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Systems Analysis & Design

(MIS-402)

Final Project

Phase 3

AI sewing system

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Group 6

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Problem Definition

The traditional process of connecting tailors and customers is inefficient and fragmented. Both customers and tailors face challenges in finding each other, matching specific needs, and sourcing fabrics. Moreover, many people lack the time or skills to design their clothes, and custom-made clothing can be expensive.

To address these issues, it is important to have a central system that connects tailors and customers.

Idea of the proposed system:

This system contains multiple processes that will make the custom clothing making experience smoother and more efficient.

The system contains 5 processes:

1. Login: The customer and the tailor access the account in the system.
2. Create Design: The customer describes the design to the system and then receives the generated design based on the customer description and design data (measurements- fabrics).
3. Request modifications: The customer request modifications on the design to the system, and the customer will receive modified design based on design data.
4. Process order: The tailor views the approved design from the customer, with the measurements and selected fabric.
5. Manage order status: The tailor updates the order status, and the customer can view the order status and the completed order after its done.

Scope and applicability of your system in a certain context

- **The scope:**

The target users of the system are:

1. Customers: People who are looking for an easy and effective way to order clothes that can be designed according to their specifications without the need for specialized knowledge in design.

2. Tailors: Expert tailors who want to increase their clientele, reduce time by eliminating manual illustrations, become more efficient while making custom clothing, and remain in contact with the user in the process of sewing the piece.

- **The applicability:**

This system that connects tailors and customers together is designed to be viable, seamless and easy to use, and provides many benefits to users.
The system enables users to log in to their accounts, provides the opportunity for tailors and customers to communicate, provides an artificial intelligence tool that helps customers create an image of the piece based on the details entered, provides a way for customers to track the progress of the order, and place the order easily and clearly.
Among the advantages provided by the system are saving time and effort, customizing pieces, enabling communication between tailors and customers, providing the opportunity for tailors to expand their business, and making the experience of ordering custom-made clothing pieces easier.
Overall, this system would be a valuable addition to the fashion industry, addressing key problems and providing benefits to all involved parties.

Information Gathering

We conducted interviews in order to obtain information about the system:

Conversation during an interview:

- **What are the main problems or challenges the fabric company encounters when working and communicating with tailors and designers?**
  The main issues or challenges we may face when we work and communicate with designers and tailors are miscommunication, delays, managing multiple projects at once, and quality control problems.

- **What particular features or functionalities are you hoping the new system will have to improve coordination and communication between designers and tailors?**
  We require a system that facilitates communication and collaboration between designers, tailors, and customers. It makes it easier to collaborate on design concepts, measurements, and changes in real time and to receive feedback. This system promotes cooperation and trust while improving the client experience overall. The system guarantees efficient communication amongst stakeholders by streamlining the design and tailoring workflow. Better customer satisfaction, more operational effectiveness, and more solid working relationships with designers and tailors are the results of this.

- **What are the main factors or requirements for your new system to be integrated with its current infrastructure and tools?**
  The new system for our organization needs to be integrated with its current infrastructure and tools while taking compatibility, data migration, user training, and scalability into consideration.

- **What is the number of designers and tailors that the fabric company regularly employs?**
  The amount of designers and tailors we typically work with varies depending on the size and scope of the business.

- **How are orders, fabric inventories, and manufacturing schedules currently tracked and managed by the fabric company? Are there any particular issues or areas that need to be improved that the new system should take care of?**

  The fabric industry currently tracks and manages orders, fabric inventories, and manufacturing schedules using a range of methods. Our order processing efficiency, inventory control, visibility into manufacturing schedules, data entry automation, and real-time updates are among the challenges that the new system might help with.

- **How does the fabric company currently track and manage orders, fabric inventories, and manufacturing schedules? Does the new system need to address any specific problems or areas that require improvement?**

  Currently, the fabric industry uses a variety of techniques to track and manage orders, fabric inventories, and manufacturing schedules. Among the issues that the new system might help with are our order processing efficiency, inventory control, visibility into manufacturing schedules, data entry automation, and real-time updates.

- **Which particular KPIs or metrics does the fabric company want to track or use the new system to gain insights into?**

  Our company is using a new system to monitor a number of metrics, such as operational efficiency, customer satisfaction, order processing time, collaboration effectiveness, and communication efficiency. By streamlining the order processing process, optimizing workflows, and assessing the system's effect on customer satisfaction, these metrics assist the company in improving the overall customer experience.

- **What are the main concerns or reservations of the fabric company regarding the new system's implementation?**

  Our concerns during the new system's implementation are staff training, data security concerns, disruptions, and system efficacy.

