AIDI_1000_01

Final Project

Business Proposal

AI-Powered Body Dimension Scanning, Fashion Recommendation, and Augmented Reality Fitting

Group 1

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Table of contents

1. One-Page Market Position

Vision

With the advent and convenience of online shopping, an AI-powered fitting room presents the ideal means of facilitating accurate, data-driven, time-saving, and customer-tailored clothing all from the comfort and ease of one's home. Such an application will install not only more reliable and confident purchases from consumers but also generate more sales and income for retailers.

The virtual fitting room will offer an overall better consumer experience by reducing the more often than not guessing game and hesitancy when it comes to cloth shopping online. Upon successful development, a series of initial and subsequently continued demonstrations to clothing retailers, manufacturers, and consumers at various junctions (such as conferences as well as technology and fashion shows) will expand the reach of the product and into an active value-added service.

The AI-powered fitting room will initially be made available to consumers and clothing retailers but can be expanded to other retailers and products beyond clothing that can utilize the service in their domain as it has the potential to cross into other business ventures that are driven by size and preference of a customer (such as upholstery, electronic and household appliances, etc.).

Mission

The AI-powered fitting room will revolutionize the online clothes shopping experience by combining tools and resources into a service that will generate more sales, reducing overall time spent searching online, and better customer confidence through the development of an AI recommendation software that uses a handheld scanner and virtual mirror to measure and suggest clothing to an individual.

The customers of the virtual fitting room are both internal – the clothing retailers and manufacturers who will use the service to sell their merchandise – as well as external - any costumer wishing to purchase items of clothing online.

The AI-powered fitting room will suggest and recommend clothing options for an individual to purchase based on their body measurements (weight, height, and overall build), purchase history (to garner an individual's taste and style in clothing), and budget. Awareness of the virtual fitting room will be obtained through various channels of communication: live demonstrations at sales conferences, fashion, and technology shows/fairs; online advertising; reaching out to consumer advocates; and lastly, offering incentives to try out the software by giving a discount to customers on their first purchase made using the software. Availability to purchase the software, handheld scanner, and VR-enabled mirror will be provided online and in person at electronic stores.

2. The Business Model Canvas

<table>
<tr>
<td rowspan="2">Key Partners:
Internal Partners
➢ Project Sponsor
➢ Executives
➢ Program Manager
➢ Project Manager
➢ Employees

External Partners
➢ Suppliers
➢ Project Sponsor
➢ Venture Capitalist</td>
<td>Key Activities:
Creating an augmented reality image processing application for the welfare of the customers as it can be easily accessible, convenient through virtual mode.</td>
<td rowspan="2">Value Propositions:
➢ Satisfying Customer Social needs
➢ Eliminating Potential threat by creating a secured database
➢ Customer Convenience
➢ Easily Accessible</td>
<td>Customer Relationships:
➢ Customer Relationship Management (CRM) Focusing mainly on customer’s data
➢ Holistic marketing
➢ Internal Relationship
➢ Performance Analysis (Financial and Non-Financial goals)</td>
<td rowspan="2">Customer Segments:
➢ Youth
➢ Adults
➢ Professionals
➢ Executives

Value-Delivery Process
➢ Choosing the Value
➢ (Knowing the product Identifying the segment)
➢ Providing the value (Setting the price for the customers)
➢ Delivering the values (Finally reaching the customers)</td>
</tr>
<tr>
<td>Key Resources:
➢ Budget
➢ AI professionals
➢ Materials
➢ Human resources
➢ Design</td>
<td>Customer Channels:
➢ Social websites
➢ Social media
➢ Through fashion-based segments
➢ Through fashion retail stores
➢ Sample testing (Marketing)</td>
</tr>
<tr>
<td colspan="3">Cost Structure:
➢ Project Investment
➢ Technology investment</td>
<td colspan="2">Revenue Streams:
➢ Social Media influencers
➢ Social websites, Advertisements</td>
</tr>
</table>

