



## MINOR PROJECT REPORT

# REVIEW ON VIRTUAL TAILORING & AUGMENTED REALITY

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## ABSTRACT

Retail is evolving and adapting to digitalization or the *phygital*. Online is destroying the way retailers, or some of them, understood physical shopping. Business Models that successfully grew during the 20th century are closing stores as virtual tailoring is the new force in today's market.

Tailor connects us with a real-life, whether it is a professional or casual attire. It hardly happens that anyone advice on how to style the clothes you already own. Users need to find the perfect new piece for the match in wardrobe. Asking your stylist or friend for personal fashion, styling, and shopping questions are annoying sometimes. **What should I wear with respective apparel to match the whole attire?** The user experience that there's always been one major issue when shopping for clothes online.

Most of the time the users are not aware if something will fit or not unless they very familiar with the brand. Usually, users just have to go with your usual size and hope for the best. Virtual tailoring application or augmented reality applications whose creators are aware of user experience thus developed an innovative way to suggest outfits for customers right from their phones.

Talking about the apps it takes a scan of your body using your phone's camera. Moreover, Virtual tailoring apps are fully customizable where customers are able to select the fabric used, pattern, collar, length and button placement.

This Virtual Clothes Fitting App captures a user's measurements in mere seconds and the measurement data is then translated across multiple product lines and used to create custom-fitting garments. This applications customization accordingly for men and women of any height, weight, or body type.

The technology used is actually quite candid. Once the device determines its distance and angle relative to the subject is helpful as measurements are relatively easy to obtain. Leveraging a complex learning algorithm, the device's camera feed translates imagery into measurements. After that, the app then makes note of several key measurements, which are applied to a garment pattern.

*The resulted output is a “custom-made clothing item with a perfect fit according to the user requirement”.*

## INTRODUCTION

It's no secret how online shopping sites have increased the demand for readymade stylish clothing. Today's forward-thinking shopper wants to be able to order their “made to measure” custom clothing whether its dresses, skirts, tops, shirts, suits, pants, jackets and even hoodies. People want to make their own unique fashion statement.

Augmented reality (AR) is sometimes wrongly interchanged with the concept of virtual reality, or virtual environment as called by Milgram and Kishino (1994). Both of them belong to the contemporary trend in digital technology and are part of mixed reality, which refers to the integration and merging of the real and virtual world . Despite being related to virtual reality (VR), AR enhances a user's interaction with reality through a computer-generated environment, while VR technology completely immerses people in a synthetic environment (Fuhrt, 2014). AR allows users to continuously see and hear the surrounding world but with additional sights and sounds that are synchronized to the exact location relative to a user's three-dimensional (3D) orientation to a geographic locale (Pavlik & Bridges, 2013). AR is considered as a part of the mixed reality continuum (Figure 1), focusing on augmenting the real world with add-on digital information, instead of implementing real-world information into virtual worlds (Azuma, 1997). Thus, AR aims to supplement the real world, rather than creating an entirely artificial environment .

Today, there exist apps on mobile phones that provide results better than actual human beings carrying out tasks. Tailoring, widely considered to be a human-only profession, is now being successfully carried out by mobile cameras. Mobile tailoring apps have taken over app stores, and struggling to find a clothing item that fits perfectly is a thing of the past now.



	<u>AR research</u>	<u>VR research</u>
1990s	Exploration of uses in augmented commerce ( <i>Brody and Gottsman, 1999</i> )	Simulation of shopping environment ( <i>Gold, 1993</i> ) Immersive aspect of virtual environments ( <i>Slater and Wilbur, 1997</i> ) and interactivity ( <i>Leinfuss, 1996</i> )
2000s	Interactive technology in physical retail environment ( <i>Sukaviriya et al, 2003</i> ) Form of experiential marketing; long-term benefits: increase customer loyalty ( <i>Bulcarca and Tamarjan, 2010</i> )	Virtual store interfaces affecting online consumer behaviour differently from traditional retail ( <i>Vrechopoulos et al, 2004</i> ) Online shopping environment influencing consumer satisfaction through VR technology ( <i>Ballantine, 2005; Kim and Forsythe, 2008; Vrechopoulos et al, 2009</i> )
2010s	Fun factor in virtual fitting rooms ( <i>Pachoulakis and Kapetanakis, 2012</i> ) Mobile AR Contribution to shopping experience; wide adoption in retail ( <i>Tabusca, 2014</i> ) Consumer engagement – immersive AR ( <i>Scholz and Smith, 2016</i> )	Contribution to online shoppers' enjoyment and engagement ( <i>Papagiannidis et al, 2013; Gadalla et al, 2013</i> ) Continuous developments to improve user experience ( <i>Alshaal et al, 2016</i> ) Consumers' positive response in physical retail; enhancing shopping experience ( <i>Mann et al, 2015</i> )

