

A MINI PROJECT REPORT ON

“Sketch Using AR”

Submitted

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UNIVERSITY OF MUMBAI

2018-2019

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This is to certify that,
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Of T.E. course in Information Technology Engineering have completed the
specified

Mini Project on,

“Sketch Using AR”

As a partial fulfillment of the project work in satisfactory manner as per the
rules

Of the curriculum laid by the University of Mumbai during the

Academic Year 2018-2019

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Internal Examiner

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Principal
(Dr. S. P. Kallurkar)

MINI PROJECT APPROVAL CERTIFICATE

This is to certify that the mini project report entitled "Sketch Using AR", for T.E. (Information Technology) submitted to University of Mumbai by Ajay Kushwaha, Rishikesh Nanaware, Damini Pandare bonafide students of Atharva College of Engineering, Malad, Mumbai has been approved for Third Year Engineering Degree in Information Technology Engineering.

Examiners

1. -----

2. -----

Guides

1. -----

2. -----

Date:

Place:

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Atharva College of Engineering
Malad (W), Mumbai-400095
UNIVERSITY OF MUMBAI

2018-2019

Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Abstract

Sketch Using AR is a fully-fledged tool for teaching drawing using augmented reality, machine learning, and neural networks. The app puts virtual images on paper/wall to let you trace drawings from your phone.

Sketching is a method used in user-centered design to visualize first drafts of a product. In corporate environments, sketching is often employed in ideation workshops with participants of various disciplines including end users. The aim of sketching is to promote communication and create a better understanding between stakeholders. However, participants are sometimes reluctant to engage in the activity for fear of inferior drawing skills. In order to counteract this phenomenon, We designed a Virtual Reality application that supports users in sketching, particularly in workshop settings.

Acknowledgements

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Ajay Kushwaha
Rishikesh Nanaware
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LIST OF ABBREVIATIONS

AR	Augmented Reality
MR	Mixed Reality
VR	Virtual Reality
JS	Java Script

1. INTRODUCTION OF THE TITLE

1.1 NEED

Most of the people love sketching, but they don't have skills to sketch. If they even try to learn skills it might be impossible because of some reasons. Also, if they possess skills, they don't have that much time to invest in sketching. Sometimes you just can't figure it out. It seems no matter how hard you try, how intensely you look at a subject, your drawings look wrong. You've read how to draw books, maybe gone to a few art classes but the art of drawing still seems to elude you. And you begin to question yourself – What if it's me? What if I don't have enough talent? What if I'm never going to improve? You are not alone.

Understanding drawing can be the key to both your artistic success and a new, razor sharp creative mind – but it can seem an uphill struggle. But what if there was a simple solution? Pieces to the puzzle that you didn't know existed, Also, it is difficult for professionals to sketch on large canvas.

1.2 PROBLEM STATEMENT

To overcome with these problems, we have designed a Mobile application to put virtual images on paper/wall to let you trace drawings from your phone and let you participate in the activities without fear for inferior drawing skills.

1.3 AIMS AND OBJECTIVES

- **AIM:**

The Sketch Using AR aims to match technology and art to bring you a better way to express yourself by drawing using augmented reality.

- **Objective:**

To unite artists, creators, and innovators who are exploring new ways of taking their art to the next level using augmented reality.

1.4APPLICATION AND SCOPE

- **APPLICATION:**

A person could draw any picture on a piece of paper perfectly, just by following a projection of the picture made by your phone

- **SCOPE:**

This system guides user to draw sketches using augmented reality and convolution neural network. Hence Leading to overall growth of network. This system is also very cost efficient and user-friendly as most of the work is done on smart phone and requires less power supply.

2. REVIEW OF LITERATURE

2.1 LITERATURE SURVEY

A mixed reality application for sketching in prototyping workshops:

According to the author, sketches mainly serve as means of communicating design ideas. They can be distributed to potential users for feedback. Criticism and suggestions for improvement are most valuable in early stages of development.

