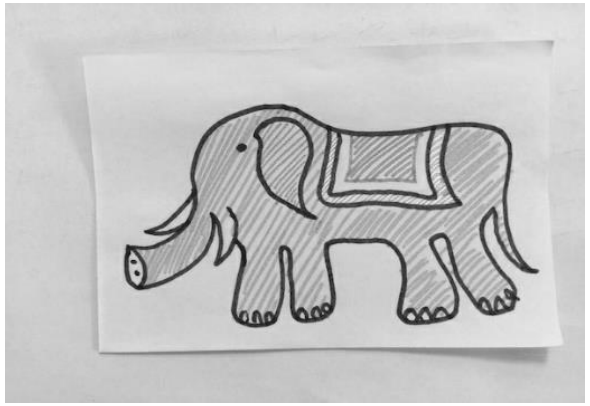
1. AR Books
   - 3D Models available in advance
   - Crayola Color Alive, Disney Color and Play
2. Sketch-based Modelling System
   - Requires sketching from multiple views
   - Teddy
3. Authoring models in AR
   - Only predefined sketches, Models created in advance
   - ARpm, Sketchaser

Workflow

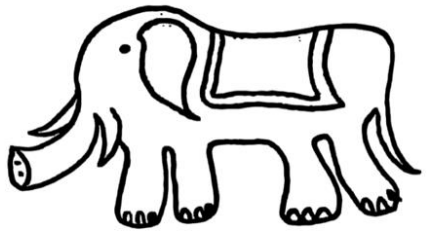
- Crop out the required image from the paper.
- Convert the 2D image into 3D model.
- Create a 3D scene, i.e., add more complexity by increasing no. of characters, etc.

Implementation

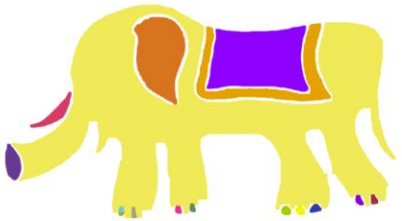
1. Scale picture to fixed height
2. Extract outline pixels from the drawing
3. Convert RGB to HSV
4. Find region maps



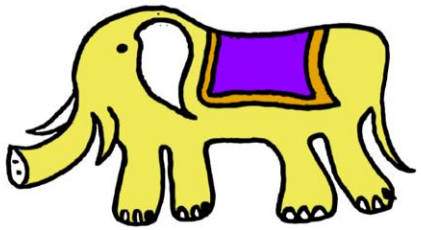
(a) S channel of the input



(b) Outline maps



(c) Region maps



(d) Region & outline maps combined

Images Source: [1]

Implementation *contd…*

5. Generate Distance Map
6. Inflate the mesh as per distance values
7. Smoothing

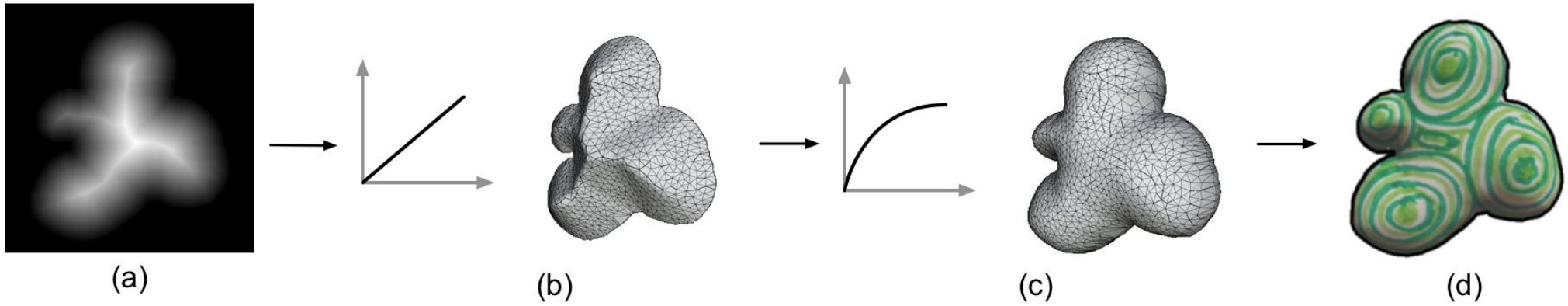


Figure: (a) The distance map. (b) The generated model after using linear distance values to inflate the region directly. (c) The smooth model after applying a circular mapping function. (d) The textured 3D model.

Images Source: [1]

Challenges

1. Neither the marker nor the 3D model is available in advance.
   - There are no ready-made templates or models.
2. From 2D to 3D
   - No information about the depth
   - How to texture the rear side of the model?

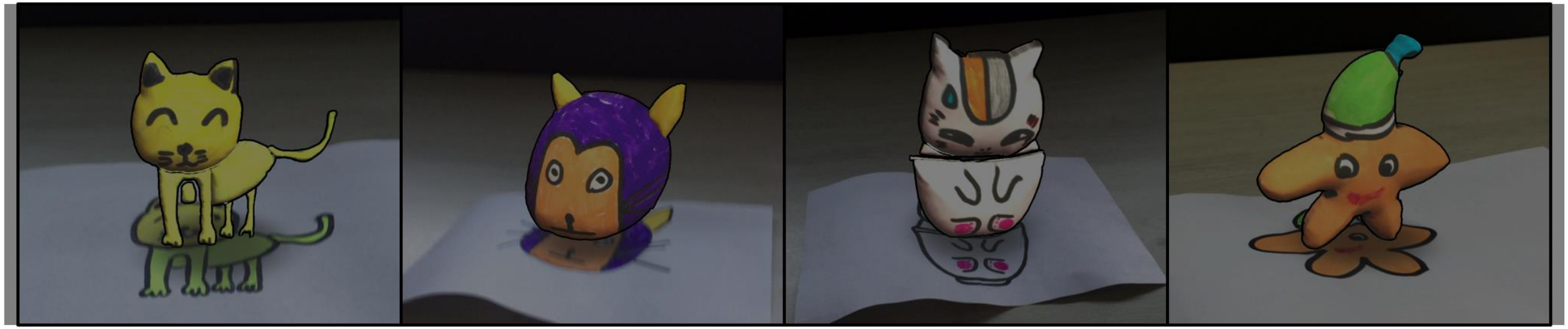


Image Source: [1]

Deliverables

- Mid-Evaluation
  - Outline Extraction
  - Region Map Generation
- Final-Evaluation
  - Texture Mapping
  - 2D to 3D Conversion (Inflation)
  - A working real-time demo of the project

Possible Expansions

- Animations
  - Skeleton embedding
- Interactions
  - Scaling
  - Translation
  - Copying

https://youtu.be/CIG1AlRhi3A

Any Questions ?

REFERENCES

1. L. Feng, X. Yang and S. Xiao. "MagicToon: A 2D-to-3D creative cartoon modeling system with mobile AR." 2017 IEEE Virtual Reality (VR), Los Angeles, CA, 2017, pp. 195-204, doi: 10.1109/VR.2017.7892247
2. L. Feng, X. Yang, S. Xiao and F. Jiang. "An Interactive 2D-to-3D Cartoon Modeling System." In: El Rhalibi A., Tian F., Pan Z., Liu B. (eds) E-Learning and Games. Edutainment 2016. Lecture Notes in Computer Science, Springer, Cham, vol 9654, 2016.

thank you!

Image Source: Google