Key: Management journals; Technology journals; Marketing journals

## INFORMATION FLOW

**APPLICATION NAME – VIRTUAL OUTFITS**

**APPLICATION VERSION – 1.0.1**

**SOURCE – Google play store**

**LINK - <https://play.google.com/store/apps/details?id=dev.virtualoutfits.org>**

### MAIN FEATURES

- This app can create your avatar ( model or animated figure which resembles the person)
- The model's face can be replaced with real face.
- We can visualize the 3D view of the garment
- We can personalize the features of the model.

**USAGE DESCRIPTION -** This application , virtual outfits is A virtual room to dress up your Avatar.

A social shopping platform where you can get your accurate measurements from your picture then try on clothes online using your virtual model. Dressed up your avatar, get feedback from friends and buy your outfits all through one website.

Create your avatar by either taking your full body picture or by providing your measurements and store your avatar inside your online fitting room. Now you can wear your clothes online.

In fact, Virtual Outfits is SUCH a social platform that you'll likely increase your inner circle to include A-List fashion bloggers and other fashionistas like yourself. By creating and sharing outfits publicly, you will invite feedback from the uber-fashionable Virtual Outfits community. And you can just as easily give

feedback to those who inspire you .This app requires Android 4.2 and higher version with minimum of 1.5 RAM.

### **Options in the app are :-**

**Home** – where you can select the avatar whether male or female .

**Body scan-** where real measurements can be obtained from person's body scan. We can also input our body measurements like overall size ( XS , S ,M ,L ,XL ,XXL,XXXL) ,height , hip size , waist size , chest or bust size ,if we already know the measurements.

We can upload or click our own photo of our face and use it on the model.

We can edit the face out line , hair style , skin colour.

**Closet** – where you can try all the selected garments on your personalized model.

3 categories of garment – tops, bottoms and dresses.

**Outfit** – from this we can add garments to our closet

**Shop** – where we can buy the outfit or add to the closet to try .

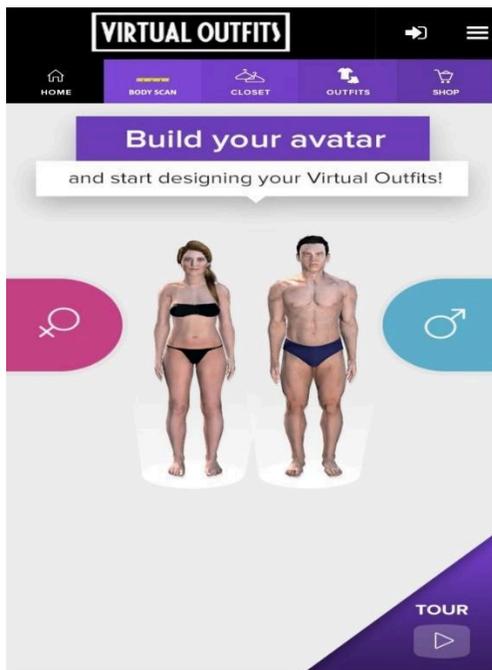
### **RATING – 3+**

#### **ADVANTAGES –**

- We can create our personalised model /avatar.
- We can put our face into the model's body and change the features of the model like ours.
- We can modify the hair style and skin tone to match with ours.
- We can set our correct measurement height , waist etc.
- We can have a 3d view of the model with the outfit
- We can get our body measurements by total body scan from the application.

#### **Disadvantages**

- We cannot visualise or view or own body instead of the model's body. (No real image of our body)
- We can just put the face not the whole body.
- We cannot create our own outfits.
- We can only try the inbuilt garment or outfits.