Identification and Grading of Freehand Sketches Using Deep Learning Techniques:

Sketches also serve as documentation for the design process in order to keep early design decisions comprehensible later on. In this paper, a Convolutional Neural Network (CNN) has been developed which can classify the freehand sketches in view of specific highlights. Publicly available dataset of Eitz et al. is considered for identification and grading. Evaluating the sketches will help in surveying the advance of a client who is figuring out how to draw outlines.

SketchSeeker: Finding Similar Sketches:

Searching is one domain where sketching is a relatively new form of input. The amount of data to search through increases every day, and with users wishing to search in more and more modalities, sketch-based searching could offer a fast and flexible solution using simple drawings like those seen.

2.2 EXISTING SYSTEMS

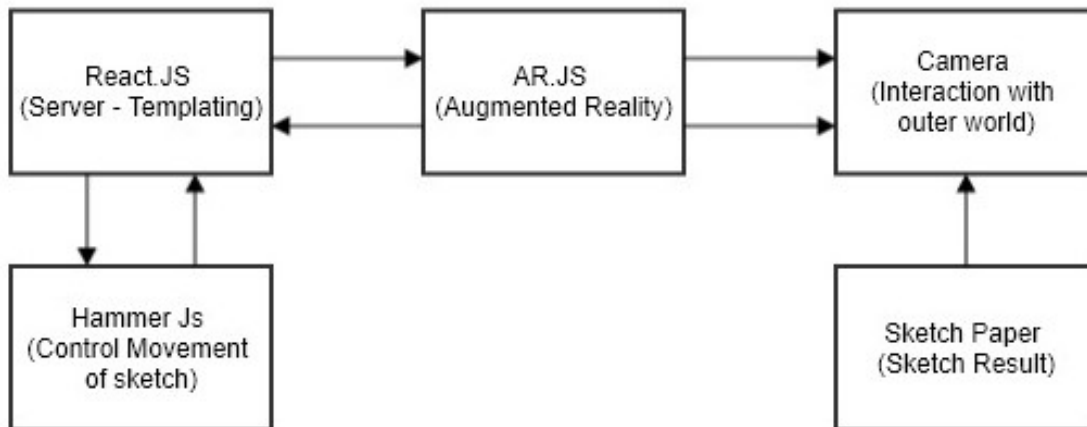
Studies that support paper prototyping with overhead projector and camera have been rated positively by participants and experts. Such a hardware setup is time-consuming. A study that solves this problem concerns the use of mobile devices. In this approach, the drawing is not done on paper but on the devices. However, it has already been proven that in early stages of design creation, designers prefer the use of pen and paper rather than computer devices. Tracing paper is paper made to have low opacity, allowing light to pass through. It was originally developed for architects and design engineers to create drawings which could be copied precisely.

2.3 SUMMARY OF LITERATURE REVIEW

Sr No	Title	Author	Publication	Approach
1	A mixed reality application for sketching in prototyping workshops	Sascha Herr, Nico Koprowski, Omar Sanchez, Katia Cirillo	Federated Conference on Computer Science and Information Systems 2018	They designed a mixed reality application that supports users in sketching. They captured the prototype in the Unity Editor with the aid of the HoloLens application. They employed the onion skinning technique as it has been positively received in previous studies.
2	Identification and Grading of Freehand Sketches Using Deep Learning Techniques	Deepika M M, Chandan C G , Suraksha S	Institute of Electrical and Electronics Engineers 2018	In this paper, a Convolutional Neural Network (CNN) has been developed which can classify the freehand sketches in view of specific highlights. Publicly available dataset of Eitz et al. is considered for identification and grading. Evaluating the sketches will help in surveying the advance of a client who is figuring out how to draw outlines.
3	SketchSeeker: Finding Similar Sketches	Seth Polsley, Jaideep Ray, and Tracy Hammond	IEEE TRANSACTIONS ON HUMAN-MACHINE SYSTEMS 2017	SketchSeeker, a system for indexing and searching across a large number of sketches quickly based on their similarity. First, semantic filtering is performed on the search results using a support vector machine (SVM) classifier. A median filter is used to eliminate any outliers before returning the final result set. SIFT, Fisher vectors, and such descriptors have been used for sketch classification

3. PROPOSED SYSTEM

3.1 SYSTEM BLOCK DIAGRAM



We first explored the JavaScript community to see if anything existed to ease web development with WebGL, AR and touch gestures, there are multiple librairies out there .