➢ Manufacturing design ➢ Customer Data ➢ Raw materials	➢ Fashion retail outlets

3. Competitive Analysis

Company Profile:

Our project aims to create an AI model that will be used in a mobile app-based virtual dressing room that will enable online users to virtually try on a variety of clothes, shoes, and other accessories with a three-dimensional model. It simulates three-dimensional (3D) models in real-time using artificial intelligence (AI) and virtual reality (VR) technologies. With three-dimensional (3D) model virtual dressing room solutions, your company or organization can represent features of any person such as gender and size, fit and shape. Not only does it help you reduce the shopping cart abandonment rates, but the cost of returns for online retailers will also decrease.

Mission, Tagline, Slogan and Main Value Proposition:

Mission: To build an AI application for promoting customer shopping satisfaction with the use of a Virtual Fitting Room system.
Tagline: See the best, live the best.
Slogan: Gonna Be a While? Grab a Virtual.
Main Value Proposition: Lower customer apparel returns and boost sales. Increase customer satisfaction and trust in clothing brands' sizes and styles.

Products and/or Services:

Main Customers: The main targeted customers for our product are online as well as offline shoppers. We will be targeting this audience as per their age group, gender and other shopping preferences based on our market analysis.
Service Offering: The service provided will be a fully functional AI-based virtual fitting room software that caters to the needs of both customers for having a better shopping experience and the retail stores for making sure proper data is rendered and return rates are reduced.

Possible Internal Competition:

Internal competition can be found from many factors such as funding possibilities concerning other projects in the pipeline, the number and importance of similar projects that have a better chance of getting funded, and the available resources for building a virtual fitting avatar.

External Competition:

To understand how the external competitors stand in this industry, we must look at their value proposition and market share. As per our analysis, this industry is a still growing one and thus has many potential use cases in other segments as well. Our selected competitors are - ELSE Corp, Fit Analytics, True Fit Corporation, and FXMirror Inc. To understand the nature of these competitors, we need to know their customer base, their funding capacities, strengths and weaknesses. Also, given most retail companies are trying to incorporate virtual features into their environment, there is a constant fast-paced advancement needed with respect to our competitors.

Competitive Advantage:

Given that the main aim behind having a virtual try-on feature for any retail company is to reduce their return rate and improve customer satisfaction and better their shopping experience, it is the best way forward to incorporate a highly accurate and entertaining model. Our goal for this project will be to build a visually impressive and accurate system to ensure customer interaction is as fun as possible and with the best accuracy achievable.

SWOT Analysis:

Strengths	**Weakness**	**Opportunity**	**Threats**
Stronger representativeness through visual and behavioral correspondence.	Motion Sickness risks.	The global Virtual Fitting Room market size Is projected to reach USD 7.6 billion by 2024, growing at a CAGR of 20.9%.	Possibility that this technology may increase motion sickness in customers.
More enjoyable and relevant than the screen-based approach.	Current approaches use stationary footage due to limited opportunities for camera movements.	Increasing adoption of advanced technologies such as AR and VR offers a better shopping experience to customers.	Other companies are also trying to build virtual fitting rooms with much more realistic and interactive abilities.
Limited financial costs.	VR technology is still being developed and needs continuous upgrades to full-scale usability.	Trend of online shopping has increased the demand for virtual fitting room technology in retail and eCommerce.	Customers moving away from in-store experience.

Competitive Matrix:

Since virtual fitting rooms is not a novelty proposal, we will have a lot of competitors following the same model and already being successful. We have identified some of our competitors to be ELSE Corp, Fit Analytics, True Fit Corporation, and FXMirror Inc to understand their business model and functioning so that we can gather more insights for our own model.

Below is the competitive analysis of potential competitors.