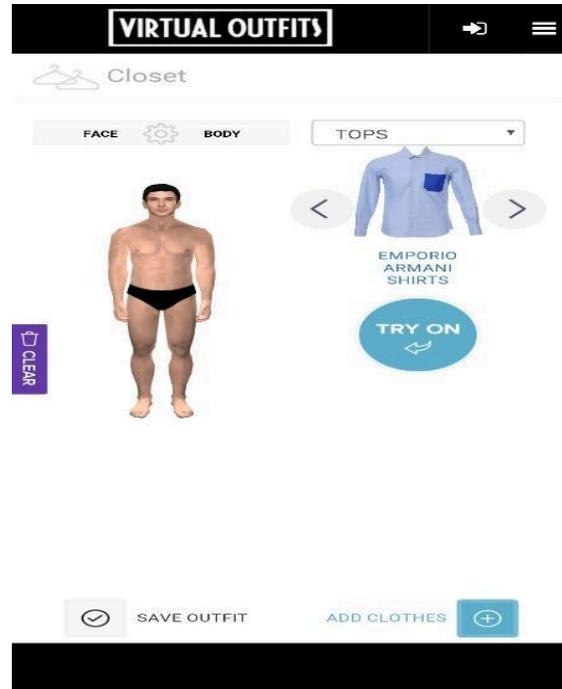


**Step 1. Select the Gender of the avatar you want to make from the home .**



**Step 2: From the body scan you can scan your whole body and know your measurements or if you known they you can just enter the specifications.**





After that 3d model appears and from the collection you can add clothes to the closet and then try on the model.

Then the selected outfits can be bought from the shop option.



virtual outfits application logo

2.

**Application Name - Meepl**

**Application version- 2.11**

**Source - Google play store**

**Link - <https://play.google.com/store/apps/details?id=com.fision>**

### **Main features –**

- You can create your free 3D body scan with meepl and online shop smarter.
- The perfect fit just needs two pictures of your body, taken with the meepl app .
- Your body scan, your personal meepl, is the basis for a range of body-related applications like made-to-measure services, size recommendations and a virtual try-on in a virtual dressing room.

### **Usage description –**

#### **HOW IT WORKS**

- Wear tight clothes which clearly show your body's silhouette
- Let the app guide you in three simple steps through the body scan process
- Use your meepl profile in our partner online shops.

First it will ask your gender – Male , Female or Other.

Then you will have to type your body height in centimetres.

Then it will ask whether you want to take picture either alone or with partner.

Then you will have to take pictures as guided by the application.

Then it will create a model of your accurate measurements like body height , bust size , waist size , hip size. Etc.