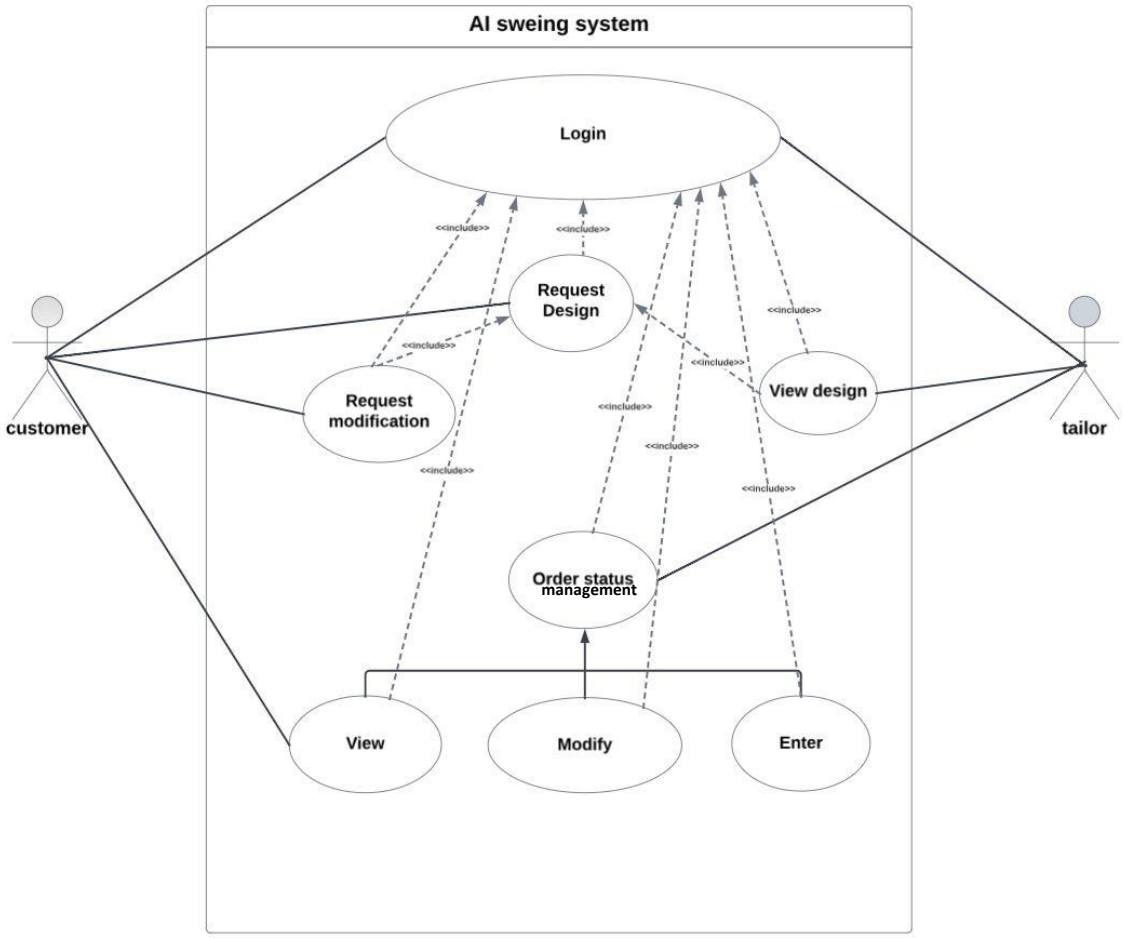
- **Will it take less than a year to implement the new system?**

  Whether or not the new system takes less than a year to deploy will depend on the implementation schedule that the organization has set.
- **Will the new system's deployment costs be higher than the budgeted amount?**

  It is possible that the cost of implementing the new system will be more than the budgeted amount, depending on the system that is chosen, the associated implementation costs, and the budget itself.
- **Exist any resources—staff or infrastructure—that could help with the new system's implementation?**

  Whether infrastructure or personnel are available to assist with the implementation of the new system depends on our company's internal resources and capabilities.

Use case


AI sweing system
Login
Request Design
Request modification
View design
Order status management
View
Modify
Enter
customer
tailor
<<include>>

Use case code:	100
Use case name:	**Login**
Actors:	Customer and tailor
Level:	Blue
Description:	Allows tailor and customer to register into the AI sewing system to access all functions in the system.
Triggering event:	The tailor and the user would use the system's page, enter username and password, and click the login button
Trigger type:	external

Steps performed (Main path):	Information for steps:
1. users enter their unique identification into the secure web page.	User's username, password.
2. User's data is read and verified.	user data, username, password
3. Users will view their web page and granted access to features and functions on the website.	User's web page

Preconditions: the user already registered and created an account
Postconditions: user successfully logs into their web page
Assumptions: user has a browser and the correct password and username
Success guarantee: the user's data has been read and verified successfully and the user will view their webpage and all the functions.
Minimum guarantee: the user couldn't log in and an error message will appear to redirect him or her to rectify the issue.
Outstanding issue: risk of unauthorized enter. by asking a question only the user would know it will provide more security.
Requirements met: allow users to enter their web page using a secure browser
Priority: High
Risk: minimum