	ELSE Corp	**Fit Analytics**	**True Fit Corporation**	**FXMirror, Inc.**
Establishment	2014	2010	2009	2004

Size	51-200 employees	65 employees	134 employees	38 employees
Yearly Revenue	<$5 million USD	<$1 million USD	<$2 million USD	<$1 million USD
Headquarters	Milan, Italy	Berlin, Germany	Boston, United States	Seoul, South Korea
Company Stage	Seed Company	Acquired	Series C	Unfunded
Investor Count	-	4	14	-
Growth Score	75/100	62/100	49/100	-
Total Funding	$733k USD	$900k USD	$148 million USD	-
Competitive Performance	#9 among 259 competitors	#24 among 259 competitors	#3 among 259 competitors	#256 among 259 competitors
Strengths	Projects items on your own body. High quality space-aware fitting. Try on self-uploaded products.	High quality product rendering. Adjust mannequin and item sizes. Projects into user's environment.	Shows how different sizes will appear on your body frame. Easy to swipe around to try similar items.	Adjusts to user's movements. Simple interface. Easy to swipe around to try similar items.
Weaknesses	Items projected on still photos. Frontal view only. Cannot try on different sizes.	Can't view items on yourself. Fitting is not specific to unique body proportions.	Projected items do not respond well to lighting changes. No full product view, just frames and partial slides.	Projected items do not respond well to lighting changes. No full product view, just frames and partial slides.
How product/service is offered	Cloud, web-based	AWS	Moving to cloud	Cloud-based

Data and Technology Risk Assessment

Risk Area	**Risk Definition** - *The project will/could fail if:*	**Proposed Mitigation Strategy**
Data sources	Listed Below are our data sources: <u>Handheld Scanner</u> ❖ Data of different body types - to guess the waist size, bust size, and hips size. An example would be the visual-body-to-BMI dataset. ❖ Data to get the other measurements such as the neck, sleeve size, etc <u>Clothing Recommender</u> ❖ The particular User's purchase and viewing history of fashion apps like Amazon and SHEIN ❖ All user's viewing and purchasing trend data - to be used to gauge patterns within regions, countries and economic backgrounds ❖ Skin Color Compatibility dataset which helps suggest the best-colored clothes that match well with different skin colors ❖ The best solution for our needs would be the ModaNet dataset. Based on eBay's Paperdoll dataset], ModaNet is a sizable new fashion dataset. ❖ It contains 55,176 high-quality, completely annotated photos of street fashion, making it the largest fashion dataset available for semantic segmentation and object recognition.	❖ Work with multinational companies like amazon and market the usefulness of our recommendation system and the sales improvement they can achieve if they are willing to share their data with us. ❖ Then we need to make a data exchange deal with them ❖ Conduct better surveys and collect more features from existing datasets

	The datasets related to the user's behavior in fashion apps are mostly not public. In the publicly available data, the split between different races, genders, etc is not clear in many cases	
Privacy concerns	❖ Data related to physical appearance is generally very sensitive and personal ❖ Features like weight, height, dimentions etc can be misused by other agencies for many illegal and sketchy activities	❖ Explicit consent must be taken from the user ❖ The default option for the user must be 'We do not want to share data' ❖ Only if the user agrees to share should data be collected ❖ User should also be given the option to chose if they should get recommendations based on generalisations using data from other people ❖ We will have a strong legal team consisting of privacy experts
Data format	❖ Data should be be unbiased, securely collected ❖ Should be of reasonable price if it is bought ❖ Most of the features we need must be available lik ethe weight, various sizes	❖ Before starting on learning the data, it should undergo proper sanity tests ❖ An expert level data pre processing and cleaning should take place ❖ If any necessary features are missing, we should think about changing the dataset
Data analysis	❖ For each feature in the dataset, proper correlation graphs should be plotted by the data analyst to guage significance	❖ We will ensure that wwe hire expert analysts ❖ There would be multiple points during the project where an

