Virtual Try-On

FYP Project Proposal

Session: 2021 – 2025

Submitted by:

Sehrish Saddique 2021-SE-12

Kausar Fatima 2021-SE-25

Laiba Amber Ejaz 2021-SE-37

Supervised by:

Ma'am Alina

Department of Computer Science, New Campus

University of Engineering and Technology

Lahore, Pakistan

Contents

List of Figures ii

List of Tables iii

1 Proposal Synopsis 1

1.1 Abstract . . . 1
1.2 Introduction . . . 1
1.3 Problem Statement . . . 2
1.4 Objectives . . . 2
1.5 Scope/Features of the System . . . 3
1.6 Related Work . . . 3
1.7 Proposed Methodology . . . 5
1.8 Tools and Technologies . . . 6
1.9 Team Members Individual Tasks . . . 6
1.10 Data Gathering Approach . . . 6
1.11 Gantt Chart . . . 6

References 8

List of Figures

1.1 Proposed Methodology Overview 5
1.2 Gantt Chart 7

List of Tables

1.1 Related System Analysis 4
1.2 Tools and Technologies 6
1.3 Work Division 6

Chapter 1

Proposal Synopsis

1.1 Abstract

This project explores the application of augmented reality in context of improving clothing shopping experiences. We identify challenges in traditional clothing try-on processes and propose solutions using AR technology. Our objective is to enhance convenience, personalization, and enjoyment in clothing shopping. We discuss existing market systems, analyzing their limitations and suggesting how they can be addressed. The proposed methodology integrates key technologies such as Unity 3D, and Microsoft Kinect SDK. Our approach involves gathering diverse datasets of clothing items and user body measurements to ensure effective and personalized virtual try-on experience. Through this project, we aim to transform clothing shopping, making it more accessible and engaging for users.

1.2 Introduction

In recent years, the use of Augmented Reality (AR) has been on the rise. AR is a technology that adds digital elements to the real world [1]. It is becoming more and more popular, especially in shopping. Many people find that using AR in stores improves their shopping experiences. This cutting-edge technology is changing the way customers interact with products in real time. AR has opened up new opportunities for retailers to engage customers more effectively. Its potential is not limited to entertainment, but extends to practical uses that improve convenience and efficiency.

Have you ever been shopping and wished there was an easier way to try on clothes

without going into a dressing room? That's where our project comes in. We are working on a system that uses AR to help people have a better time shopping in stores. By integrating advanced AR capabilities, we aim to bridge the gap between physical and digital retail experiences. Our project also focuses on creating an intuitive interface to enhance user comfort. This innovative solution promises to redefine how shoppers interact with clothing in real-time.
Traditional ways of trying on clothes in a store can be a hassle. You have to spend a lot of time going in and out of dressing rooms, and it can be messy. Our goal is to make shopping easier and more fun by letting people try on different clothes without actually putting them on. This approach also offers a hygienic alternative to traditional dressing rooms, which some may find uncomfortable.
Our system uses AR to understand a person's body shape and size, so when they try on clothes virtually, it looks realistic. This means that people can see how clothes will fit them before they buy them, which saves time and makes shopping less stressful.

1.3 Problem Statement

Traditional shopping experiences, particularly the process of trying on clothes in physical trial rooms, pose significant challenges. These challenges include time-consuming trials, high costs associated with maintaining trial rooms, and the inconvenience faced by both customers and staff. Moreover, the inability to visualize different clothing options easily leads to decision-making struggles for customers. These inefficiencies highlight the need for a solution that enhances the shopping experience by integrating AR technology.

1.4 Objectives

The main objectives of our virtual try-on system are:

1. To develop an Augmented Reality system that enables customers to virtually try on different clothing items.

2. To ensure the AR system accurately senses and adapts to users' body features for realistic virtual try-on experiences.

3. To navigate using hand gestures for continuous interaction.

4. To ensure system management and administrative roles, accessible to authorized admin.

1.5 Scope/Features of the System

The tryon-system requires a distraction-free environment and proper lighting because they are crucial for ensuring the system to accurately detect and interpret user data readings.

Admin-side

1. Allow admin to manage his profile.
2. Allow admin to manage inventory details.

User Tryon-side

1. Implement virtual try-on for clothing items.
2. Allow users to customize and visualize different clothing combinations.
3. Enable users to save pictures of their virtual try-ons.
4. Show relevant details alongside the virtual try-on.
5. Basic navigation using hand gestures for continuous interaction.
6. Utilize 3D depth sensors for accurate placement of virtual items.