### Rating – 3+

#### What's your gender?

- Female  
 Male  
 Other

Continue

Step 1

#### What's your body height?

Height  
Your height  cm

Continue

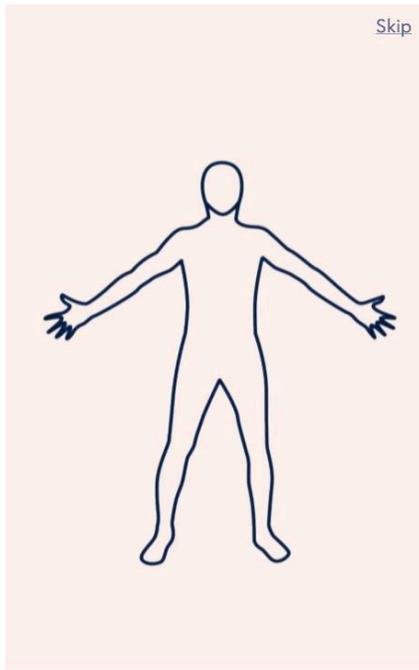
Step 2

#### How do you want to take the two photos?

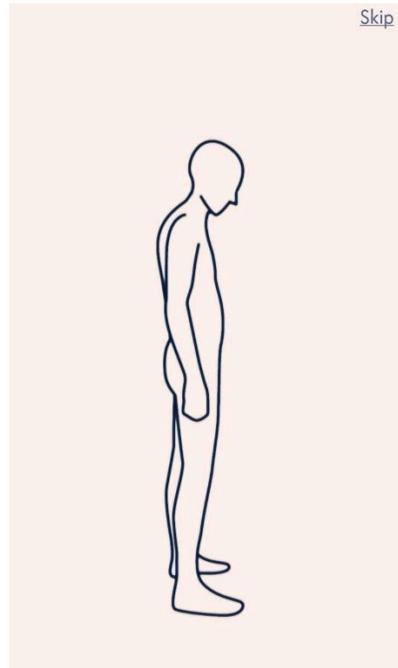
- With partner  
 Alone

Continue

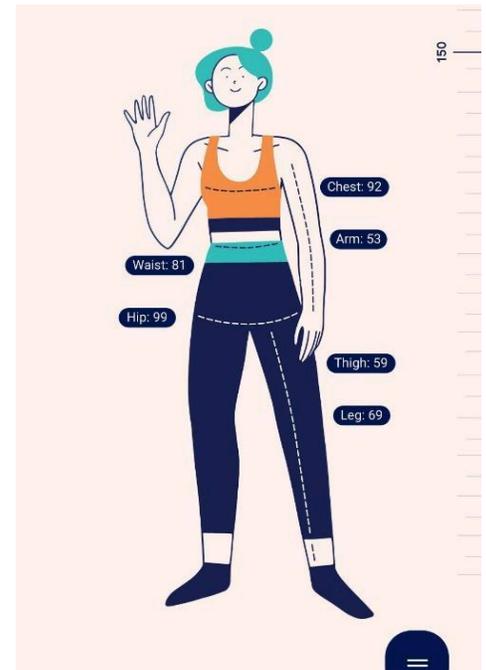
Step 3



Step 4.



step 5.



Step 6.

### Advantages –

- You can get accurate measurement of your body .
- You just have to know your height rest measurements can be scanned by the application.
- This app creates a 2D figure of your body.

### Disadvantages –

- No outfits to try from the application
- No real image of your face ,just the 2d image of the model.
- Just helpful for measuring your body size
- Not useful for virtual outfit trial

3.

**Application Name – Fit 'N SHOP**

**Application version- 1.80**

**Source – Google play store**

**Link -**

<https://play.google.com/store/apps/details?id=net.fxgear.fitnshop>

**Main features** - A size simulation function is added for both male and female avatar

- An avatar's size adjustment function is improved in the avatar setting
- The size saving function for each garment has been improved.

**Usage description** - The First Mobile Shopping App with Virtual Fitting, FIT'N SHOP

FIT'N SHOP, the world's first virtual-fitting clothes shopping mall.

This application allows us to make our own 3D avatar, or take a photo of ourselves to dress as you shop for clothes.

1. Virtual fitting with a video we took ourselves

-we can adjust your body measurements and add photos of yourself to make possible the most realistic and lifelike virtual fitting.

-You can have a more enjoyable fitting experience by trying clothes onto a photo of yourself taken with FXMirror.

**2.** Various types of clothes provided we can virtually experience trying on tops, bottoms, one-pieces.

**3** Virtually try on and then purchase

-Regardless of how many clothes there are, we can quickly and easily try on, try on again, and try on some more clothes in the virtual fitting room.

- we can get information on clothes we like and even purchase them.

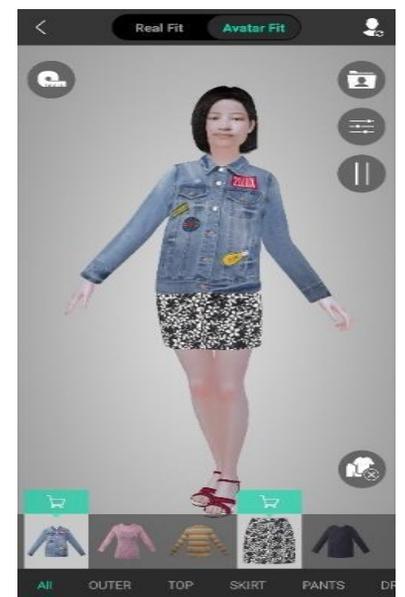
**4.** The most number of 3D clothes in the world