	❖ Professional analysis must be done to judge the quality of the clothing recommendation predictions ❖ The accuracy of the hand held scanner's output must be studied in detail ❖ The fit quality of th AR Mirror must also be analysed	external analyst will drop in to provide insights and corrections from a different perspective
Insights	❖ We expect all the three products to have hight explainability ❖ If a user asks why he was recommended a product, we should be able to say answers like "this matches your skin tone perfectly + is a perfect fit for your waist size"	❖ For high explainability we might have to compromise on performance ❖ The balance will be key
Model replication	❖ We will be updating our data on a regular basis ❖ Every other week a new fashion app come up, so if we want to sell our product to thwm we should be able to utilise their new data and replicate what we have already done on existing data ❖ Retraining will be a costly exercise if the feature set is different	❖ Whenerver new data come in, we should re-run the models ❖ We should set up a completely independent pipeline for testing out new datasets - as there might be changes in the list of features ❖ The model we make will be one with high replicability
Data infrastructure	❖ Since we are dealing with multiple data sources with entirely different types of features (text, image, numbers, etc) without proper organization it will	❖ A well-organized hierarchy and infrastructure should be set up for each product before starting the projects

<table>
<tr>
<td></td>
<td>be near to impossible to manage them

❖ We also have three separate but connected products and we will probably have to exchange data and talk between the products</td>
<td>❖ Regular checks should be set up up to review the data infrastructure</td>
</tr>
<tr>
<td>Partnerships and synergies</td>
<td>❖ Since we have three different but interconnected products as part of the entire project, we are likely to get into various blocks in the pipeline

❖ A blocker in one product will adversely effect the other two products also

❖ Collaboration between different departments will get complicated in one department works on say all three products</td>
<td>❖ We should establish good partnerships with the fashion shopping apps and maintain good relations with them. This is crucial for marketing and getting relevant data

❖ A very fluid company hierarchy will be set up where the three different products will be known to everyone in every department

❖ They will know if doing one change in the handheld devices would create an issue in the recommendation software, which would in effect ruin the AR mirror experience

We will engage in partnerships with

<table>
<tr><td>Fashion Apps</td><td>For getting data and selling product collaborations</td></tr>
<tr><td>Marketing consultants</td><td>To know which apps to create deals with</td></tr>
<tr><td>AI ethicists</td><td>To make sure everything we do stays ethical</td></tr>
</table>
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		Law experts	Privacy policies

Credit: NEXT Canada

5. Financial Model

1. The personnel required for AI recommendation software that uses a handheld scanner to measure cloth size will depend on the specific implementation and scope of the project. At a minimum, the team will likely need one or more individuals with expertise in AI algorithms and machine learning, as well as software development skills to create the AI software itself. In addition, the team will need individuals with knowledge of the specific domain in which the AI software will be used (in this case, cloth sizing) to ensure that the algorithm is trained on relevant data and produces accurate results.

- Augmented reality is used in the majority of virtual fitting rooms. In this scenario, a camera scans a person's physique to create a 360-degree 3D depiction.
- Other virtual fitting rooms employ artificial intelligence. AI, like augmented reality, uses algorithms and machine learning to construct full-body 3D representations of the client standing in front of the camera.
- AI or augmented reality generates a three-dimensional representation that is combined with radio frequency identification (RFID). Another gadget that scans the goods brought into the virtual fitting room by the consumer.
- Using virtual reality technology, the scanned products are placed on the shopper's 3D model. They can see how the item looks on them without having to try it on.

	Cost (In USD)
License Fee	$1500
Additional License Fee	$ 500
2D Apparel Optimization	$ 500 for each item
3D Apparel Model Creation	$ 500 for each item
Total	**$3000**

Other personnel that may be required for the project include a project manager to coordinate the work of the team, a data scientist to process and analyze the data used to train the AI algorithm, and a user experience (UX) designer to create an intuitive and user-friendly interface for the handheld scanner. Depending on the size and complexity of the project, the team may also need support from other technical specialists, such as system administrators or network engineers.