- Three.js: A JavaScript 3D library
- ARToolkit: A set of tools for AR using three.js
- AR.js: A thin layer on top of artoolkit to make AR even easier
- Hammer.js: A javascript library for multi-touch gestures

And since we'll have to compose several components together and handle navigation, we'll use React.js and make it a Single-Page Appliction. For the UI kit, we settled on material-ui

4. DETAILS OF HARDWARE AND SOFTWARE

Hardware Requirements:	Software Requirements:
1. Smartphone having good resolution camera	1. Android 5.0 and up
2. 2gb or above ram	2. Chrome , safari or any other ar.js supporting web browser.
3. Medium range CPU	
4. Active Internet Connection	

5. IMPLEMENTATION

5.1 Program Implementation:

Skecth Interaction.html

```
<html>

<script src="https://aframe.io/releases/0.6.1/aframe.min.js"></script>
<script src="https://rawgit.com/donmccurdy/aframe-extras/master/dist/aframe-
extras.loaders.min.js"></script>
<script src="https://cdn.rawgit.com/jeromeetienne/AR.js/1.5.0/aframe/build/aframe-
ar.js"> </script>

<body style='margin : 0px; overflow: hidden;'>
  <a-scene stats embedded arjs='trackingMethod: best;'>
    <a-marker preset="kanji">
      <a-image src="{% static " %}" {{ sketch_image }}" position="1 0 0.5"
rotation="-90 0 0" transparent="true">
    </a-marker>

    <a-entity camera></a-entity>
  </a-scene>
</body>
</html>
```

App_Interface.jsx

```
import React, { Component } from "react";
import MuiThemeProvider from "material-ui/styles/MuiThemeProvider";
import FileSelection from "./FileSelection";
import Sketch from "./Sketch";

const styles = {
  container: {
    position: "fixed",
    top: 0,
    left: 0,
```

```
    right: 0,  
    bottom: 0,  
    fontFamily: "'Roboto', sans-serif"  
  }  
};
```

```
class App extends Component {
```

```
  state = {  
    image: null  
  };
```

```
  handleFileSelected = ({ image, whiteImage, blackImage }) => {  
    this.setState({ image, whiteImage, blackImage });  
  };
```

```
  render() {  
    const { image, whiteImage, blackImage } = this.state;
```

```
    return (  
      <MuiThemeProvider>  
        <div style={styles.container}>  
          {!image && <FileSelection onFileSelected={this.handleFileSelected} />}  
          {image && (  
            <Sketch  
              image={image}  
              whiteImage={whiteImage}  
              blackImage={blackImage}  
            />  
          )}  
        </div>  
      </MuiThemeProvider>  
    );  
  }  
}
```



```
export default App;
```

