Scrum Team

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Graduate Student CSE

Yashank Sakhardande
Graduate Student CSE with access to conference rooms in CSE building

Abel John
Electrical Engineer by Major, Computer Engineer by choice

Jack Lee
Undergraduate Student EE

Debjit Roy
Graduate Student ECE ("undergrad" for the purposes of this class)
The problem

In a culture that is steadily moving towards mathematics and sciences, young children often find themselves without a caring mentor for the arts.

This lack of direction causes children to lose interest in developing and refining their skills in the arts, stunting their creative growth.
The solution and impact

Right in front of our eyes

Allow young children to take pictures of objects that they want to draw, and create a quick step-by-step tutorial
The Technology: Google Glass
How it works - 3 steps

Step 1
Ok Glass, Start UbiScope
User gives voice command to glass and the glass opens the UbiScope application.

Step 2
Capture image
Ubiscope app captures first person user view, when take picture option is selected.

Step 3
Process image
The image obtained is processed in the background through openCV library. Contours are separated and presented to the user to guide him in drawing the desired object.
Dream Goal: Charmander

Our Result:
High Level Architecture

1. UI
   - Application Tutorial
   - Bitmap Image

2. Image Processing
   - Stepwise Rendering
   - Array of Contours

3. Renderer
1. UI Module

User Interaction

1. Voice/Gesture Trigger
   1. Voice/Gesture Trigger

Ubiscope Display

2a. Open Camera

Camera

2b. Select from Library

3b. Reject Image

3a. Accept Image

Display Result
2. Image Processing Module

- Preprocessing
  - Gaussian Blur
  - Thresholding
  - Image Dilation

- Preprocessed Image

- CannyEdgeDetection

- Output Image Matrix

- FindContours

- Array of Contours
3. Renderer

**Control block**
- Check number of contours
- Combine contours

**Result Processing**
- Array of Contours → Final Contours → Draw Contours → Stepwise Rendering
Agile Management

Scrum masters (Yashank and Divya)

Scrum Team
- Jack and Abel (User Interface)
- Debjit, Divya and Yashank (Image Processing)
Challenges

- Integration of OpenCV in android.
- Lighting conditions and handling large number of contours.
- Setting up hysteresis threshold for edge detection.
Milestones

- Oct 15: Propose Idea
- Oct 21: Bring up Glass
- Oct 28: Add voice command
- Nov 3: Midterm Presentation
- Nov 4: Add camera activity
- Nov 11: Integrate OpenCV. Run CannyEdgeDetection
- Nov 12: Madness Demo
- Nov 18: Test several contour algorithms
- Nov 25: Add Tutorial UI
- Dec 8: Final Demo
- Dec 1: Final Presentation
Risks

Technical
Processing Capabilities
- Limited processing
- Heating issues

Small Display
- Head orientation
- Size of display

Product
Market Audience: Children
- Fragile product

Niche Market
- Targeted age group
Future Scope

- Internet connectivity
- Image search feature to select pictures from web
- Controlled feedback to user on progress of sketch
- Contour overlay on drawing paper using phone projection
- Integration of Anoto digital pen with Ubiscope
- Offload processing to server for complex images