2. To use AI software that utilizes a handheld scanner to measure cloth size, you will need the following equipment and services:

A handheld scanner that is capable of capturing detailed measurements of cloth

A computer or other device that can run the AI software and process the data from the handheld scanner

A stable internet connection to enable the AI software to access any necessary updates or additional resources

An AI software platform that is specifically designed to process and analyze the data from the handheld scanner

Additionally, you may need to purchase a subscription or license to use the AI software platform, as well as any additional services or support that may be offered by the software provider. Depending on the specific needs of your organization, you may also need to invest in additional equipment or services, such as training for your staff on how to use the AI software and handheld scanner.

3. The cost of developing an AI recommendation software that uses a handheld scanner and VR-enabled mirror to measure clothing size will depend on a number of factors, such as the complexity of the algorithm and the cost of the hardware. In general, developing an AI system can be a costly endeavor, as it may require a significant investment in hardware, software, and data. Additionally, you may need to acquire or license data to train your AI algorithm, which can also add to the cost.

It is also worth noting that depending on the specific use case and location, you may need to obtain certain licenses or permits to use a handheld scanner and VR-enabled mirror for measuring clothing size. It is best to check with your local authorities to determine what, if any, permits or licenses you may need in order to develop and use this type of AI system.

4. To market and promote your AI recommendation software, you could use a variety of advertising and promotional tactics. Some possible strategies could include:

Leveraging social media platforms to create buzz about your product and share updates, success stories, and other relevant information with your target audience.

Running targeted online ads on platforms such as Google AdWords or Facebook Ads to reach potential customers who may be interested in your product.

Participating in trade shows or conferences related to AI and technology to showcase your product and network with potential customers and partners.

Partnering with clothing retailers or fashion bloggers to offer your product as a value-added service to their customers or readers.

Offering special promotions or discounts to early adopters or customers who refer others to your product.

Creating engaging content such as blog posts, videos, or infographics that educate potential customers about the benefits of your product and how it can help them find the perfect clothing fit.

Overall, the key to successfully marketing and promoting your AI recommendation software is to clearly communicate the benefits and value of your product, and to reach out to potential customers in a variety of ways to build awareness and interest.

5. There are several ways to collect feedback about a product or service, and the specific method chosen will depend on the context and goals of the project. Some potential options include:

Surveys: Surveys can be conducted online, through email, or in person, and can ask customers to rate their satisfaction with the product or service on a scale or provide open-ended feedback. Surveys can be conducted using free or low-cost survey software, and can be tailored to the specific goals of the project.

Focus groups: Focus groups involve gathering a small group of customers together to discuss their experiences with the product or service and provide feedback. This can be a useful way to gather in-depth insights and identify common themes or trends.

Customer service interactions: Customer service interactions can provide valuable feedback, as customers may express their opinions or concerns directly to customer service representatives. This feedback can be collected and analyzed to identify areas for improvement.

Social media: Social media can be a useful tool for collecting feedback, as customers may post reviews or comments about their experiences with the product or service. These can be

monitored and analyzed to identify trends and areas for improvement.

Using AI recommendation software, such as a handheld scanner or VR enabled mirror, to collect feedback would likely incur additional costs. These technologies can be expensive to implement and maintain, and may require specialized training and support. Before implementing these technologies, it is important to carefully consider the potential benefits and costs, and determine whether they align with the overall goals of the project.

Yes, training will be required to sell and make available the AI recommendation software that uses handheld scanner and VR enabled mirror. This training process will incur additional costs, as it will require time and resources to properly educate employees on the proper usage and functionality of the software and equipment.

Yes, an office space would need to be set up to accommodate the AI recommendation software and its associated equipment, such as a handheld scanner and VR enabled mirror. Additionally, new inventory or equipment may need to be purchased to support the operation of the AI recommendation software.

It is possible for unexpected problems to arise during the business season, as is the case with any business. However, it is difficult to predict what specific problems may arise and how they may affect the business. It is important to have contingency plans in place and to be prepared to adapt to changing circumstances. Additionally, having sufficient cash reserves can help a business to deal with unexpected problems and continue operating smoothly.