gallery.jsx

```
import React from "react";  
import GalleryItem from "./GalleryItem";  
import RaisedButton from "material-ui/RaisedButton";
```

```
const styles = {  
  container: {  
    position: "relative",  
    height: "100%"  
  },  
  
  gallery: {  
    display: "flex",  
    flexWrap: "wrap",  
    justifyContent: "space-between",  
    padding: "0.5rem 0.5rem 2.5rem 0.5rem",  
    position: "relative",  
    overflowY: "scroll",  
    height: "100%"  
  }  
};
```

```
const defaultImages = [  
  require("./assets/drawing1.png"),  
  require("./assets/drawing2.png"),  
  require("./assets/drawing3.png"),  
  require("./assets/drawing4.png"),  
  require("./assets/drawing5.png"),  
  require("./assets/drawing6.png"),  
  require("./assets/drawing7.png"),  
  require("./assets/drawing8.png"),  
  require("./assets/drawing9.png"),
```

```
require("./assets/drawing10.png"),
require("./assets/drawing11.png"),
require("./assets/drawing12.png"),
require("./assets/drawing13.png")
];

const Gallery = ({ images = defaultImages, onClose, onSelect }) => (
  <div style={styles.container}>
    <RaisedButton secondary fullWidth onClick={onClose} label="Cancel" />
    <div style={styles.gallery}>
      {images.map(image => (
        <GalleryItem key={image} image={image} onSelect={onSelect} />
      ))}
    </div>
  </div>
);

export default Gallery;
```