1.6 Related Work

Creating virtual fitting rooms (VFRs) is currently a hot research topic [2], and it is being proposed as an important part of many virtual reality (VR) or augmented reality (AR) systems [3]. In fact, virtual try-on of clothes has received much attention recently due to its commercial potential [4]. Generally speaking, the majority of the VFR systems use the Microsoft Kinect sensors; version 1 and version 2 [5], [6]. Such sensing technologies, also known as red, green, blue and depth (RGB-D) sensors, are capable of providing high quality videos of both color and depth [7]. Some related work are mentioned in the following table:

TABLE 1.1: Related System Analysis

Related System	**Weakness**	**Proposed Solution**
Sapphire Pakistan [8]	Limited to show 3D images of clothes on models but now this feature is unavailable on their app. Virtual Try-rooms are not accessible in stores, requiring customers to physically try on clothes.	The project aims to enable customers to virtually try on clothes using their own bodies, providing them with a styling 3D experience.
Bonanza Satrangi [9]	Avatars and real face try-ons were previously accessible online as per an article, but they are currently unavailable. Moreover, there are no virtual try-ons for clothing, and virtual try-on rooms are not provided in stores, necessitating customers to physically try on clothes.	The project aims to enable customers to virtually try on clothes using their own bodies, providing them with a 3D styling experience.
FX Mirror[10]	FX Mirror is unavailable to Pakistanis as it is only accessible in physical stores outside of Pakistan. Additionally, its online app is not compatible with newer versions of Android.	The project aims to enable local Pakistani brands to utilize resultant product.
Zeekit [11]	Limited to avatars with defined height and size ranges, and some predefined skin tones.	The project aims to enable customers to virtually try on clothes using their own bodies, providing them with a 3D styling experience.

Face Cake[12]	Real background limitation may distract customers from experiencing virtual try-ons with focus.	The project aims to enhance the customer experience by incorporating plain backgrounds, enabling them to focus on their try-ons without any distractions.

1.7 Proposed Methodology

In our 3D system, we integrate Microsoft Kinect to capture user physical measurements and simulate clothing interaction within a 3D environment. Initially, the system captures skeleton, depth, and RGB data from the Kinect sensor. Utilizing this data, the user's 3D body model is constructed and refined for accuracy. The 3D clothing is mapped onto the user's body model using pixel data obtained from Kinect, ensuring realistic alignment with the user's movements. Meanwhile, in the 3D environment, tools are utilized for segmenting, coloring, and adapting the clothing to enhance pragmatism. Through real-time mapping and 3D rendering, the system achieves precise and immersive interaction between the user and the simulated 3D clothing, offering an enchanting user experience.

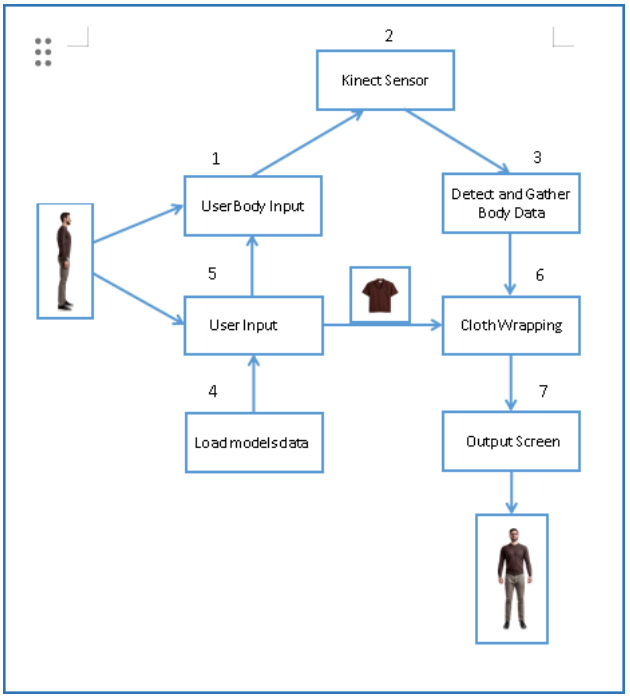

FIGURE 1.1: Proposed Methodology Overview

1.8 Tools and Technologies

Following tools and technologies will be used in the System:

TABLE 1.2: Tools and Technologies

Programming Language	C sharp
Sensor	Kinect v2
Library	Microsoft Kinect SDK
IDE	Visual Studio
System Development	Unity 3D and .NET
Documentation	Word, Excel, Power Point and Latex

1.9 Team Members Individual Tasks

In the execution of our project, we've divided responsibilities among team members to ensure self-learning, efficient progress and successful completion.