Use case code:	110
Use case name:	**Request design**
Actors:	Customer
Level:	Blue
Description:	Allows customer to describe their desired design to an AI photo editor tool, choose fabric, and enter their measurements. After entering the design information wanted, the tool would immediately show the customer the AI generated design.
Triggering event:	customer would use the description bar to write the intended design idea, click on the preferred fabric and enter their measurements, then click on “generate” button to be shown the AI generated design.
Trigger type:	external

Steps performed (Main path):	Information for steps:
1. User will initiate the request by clicking on the “request a design” button, then will be taken to the fabric category to select a fabric.	Initiation confirmation, fabric selection confirmation.
2. The user will enter their design’s description and the measurements in the intended bar.	Description form page.
3. The discerption alongside the chosen fabric and measurements will be sent to the AI photo editing tool.	Design description, chosen fabric, customer’s measurements, generation web page.
4. AI generated design photo will be shown to the customer, then the customer would be shown two buttons “approve” or “modify”.	Design photo, generation web page, approve or modify option buttons
5. If the customer likes the design**,** they will click on the “approve” button.	Design photo, generation web page, approval notification.
6. If the customer dislikes the design**,** they will click on the “modify” button	Design photo, generation web page, modification notification.
Preconditions: the description was clear and understood by the tool, choosing the fabric, and entering	

the measurements.
Postconditions: the approval and modification notification will be sent.
Assumptions: fabric chosen is available, AI tool is functional, AI tool understands the description, and customer is logged in successfully.
Success guarantee: the design is successfully generated and shown to the customer based on their description.
Minimum guarantee: the design is generated and shown to the customer.
Outstanding issue: the tool misreads the description; the design's output is not what the customer expects how will the issue be handled?
Requirements met: Customer input is correctly interpreted and translated into a visual design using the AI design tool.
Priority: High
Risk: minimum

Use case code:	120
Use case name:	**View design**
Actors:	tailor
Level:	kite
Description:	After the approval of the customer, the design is viewed by the tailor alongside with its selected fabric, and measurements.
Triggering event:	The tailor would click on his dashboard and choose the “view” button to view the generated design photo, fabric selected, and measurements.
Trigger type:	external

Steps performed (Main path):	Information for steps:
1. Tailor would receive a request design notification and will click on his or her dashboard.	Tailor’s web page, Dashboard page, requested design notification.
2. Tailor will click on the “view” button to view the design, fabric**,** and measurements.	View page redirection, AI generated design, design description, fabric selected by customer, and customer’s measurements.

Preconditions: the tailor would receive a request design notification.
Postconditions: tailor is redirected to the view page and receives the design information.
Assumptions: tailor is successfully logged in, the web page is secure, the customer has successfully approved the design, the design photo, fabric, ad measurements are stored in the system.
Success guarantee: The customer's agreed-upon design, complete with fabric selection, measurements, and design photo, is fully visible to the tailor.
Minimum The design information won't go to the tailor if the consumer dislikes the design.
Outstanding issue: if there are problems throughout the viewing process if there are inconsistencies or misunderstandings between the presented design and the customer's approval.
Requirements met: The system securely saves and retrieves design data; the tailor's rights of access allow viewing of designs that have been authorized by customers; The design picture, fabric information, and measurements are presented in an easily understood manner by the interface**.**
Priority: High
Risk: minimum

Use case code:	130
Use case name:	**Request modifications**
Actors:	Customer
Level:	Blue, indigo
Description:	After viewing the design in the request design case, if the customer clicked on the “modify” button he or she will be able to modify their design as many times as possible.
Triggering event:	It happens after the customer click on the “modify” button on the request design page.
Trigger type:	external

Steps performed (Main path):	Information for steps:
1. Customer will be redirected to modification page.	Modifying web page.
2. Customer will write the description of the modifications on the description bar.	Modifying web page, written description.
3. Customer will click on “generate” button shown on the page and will be directed to a generation page. the description will be sent to the AI photo editor tool.	Modifying web page, written description, generation web page.
4. The AI tool would generate the design photo based on the customer’s description of modifications.	Modifying web page, written description, generation web page.
5. The customer will view the generated modified design.	Modifying web page, written description, generation web page.
6. If the customer liked the modified design, he or she will click the “approve” button.	Modifying web page, written description, generation web page.
7. The customer will get a notification based on their click on the approval.	Modifying web page, written description, generation web page, approval notification.

Preconditions: The customer must log into the system, must already requested a design, has yet to provide their approval for the design in the requesting a design process, and the AI design tool is functional and accessible.