Real Fit



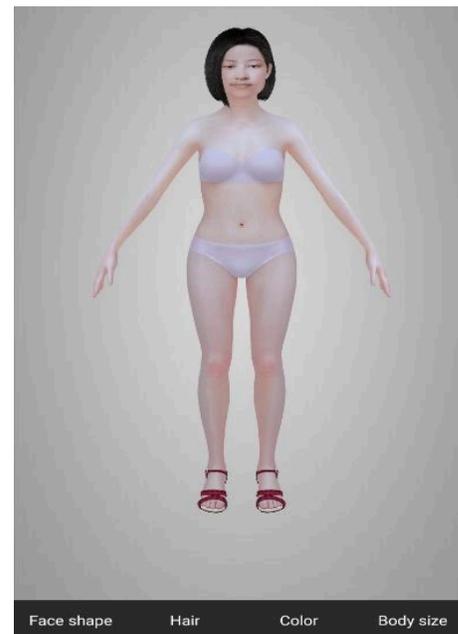
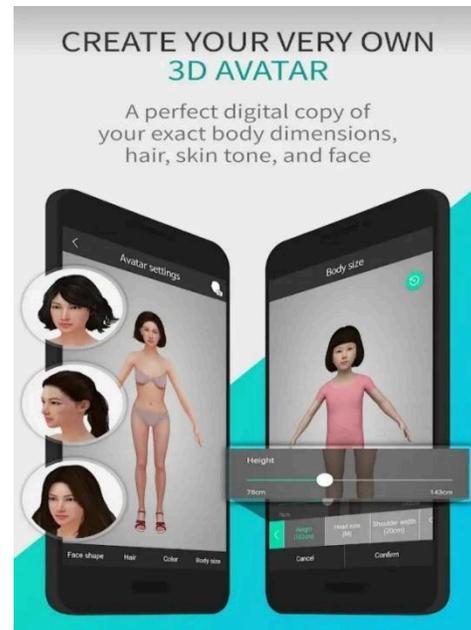
Avatar Fit



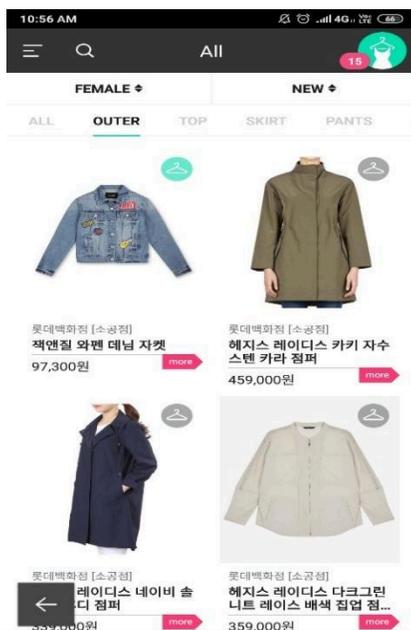
Dressing up the avatar



Avatar's face can be replaced by own face .