TABLE 1.3: Work Division

Team Member Name	**Tasks**
Sehrish Saddique	Frontend, Backend and Documentation
Kausar Fatima	Backend, Testing and Documentation
Laiba Amber Ejaz	Backend, Testing and Documentation

1.10 Data Gathering Approach

A dataset for a virtual try-on system will be sourced from freely available online clothing items. Body measurements will be captured using depth-sensing technologies like Microsoft Kinect for accuracy in height, weight, body shape, and dimensions.

1.11 Gantt Chart

Figure 1.2 presents the proposed timeline to complete our project.

ID	Task Name	Duration	Start	Finish
1	Requirement Gathering	30 days	Mon 4/1/24	Fri 5/10/24
2	Design Document	60 days	Fri 5/10/24	Thu 8/1/24
3	Data Gathering	60 days	Mon 7/1/24	Fri 9/20/24
4	Implementation	150 days	Mon 7/1/24	Fri 1/24/25
5	Testing	15 days	Fri 1/24/25	Thu 2/13/25
6	Debugging	5 days	Thu 3/6/25	Wed 3/12/25
7	Deployment	10 days	Thu 3/6/25	Wed 3/19/25

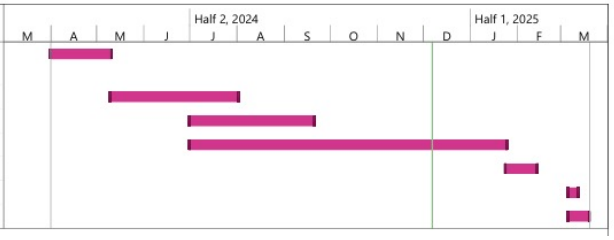

FIGURE 1.2: Gantt Chart

References

[1] V. Shukla, "The next frontier in technology: Creating immersive ar and vr experiences," *Medium*, 2023. Accessed: March 24, 2024.

[2] A. Traumann, G. Anbarjafari, and S. Escalera, "A new retex turing method for virtual fitting room using kinect 2 camera," in *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops*, pp. 75–79, 2015.

[3] A. Vitali and C. Rizzi, "Acquisition of customer´s tailor measurements for 3d clothing design using virtual reality devices," *Virtual and Physical Prototyping*, pp. 1–15, 2018.

[4] M. Yuan, I. R. Khan, F. Farbiz, S. Yao, A. Niswar, and M. H. Foo, "A mixed reality virtual clothes try-on system," *IEEE Transactions on Multimedia*, vol. 15, no. 8, pp. 1958–1968, 2013.

[5] C. KAEWRAT and P. BOONBRAHM, "A survey for a virtual fitting room by a mixed reality technology," *Walailak Journal of Science and Technology (WJST)*, vol. 14, no. 10, pp. 759–767, 2017.

[6] Y. Wan, D. Lu, and X. Wang, "Real-time virtual fitting technique based on kinect," in *Recent Developments in Intelligent Computing, Communication and Devices*, pp. 607–616, Springer, 2019.

[7] K. Lai, L. Bo, X. Ren, and D. Fox, "A large-scale hierarchical multi-view rgb-d object dataset," in *Robotics and Automation (ICRA), 2011 IEEE International Conference on*, pp. 1817–1824, IEEE, 2011.

[8] S. Pakistan, "Sapphire 3d ar app." https://www.youtube.com/watch?v=cFPH72KPZd4&list=PLvClqYv5J8g9EInHxkv1XhoQr2kRiE8yx&index=3, 2018. [Online; accessed March 24, 2024].

[9] "Bonanza satrangi becomes the first e-store in pakistan to introduce augmented reality." https://images.dawn.com/news/1186025, 2020. [Online; accessed: March 24, 2024].

[10] I. FXGear, "Fxgear." https://www.fxgear.net/vr-fashion, n.d. [Online; accessed: March 24, 2024].

[11] D. Incandela, "Walmart launches zeekit virtual fitting room technology." https://corporate.walmart.com/news/2022/03/02/walmart-launches-zeekit-virtual-fitting-room-technology, 2022. [Online; accessed: March 24, 2024].

[12] "Facecake marketing technologies, inc.." https://www.facecake.com/, 2020. [Online; accessed: March 24, 2024].