Postconditions: the modifications described is sent to the AI photo editor tool, an after the modification approval the customer would be sent a notification.
Assumptions: the customer desires to modify the previously generated design, and the tool is successfully understanding the described modifications
Success guarantee: The AI design tool receives the modification description correctly, facilitating described modifications precisely and sent to be viewed to the customer.
Minimum guarantee: the AI photo editing tool sends the modifications to be viewed.
Outstanding issue: the AI photo design tool misinterprets the description**,** or the generated design is not what the customer expected.
Requirements met: Requests for modifications are handled securely by the system, the customer is allowed to write the modifications wanted.
Priority: High
Risk: minimum

Use case code:	140
Use case name:	**order status management (Enter)**
Actors:	tailor
Level:	Blue
Description:	Allows the tailor to enter the customer's order status.
Triggering event:	The tailor would click on order processing button to enter the order status.
Trigger type:	external

Steps performed (Main path):	Information for steps:
1. Tailor will click on his dashboard and clicks on the "order processing" button to be redirected into a manage order status web page.	Tailor dashboard, "order processing" button, manage order status web page.
2. In the manage order status web page, the tailor determines the order in which the status must be entered.	manage order status web page, orders dashboard.
3. determined by the current processing step, the tailor inputs the order status and clicks "send" button to be sent to the customer's dashboard.	manage order status web page, orders dashboard, status of customer order, "send" button.
4. After the order status has been successfully entered, the system stores the entered order status and issues a confirmation to the tailor.	manage order status web page, orders dashboard, status of customer order, "send" button, notification of sending the status.

Preconditions: For the tailor to input the status, he or she must have successfully entered into the system and there must be an order in the system.
Postconditions: entered order status is successfully inputted and saved in the system.
Assumptions: The tailor has the appropriate authority to enter order status, the order status is a separate field that can be entered separately, in addition, the system provides a simple and easy-to-use interface for entering order statuses.
Success guarantee: the entered status is saved successfully, and the confirmation notification is sent.
Minimum guarantee: If the order state is not entered, the system offers detailed feedback on why the order failed (information missing, error).

Outstanding issue: If the system encounters mistakes during the status entering process or if the order data is inadequate, potential problems may develop.
Requirements met: allow tailor to enter the status using a secure browser, securely handling the data, only authorized tailor would enter the status.
Priority: High
Risk: minimum

Use case code:	150
Use case name:	**order status management (Modify)**
Actors:	tailor
Level:	Blue
Description:	Allows the tailor to modify the entered order status data.
Triggering event:	The tailor would click on order processing button to change the entered order status.
Trigger type:	external

Steps performed (Main path):	Information for steps:
1. Tailor will click on his dashboard and clicks on the "order processing" button to be redirected into a manage order web page.	Tailor dashboard, "order processing" button, manage order status web page.
2. In the manage order status web page, the tailor determines the order in which the status must be modified.	manage order status web page, orders dashboard.
3. determined by the current processing clothing step, the tailor inputs the updated order status and clicks "send" button to be sent to the customer's dashboard.	manage order status web page, orders dashboard, status of customer order, "send" button.
4. After the updated order status has been successfully inputted, the system stores the entered order status and issues a confirmation to the tailor.	manage order status web page, orders dashboard, status of customer order, "send" button, notification of sending the updated status.

Preconditions: For the tailor to input the updated status, he or she must have successfully updated into the system and there must be an order in the system.
Postconditions: updated order status is successfully inputted and saved in the system
Assumptions: The tailor has the appropriate authority to change order status, the order status is a separate field that can be entered separately, in addition, the system provides a simple and easy-to-use interface for entering order statuses.

Success guarantee: the updated status is saved successfully, and the confirmation notification is sent.
Minimum guarantee: If the order state is not entered, the system offers detailed feedback on why the order failed (information missing, error).
Outstanding issue: If the system encounters mistakes during the status updating process or if the order data is inadequate, potential problems may develop.
Requirements met: allow tailor to update the status using a secure browser, securely handling the data, only authorized tailor would enter the status.
Priority: High
Risk: minimum

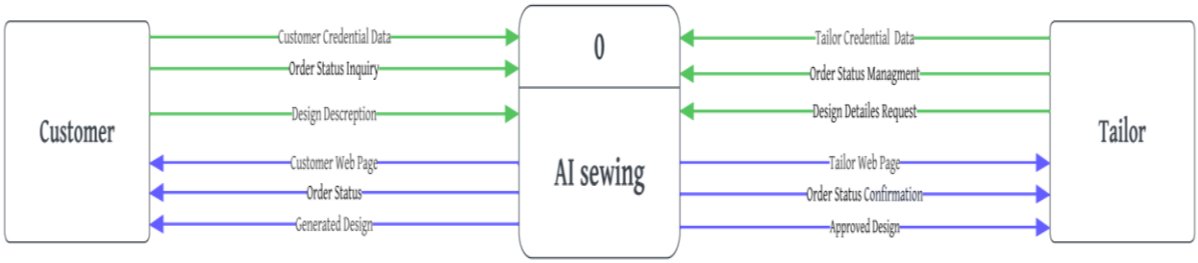
Use case code:	160
Use case name:	**order status management (View)**
Actors:	Customer and tailor
Level:	kite
Description:	Allows the customer and tailor to view the order status along with the completed order.
Triggering event:	Actors would click the “view order status” on their dashboards to display the status and the completed order.
Trigger type:	external