6. OUTPUTS



Fig .6.1. Instruction for Users

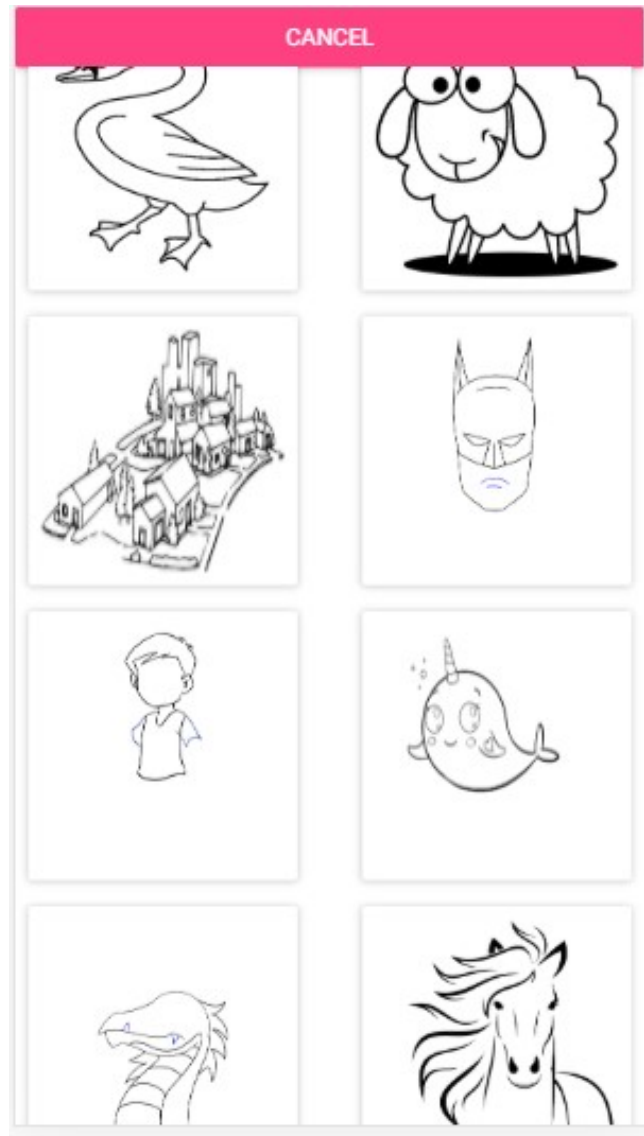


Fig .6.2 .Library For user to Select Sketch

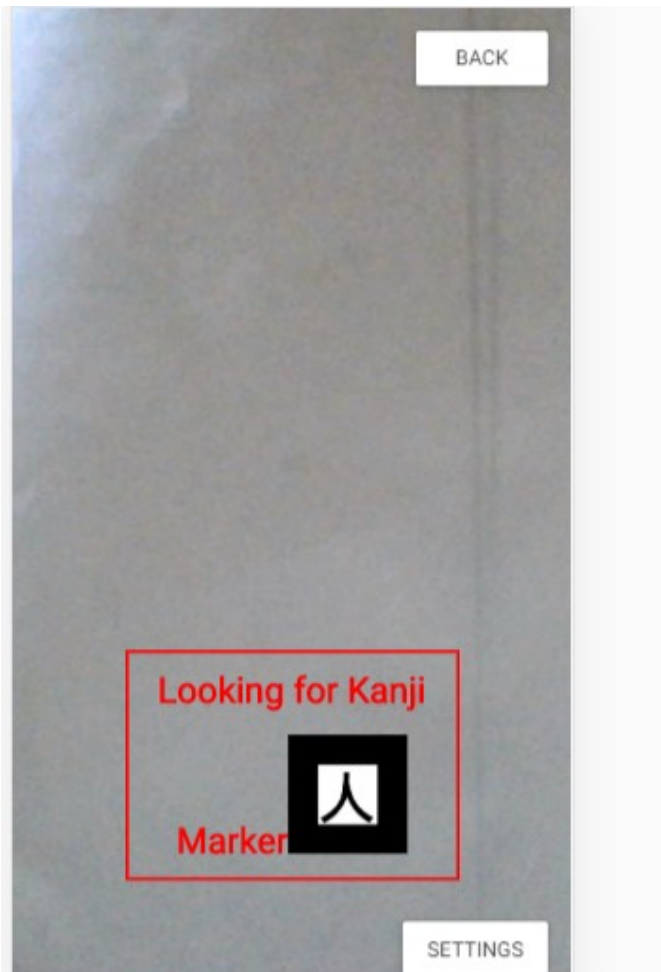


Fig.6.3. Looking for Marker

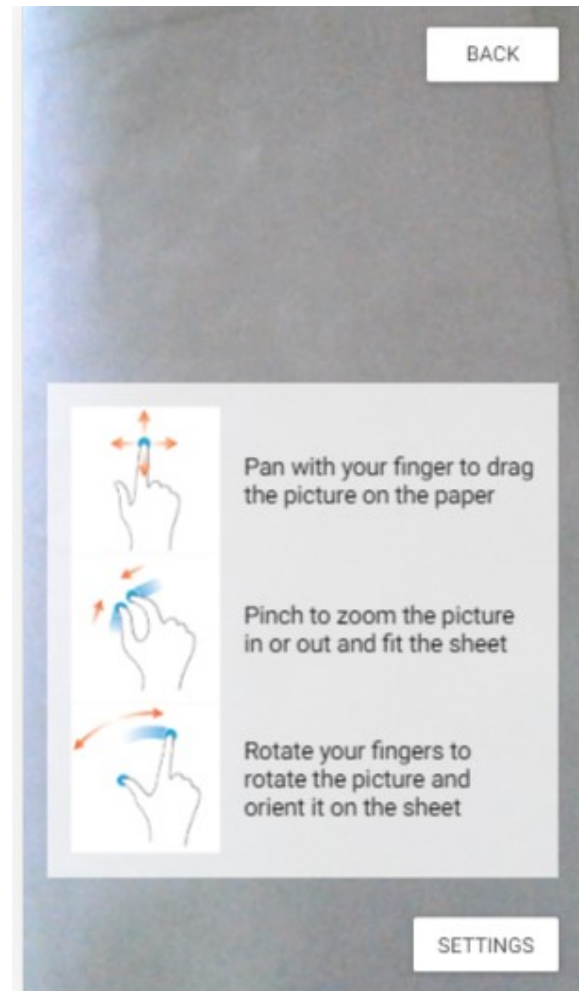


Fig.6.4. Instructions for Sketch Placement

7. CONCLUSION

For better results in an evaluation of usability and user experience, we suggest to continue development of the prototype by expanding the range of UI widgets and improving the interaction concept.

Taking into account the Upcoming technological advancements, we conclude that the Sketch Using AR will offer professional artists, creators, innovators and naïve sketcher a new learning insight with augmented reality promoting their designing and creative skills.



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