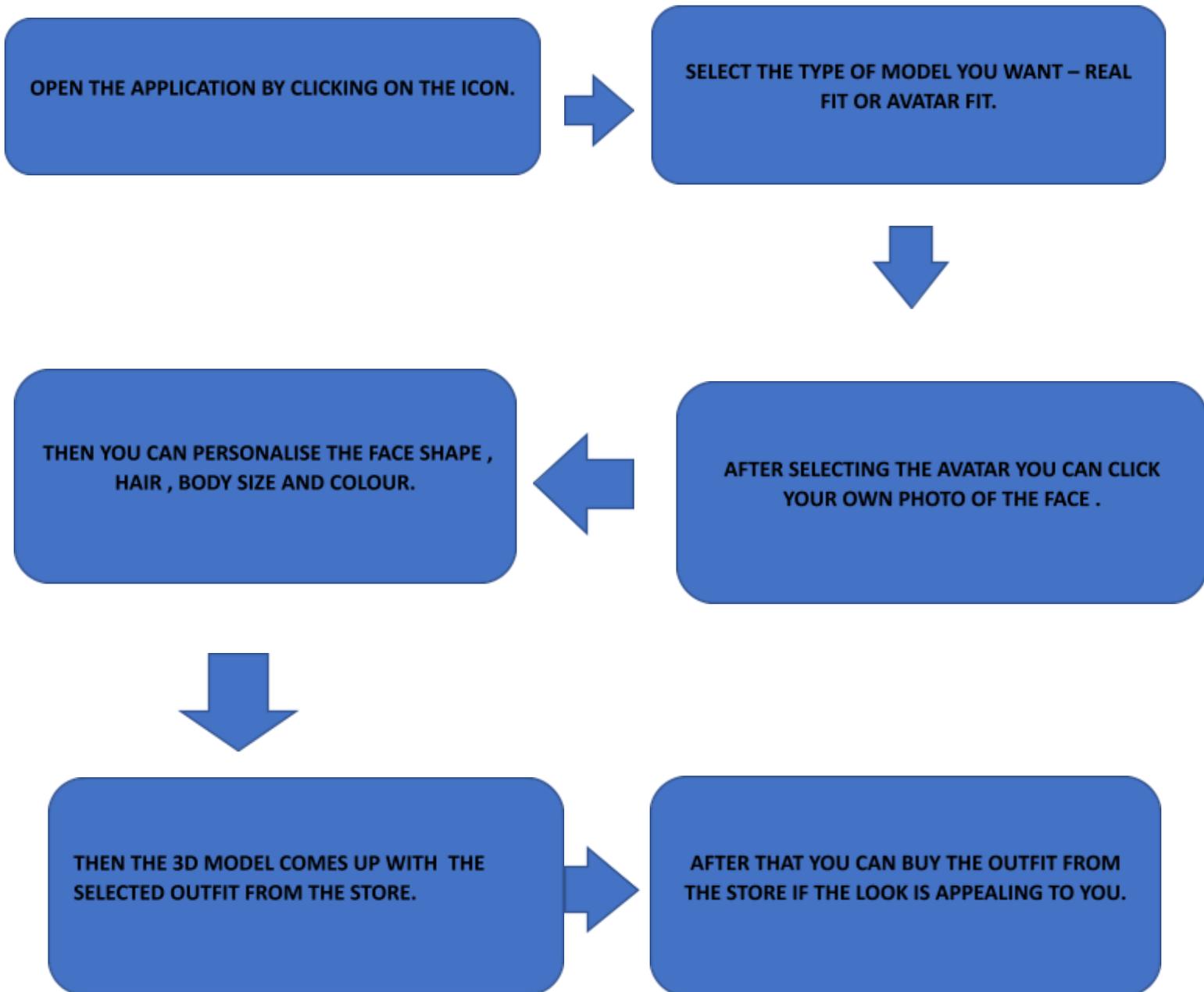


Face shape , Hair ,Color , Body size can be personalized.



Dress options to pick and try on avatar or real fit model and also to buy.



**FLOW CHART**

Logo of FIT'N SHOP



**Rating – 3.3****Advantages –**

- There is a moving model which we can choose from the list whether man ,woman , boy or girl .
- We can view both real fit and avatar fit.
- We can download outfits from options given .
- We can find categories like All , outer , top , skirt , pants.
- We can put our face in that avatar's face and change features like hair style , colour , face shape , body size
- We can specify the model's body measurements.

**Disadvantages –**

- We cannot add our own outfits
- This app cannot measure or scan our body measurements
- Limited number of outfits.

## DISCUSSION

The purpose of our research based on the problem discussion is to close the gap within the augmented reality field of study. We especially focus on the business potential of the AR technology. AR applications have not been quantitatively researched while using the experimental method, in which participants could actually interact with the new interactive technology. This will make a contribution to the research field with the current applications of virtual tailoring and Augmented reality. Hence, in summary, we are going to experimentally investigate the market positioning of virtual Tailoring applications and its user interface.

The first discussion of the project was about the VR and AR applications present regarding the virtual tailoring. We have chosen the virtual tailoring or Augmented reality applications from the Google play store. After that all group members opted for different VR and AR applications to study and review on. After we have chosen the application to work on and study, we installed the those applications on our smartphones. After that we used the applications, tried to know its concept, features, advantages, disadvantages, 2D or 3D viewing, user interface. The applications were run on the Android smartphone and its total specifications were analysed manually. Some of the applications were presenting a 2D view of the model and some of the applications were presenting a 3D view of the model/ avatar. The application had the features to obtain body measurements of a person by scanning using the camera of the smartphone.

After that the applications were analysed whether it is easy to personalise or not. Making an avatar and dressing it up and even changing the skin tone, hair style, body features, face shape were given importance.