Steps performed (Main path):	Information for steps:
1. the customer would click on their dashboards.	customer dashboard.
2. The customer would click “view” button on his or her dashboard and will be redirected to order status page.	Customer dashboard, “view” button, order status page.
3. The customer would click on the order that he or she wants to view the status for.	Customer dashboard, “view” button, order status page, selected order status page.
4. Tailor will click on his dashboard and clicks on the “order processing” button to be redirected into a manage order web page.	Tailor dashboard, “order processing” button, manage order status web page.
5. In the manage order status web page, the tailor determines which order to be viewed.	manage order status web page, orders dashboard.

Preconditions: Both the tailor and the customer have to be permitted and logged in to the system. An order with proper status and complete information must exist in the system, and the order viewing process of the system must be working.
Postconditions: The order status and finished order details are successfully viewed by the tailor and the customer.
Assumptions: the tailor and the customer are authorized to view the order data. The order information consists of the order's status as well as the order's details. The system provides an easy-to-use interface for accessing order details.

Success guarantee: The current condition of the order in the system is appropriately represented by the displayed order status along with finished order information, The system delivers an easy-to-use interface for viewing the information by each tailor and the consumer.
Minimum guarantee: if there is a problem receiving the details of the order, the system offers detailed feedback on the cause of the failure.
Outstanding issue: There may be delays in syncing order state and completion data across the system's various components or units, the system will provide the customer service number.
Requirements met: Viewing the status of orders and completion data is handled securely by the system, The interface is simple to use and gives quick access to order details, and only designated users (tailor and customer) may view order information
Priority: High
Risk: minimum