Part-2

The proposed initiative may save money by replacing time-consuming manual labor with automation. For example, if the process currently involves manually scanning items and entering data, the AI recommendation software with a handheld scanner and VR enabled mirror could automate this process and reduce the need for manual labor. The cost savings from this automation may be realized over a period of time, such as through reduced labor costs and increased efficiency. The specific cost savings objectives will depend on the details of the initiative and the specific processes that are being automated.

If the product is customer-facing, its quality, novelty, utility, and competitive pricing can help to attract customers from rival businesses. The product's quality can help to ensure that it meets customer expectations and provides a good user experience, which can help to build customer loyalty. Novelty can also be an attractive feature for customers, as it provides something new and

exciting that may not be available from rival businesses. The product's utility, or its usefulness in solving a specific problem or meeting a need, can also be a key factor in attracting customers. Competitive pricing can help to make the product more attractive compared to similar products offered by rival businesses. By addressing these factors, the product can differentiate itself from rival businesses and lure customers away from them.

There are several potential obstacles that may prevent the AI recommendation software from reaching its cost savings or revenue objectives. One obstacle could be the adoption of the technology by customers, as it may require them to change their existing processes and invest in new equipment. Another obstacle could be the availability of skilled personnel to operate and maintain the software, as well as provide support to customers. Additionally, there may be competition from other companies offering similar or competing products, which could impact the market demand for the AI recommendation software. There may also be technical challenges associated with implementing the software, such as compatibility with existing systems or integrating with other technologies. Overcoming these obstacles will require careful planning and execution to ensure that the product is successful in the market.

It may be necessary to have new plans in place to reduce the overall cost and increase the profit for AI recommendation software that uses a VR enabled mirror and handheld scanner. This could involve implementing cost-saving measures, such as reducing labor costs through automation, sourcing materials and equipment at a lower cost, or streamlining processes to increase efficiency. Additionally, strategies to increase profit could include expanding the customer base, introducing new products or services, or finding new markets to enter. The specific plans and strategies will depend on the details of the business and its goals.

6. Operational Plan

Proposed Model: an 8 to 10-month Agile approach

The group has decided to follow the Agile model performing along with different members of the various departments such as IT, Marketing team, R&D team, UX & UI team, data scientist, data analyst, business analyst, developer team, data architect, database administrator. The team will firstly research and explore new ideas so that they can be worked towards the execution in the meantime.

By Date	Phase	Action Items
1 Month	Starting of the Project	* Determining the role of leadership and finding the investors. * Assign different high position roles like leader and manager. * Recruit a group of professionals to serve on the project's working committee. * Organize the first meeting to discuss the project's aims, outputs, and goals.

"By-Date" Statements

1-2 Months	AI	* Data processing preparation includes data mining and data cleanings like integrating and removing outliers and missing values. * Designing AI algorithm models for training and testing model. • Finding accuracy • Complexity of the model • Is the model efficient for our business.
1-2 Months	The architecture of the Project	* Design the flowchart and wireframes of the front-end as well as the use cases. * Developing the backend part using AI and ML and integrating it with the frontend. * Connecting the database with the backend part and creating visualisations.
1 Month	Training	Training of the team members and employees
1 Month	Testing	* Verifying a system component or the complete system under real-time operational conditions. * Fix bugs.
1 Month	Deployment	* Deploy the project which would be known as the prototype which will be the first version of the project. * Getting feedback from the users so that improvements can be made.
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Longer-Term Objectives :

- The long term goal is to achieve a highly accurate model and also an application that will use by online offline stores as well as by other people.
- The second goal will be to generate revenue using our model.

"By-Date" Statements

1 Month	Data	▪ Data requirements ▪ Data protection and privacy ▪ Determine & address any privacy and data security problems. ▪ Managing data infrastructure like storing data on the cloud, service fees, etc.

1-2 Months	AI	Data processing preparation includes data mining and data cleanings like integrating and removing outliers and missing values. Designing AI algorithm models for training and testing models. • Finding accuracy • Complexity of the model • Is the model efficient for our business
1-2 Months	The architecture of the project	• Design the flowchart and wireframes of the front-end as well as the use cases.

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