## Scope

Augmented Reality itself has become a medium, which has opened doors for several marketing strategies. AR marketing is going to dominate the future arena. According to Vibrant Media, nearly 70% of the media planners and buyers seek to include AR ads into their digital marketing campaigns due to increasing demand for customer engagement, Some of the major prospects in AR marketing are listed below.

- Content Marketing – There is lot of opportunity in content development in AR, as you can upgrade or customise your existing content with the use of filters and visual stickers to suit the medium.
- Advertising – As AR is a new medium by itself, you can integrate “try before you buy” tactic in ad-campaigns. Due to the depth in interaction and immersion that AR provides, advertising can be done very differently. Imagine selling apparels, where the users can actually ‘try it on’ before they actually buy it. This also reduces the product return rate.
- App Development – If you can develop an app that incorporates AR, then your customers can engage with your brand more deeply and directly. Apps have the ability to engage the users to constantly
- Small and Big Retailers are on a level playing field
- Another way AR technology has altered the competitive landscape is the breadth of space that it has provided to small retailers. How many times have you been to a clothing retailer and left that “nice” shirt which you would have bought – but in a different colour?

- Retailers are now leveraging the AR technology to their advantage by providing limitless options to the consumer, without the space limitations of a brick-and-mortar store. So if a shopper points the retailer's app to a certain shirt, the app will display the shirt changing colours. Next step? The shoppers can instantly buy or order it online in the colour he/she wants.
  - By utilizing AR, consumers will be able to swipe their way to unlimited options. Even the smallest retailer now has unlimited space. This not only enriches the customer experience but also provides a level playing field to retailers regardless of their size.
  - 3. Worried about keeping your inventory low? How about eliminating it altogether ...
  - BMW leads the game with its virtual showrooms. Partnering with Google and Accenture, BMW has released an app that displays its sports cars (including i3 and i8) on smartphone screens. Car shoppers can walk around these luxury cars in their own garage or driveways. They can even choose the colour of these vehicles, and try on the trim levels and wheel choices on this superimposed car in their driveway. BMW is planning on adding more models to this app soon.
  - Any retailer can show unlimited products to the consumer in a virtual space. Many retailers are using AR to showcase virtual products. And in the process, they are eliminating their inventory costs.
  - 4. Online Shopping just got REAL, make your Online Store REAL
  - How many times have we all shopped online and left products in the cart? We couldn't make that final decision because somehow, we subconsciously wanted to touch, feel, and see how the product would look in reality. This pain-point need not be felt anymore, thanks once again to AR. According to Retail Perception:
    - *"40% of the consumers will be willing to pay more for a product if they could experience it through augmented reality."*

Today augmented reality has spread its wings not just into gaming but also into our day to day life. From retail business to health sector. Augmented reality shown its capabilities and showcased its future scopes to all of us. In the retail sector, where it can change the whole shopping experience and will definitely bridge the gap between the online and physical store

### **Limitations**

- ❖ Although it does have some limitations like GPS is only accurate within the range of 30 feet i.e. 9 meters and doesn't work in the indoors as well.
- ❖ Other than these even your connectivity matters it won't work if it's not 3G network at least and the quality of your camera does effect the technology when it comes to quality.
- ❖ Another major disadvantage is the existing mobile devices are still not powerful enough to process the required amount of data in real-time whereas to run at interactive frame rates is (15-30 frames per second)
- ❖ There are also some privacy concerns when it comes to image recognition software coupled with AR.
- ❖ In AR, people are missing out on important moments.
- ❖ Low performance level is a concern which needs to be addressed during testing process. requires basic learning to effectively use AR compliant devices.

There are also privacy concerns. Image-recognition software coupled with AR will, quite soon, allow us to point our phones at people, even strangers, and instantly see information from their Facebook, Twitter, Amazon, LinkedIn or other online profiles. With most of these services people willingly put information about themselves

online, but it may be an unwelcome shock to meet someone, only to have him instantly know so much about your life and background.

### **CONCLUSION**

Despite of these few limitations; the future of augmented reality seems really bright and prospective. Like any other evolving technology, AR also faces some obstacles regarding technical issues, to social and ethical problems to financial problem. Where none of the issues seems overwhelming. With the time, all the technical issues will be resolved and AR will definitely showcase something that would fill the gaps between social and ethical issues too.

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