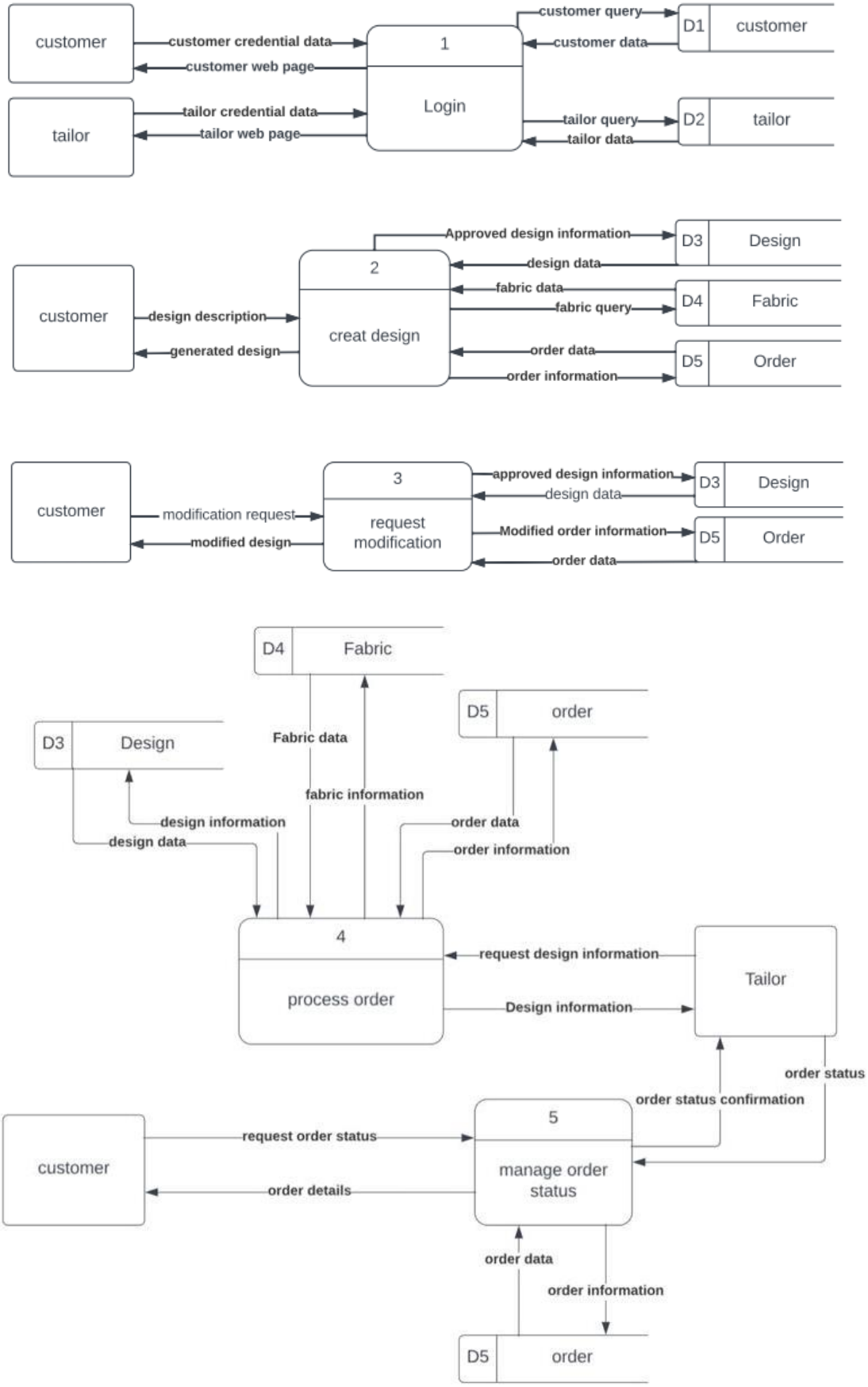
Context Diagram



The context diagram of the AI Sewing system reflects an enhanced connection between consumers and tailors. Customers utilize their profiles to place clothing orders, describe designs, and browse generated design photos, as well as track order statuses. Tailors, on the other hand, use their profiles to enter specific design information such as fabric and handle order statuses efficiently. This comprehensive system improves communication, transparency, and efficiency throughout the clothing creation process, resulting in a mutually beneficial relationship between customers and tailors.

Logical diagram

- **Zero-level Diagram**



process1 (login)

begins with the customer entity, who is going to input a username, password, and email to get access to the customer web page, and then all the customer queries will be stored in the D1 customer file. The tailor entity and tailor query will be stored in the (D2) tailor file. And get access to a tailored web page.

Process 2 (create design)

is responsible for generating designs based on customer descriptions and design data. The generated design is then reviewed and approved, resulting in approved design information (D3). Design data and fabric data are also associated with the creative design process. (D4) is involved in fabric queries and provides fabric data. It is linked to order data (D5) and order information (D4) related to the customer's order.

Process 3 (request modification)

customer who makes a modification request. Then a system will modify the design based on design data from (D3) and order data from (D5) and send approved information to (D3) and modified information to (D5).

Process 4 (Process order)

What happens here is the customer’s order would be processed and will be viewed by the tailor upon their request to view it, alongside its design retrieved from storage (D3), the selected fabric by the customer and measurements retrieved from (D4) and order’s number and other information such as date of request which would be retrieved from storage (D5).

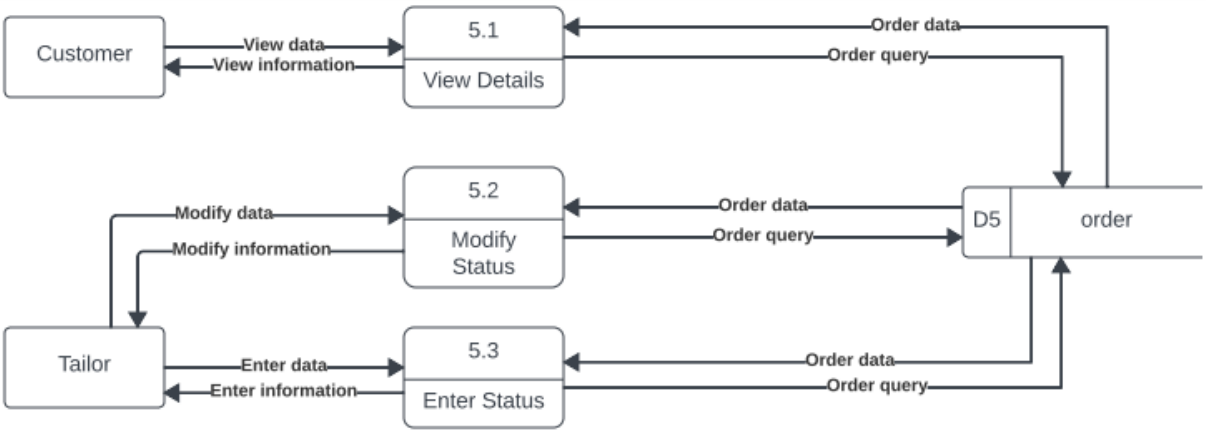
All that information would be sent to the tailor to view and complete the customer’s order.

Process 5 (manage order status)

When the tailor is progressing the customer's order, he or she would send the order status and will retrieve the order's information from the storage (D5) then he or she will get the confirmation text that the order status was sent to the customer.

