MagicToon: A 2D-to-3D Creative Cartoon Modeling System with Mobile AR

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Major Components

- Automatic 2D to 3D cartoon model creator

- Interactive model editor to construct complicated scenes

Related Work

- Similar products in this space only allow colouring and hence do not allow the child to be creative

Implementation

Segmentation

- Scale image

- Get outline

- Map different regions

- Merge different regions

- Combine outline with region map to obtain temporary region map

- Morphological erosion to remove the outline

- New region map which is the final mesh

Mesh Generation

- Generate mesh only for extreme boundaries

- Apply Delaunay triangulation to each boundary for getting discrete vertices

- Inflate mesh by calculating distance of every pixel from the nearest black pixel and then applying circular mapping function to smooth height values

- Apply Laplacian smoothing method

- Use tone based shading to stylise

Interaction and Animation

- Allows merging of regions

- Transformations and copying supported

- Animate objects by adding skeleton to the 3D model and then use predefined motions

Results

- Inflation was a time consuming process as too many calculations

- Since this was done one iPad 2 current process should be faster

- Segmentation and mesh generation can be used in our models. We don't need these interactions or animations though

Limitations

- Lighting/ reflection can hinder segmentation

- Outlines should be thick and enclosed

- Depths between paths not captured

- Angle of the image captured matters a lot

- The front view image is replicated as back view. Might not be true in our case

Thank you!