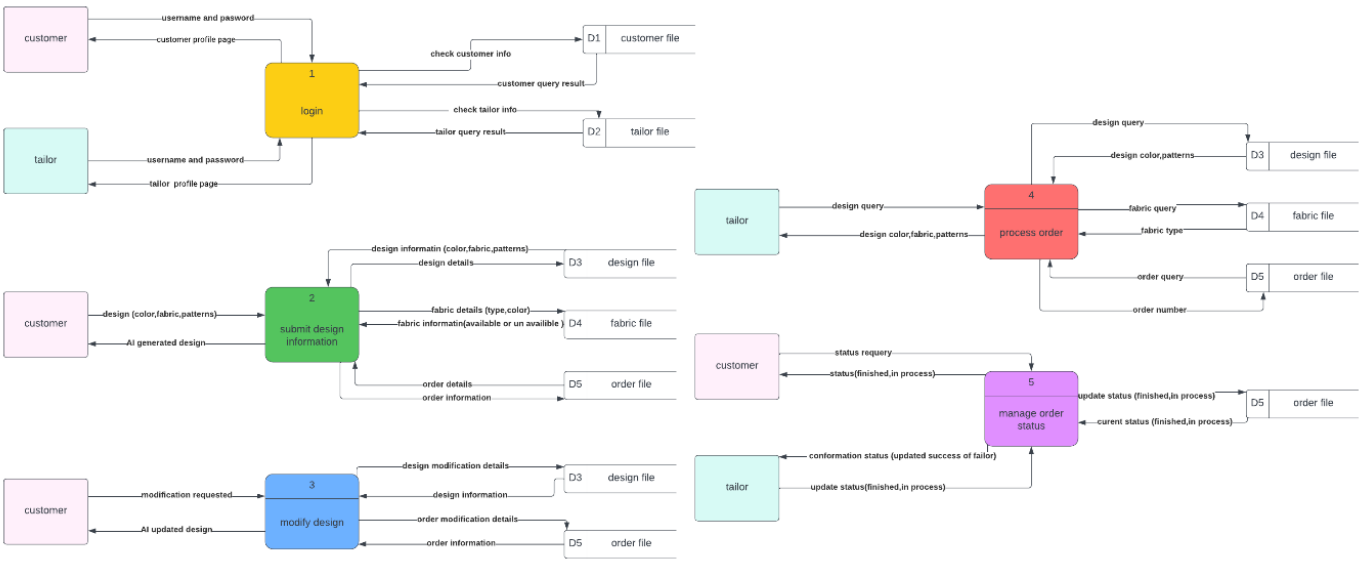
The customer will request to view their order's status or the completed desired clothing and then the system would respond by showing him or her the status and the finished order if done.

Child Diagram



This child diagram of (Order Status) process includes three processes: View Status, Update Status, and Enter Status. The “View details” process enables users to check the details of the current order status. The “Enter status” process includes the tailor entering the initial order status information, and the “Modify status” process includes the tailor making modifications to the order status. These processes work together in the child diagram to efficiently track the order and know the status of the order from the beginning until the order is completed.

Physical Diagram



Process 1: Login

1. The user enters their email address, password, and username into the system.
2. The customer's credentials are validated by the system.
3. The customer can access their customer web page after their verification is successful.
4. The D1 customer file contains records of customer inquiries and correspondence, then it checks the customer information.
5. The D2 tailor file contains the tailor entity and tailor queries, and then it checks the tailor information.
6. If the custom web page is available in the storage success message will appear and if not the error message will appear.

Process 2: submit design information.

1. The system creates designs based on design data and customer descriptions such as color, fabric, and patterns of the design.
2. A review and approval are given to the generated design.
3. The D3 file contains the approved design data.

4. The creative design process's fabric and design data are kept on file.

5. The system retrieves fabric data from D4 in response to fabric queries.

6. Order information connected to the client's order is kept in D5 and is connected to the design process.

Process 3: modify design.

1. A request for modification is made by the client.

2. Using order data from D5 and design data from D3, the system makes changes to the design.

3. D5 receives the updated data and authorizes it

Process 4: Process Order.

1. The order placed by the client is handled.

2. The tailor gets the design from D3 and asks to see the order.

4. Measurements and the fabric the customer chose are taken from D4.

5. Order information is obtained from D5, including the order number and the request date.

6. The tailor receives all pertinent data so they can view and finish the customer's order.

Process 5: Manage Order Status.

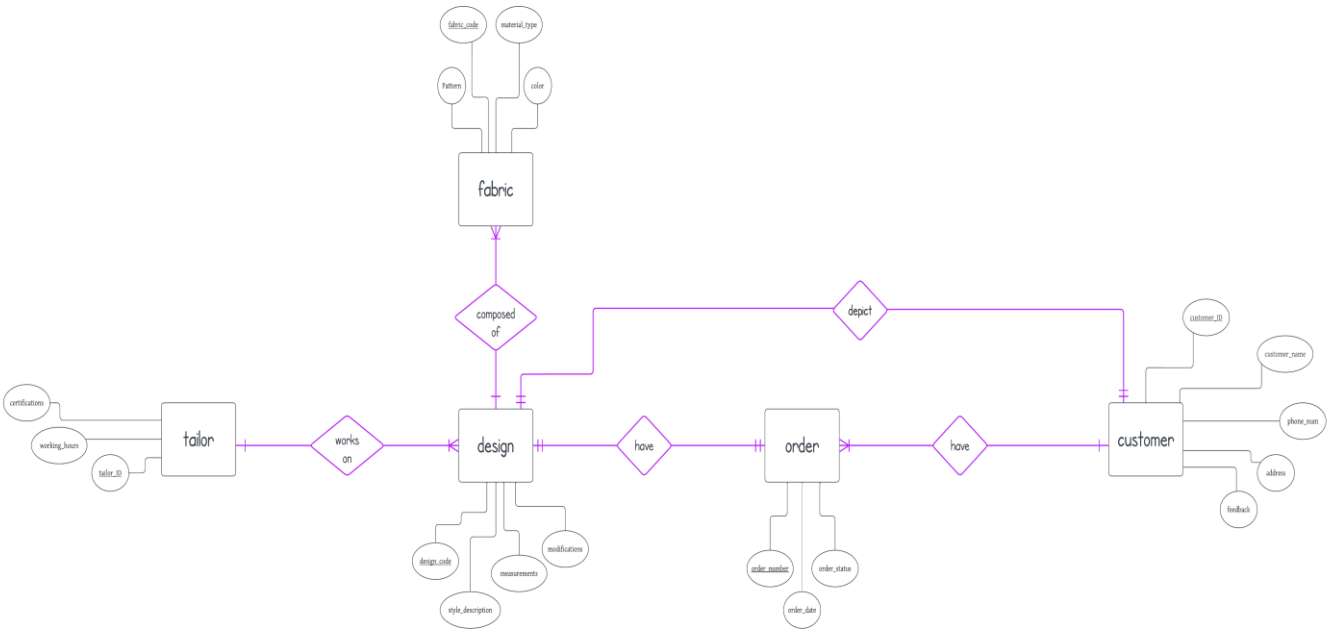
1. The order status is updated by the tailor.

2. The order data is retrieved by the system from D5.

3. The system verifies that the customer has received the order status.

4. The system displays the order status and the finished desired clothing when the customer requests it.

ER Diagram



The AI Sewing system's Entity-Relationship Diagram (ERD) highlights critical relationships between entities. One tailor can work on multiple designs at the same time, and a design can be made up of multiple fabrics. Each design is connected with a specific order and represents the preferences of a single consumer. Moreover, several orders can be linked to a single consumer. This ERD provides a full view of the data model's connections, allowing for more effective administration of design, fabric, order, tailor, and the customer entities within the AI Sewing system.

Conclusion

In conclusion, the proposed centralized system revolutionizes traditional bespoke clothing processes by addressing their inherent inefficiencies. It seamlessly connects tailors and customers, providing a comprehensive solution. The existing difficulties that both parties have encountered in understanding each other, matching specific demands, and negotiating the complicated details of specially tailored clothes are efficiently handled through a simplified procedure assisted by the system's five basic processes.

This distinct collection of processes provides innovative features such as AI-generated design visualization and management order tracking. These features are critical in improving the user experience for customers and tailors, especially in processes like (request design), where the AI tool supports customers in interpreting their design ideas. Technology emerges as a useful tool in the clothing industry, tailored to fulfill the unique demands of customers lacking design experience and tailors striving for operational efficiency.

The system's usefulness extends to a diverse variety of users, including customers looking for an efficient and simple method of ordering customized clothing and tailors looking to expand the number of their customers. With ease of use, time and effort savings, customization selections, and a greater collaboration between tailors and customers, this system is positioned as a significant improvement in the fashion sector. As a result, the suggested integrated system is an icon of innovation, transforming the tailored clothing ordering experience while also boosting connection and efficiency in the fashion industry.

Contribution table

Ghada Turki Almutairi 2210006230	○ Use case. ○ Use case scenarios. ○ Diagram 0. ○ Diagram 0 description (4&5).
Shahad Abdullah Alhassar 2210003257	○ Context diagram and its description ○ ER diagram and its description
Shaikhah Khalid Alqahtani 2210003379	○ Project Proposal (System processes - Scope – applicability) ○ Child Diagram ○ Child Diagram Description
Layan Alnfaiai 2210004703	○ Information gathering ○ Physical diagram ○ Physical diagram description
Shoug Ali Alluhaidan 2200005456	○ Diagram 0 ○ Child diagram ○ Diagram 0 description (1&2&3)