

SECV 2113

HUMAN COMPUTER INTERACTION

(Session 2025/2026 Semester 1)

Faculty of Computing
Universiti Teknologi Malaysia

PROJECT 2 – ESTABLISH REQUIREMENT

[Project Title: AI Assisted Mini Visual Projector]

LECTURER

NOR ANITA FAIROS BINTI ISMAIL

(Section 01)

PR05 - AiPro

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Gathering Requirements - User Analysis

Proposed Tasks

Task 1 : Choosing appropriate design for products from available online stores

Task 2 : Project the selected design in real time

Task 3 : Proceed to payment and delivery status

Persona 1

Name : Aiden Ng

Age : 22

Occupation : Undergraduate Student

User goal : To quickly visualize and find clothing that suits his style and avoid return wrong purchases.

Aiden is an undergraduate student who have just started to experiment with his fashion sense. However, he has busy schedule and felt that shopping at retail stores are too time consuming. He prefers to purchase his clothes via online platform such as Shopee and Shein at the comfort of his fingertips.

As convenient as online shopping platform may be, Aiden finds himself many times facing frustration of such shopping. There are a lot of time where he will have to return the clothes that he purchased because of sizing and color issues. At it's worst, the item he purchased are not as shown in the picture on the online shopping platform.

He need to find better alternative to best suit his fashion needs.

Scenario

Task 1: Choose Clothing Design

When Aiden wishes to shop for clothes, he need to went out to the shopping mall or outlet to see what kind of latest clothing design are available for purchase. Aiden would have to decide what mall or stores he would want to go and it usually those that are close to where he is as travel further would takes more time and get more inconvenient to go.

Task 2: Trying On Different Clothes Design

After Aiden have reached the store that he chosen, he would need to spend time in browsing through what is available in the store then pick and try out the clothes one by one as it is difficult to imagine how it would look like on him.

From travelling to desired stores to choosing and trying out the clothes of interest often consumes a lot of Aiden's time.

Task 3: Proceed To Clothes Purchases

When Aiden have confirmed the clothes that he want to buy, he will have to bring the clothes to cashier to checkout and bring them home.

Persona 2

Name : Muhammad Arshad

Age : 30

Occupation : Interior Designers

User goal : To manage the interior design business in helping client choosing design , show what the design will look like and helping client purchase the product.

Muhammad Arshad is an interior designer who want to expand his business in the interior design competitive market where there is a lot of interior designers currently in the market. He wishes to show his design to client and help them choose the best furniture to fit the design his client would want.

He believes client would like to see how the design would look like in real time. Currently client couldn't visualize the design and can only imagine based on the drawing and sketches that Arshad drawn on paper.

Client also don't know what the market price and its justification, hence couldn't make informed decision. This kind of confusion make Arshad having a hard time with client who have no prior knowledge or idea of the market price.

Scenario

Task 1 : Choosing design for the client

A client request Mr. Arshad to do interior design for his newly bought house. However, the client does not have clear idea of what style he wants and request Mr. Arshad to prepare multiple style for him to choose from as this is his first time designing his own home. The request creates a heavy workload to Mr. Arshad as he need to crack his head for different style at a short amount of time.

Each time a design draft is done, Mr. Arshad will have to arrange a meeting time with his client for confirmation and further discussion for suggested material and furniture to be used. This process took several cycles as each meeting will have changes needed to be amend to suits the client's needs.

Task 2 : Show ID design to client

After the interior design is decided, Mr. Arshad will have to bring various material and furniture picture to show his client hopefully they can visualize and see what Mr. Arshad has envisioned for their new home. This process often repeat for many cycles as the client have difficulty to visualize the design by just looking at sample, that's also why the renovation time have long delay due to changes made halfway as client can only made up their mind when they see the design or furniture in actual space.

Task 3 : Help client purchasing product

In order to get the furniture that the client requested, Mr. Arshad will have to source for the furniture that suits the design concept from various vendors.

Persona 3

Name: Abdulrahman Saeed

Age: 29

Occupation: Collectibles Retail Seller

User Goal: To plan and visualise merchandise prototypes, gather feedback, make decisions, track progress and approve productions.

Mr. Abdulrahman is a 29 year old Collectibles Retail Seller especially on poster. He operates a small retail business specializing in printed posters for home decoration, educational use, and promotional purposes. He sources design from local artists and digital creators, offering posters in various sizes, styles, and finishes to meet different customer preferences. With limited storage space, most posters are printed on demand to reduce waste and manage costs efficiently.

He handles daily operations such as managing customer inquiries, assisting buyers in selecting suitable designs, explaining differences in poster materials and pricing, and processing orders. For online sales, Mr. Abdulrahman oversees order confirmation, printing coordination, packaging, and delivery arrangements. In physical stores, he assists walk-in customers and ensures posters are displayed neatly for easy browsing.

Due to varying customer knowledge levels, the seller frequently explains technical details such as paper quality, print resolution, and size specifications. The seller's goal is to provide clear guidance, deliver high-quality posters, and ensure customer satisfaction throughout the purchasing process.

Scenario

Task 1: Choose Design

A customer decides to purchase a poster to decorate their bedroom. The customer first identifies the purpose of the poster, which is to enhance the overall appearance of the room. They consider the available wall space and determine that an A2-sized poster in portrait orientation would be suitable. The customer also sets a budget to avoid overspending.

Next, the customer searches for poster options by choosing to shop online for greater variety and convenience. They browse through several online stores, filtering posters by theme and colour to match the bedroom's interior design. The customer compares different designs and shortlists a few posters that meet their aesthetic preferences.

Task 2: Try on Design

After narrowing down the options, the customer evaluates each selected poster in more detail. They check the size specifications, material quality, and price, ensuring the poster fits within their budget. The customer also reads product descriptions and customer reviews to confirm the quality of the poster. Once a suitable poster is found, the customer decides to proceed with the purchase.

Task 3: Purchase Design

The customer then adds the chosen poster to the online shopping cart and reviews the order details, including size, quantity, and total cost. After confirming that all details are correct, the customer selects an online payment method and completes the transaction.

Finally, the customer waits for the poster to be delivered. Upon receiving it, they inspect the poster to ensure it is in good condition and matches the selected specifications. Satisfied with the purchase, the customer prepares the poster for display. If any issues had been found, the customer would contact the seller to request an exchange or refund.

Videos

Project 2 scenario videos are combined with updated prototype user manual video in Project 4 final video.

Gathering Requirements - Task Analysis

Introduction

The conventional shopping method under observation without AI assistance for interconnecting stores products to display relevant design user needed in short amount of time. This shopping method often consumes a lot of time and effort to do but it does not always produce the best possible outcome as it heavily depends on the resources that the user have.

For the usability study, we have identified three common tasks associated with shopping habits:

Task 1: Choose design

User have to manually choose between stores and the design they have.

Task 2: Try on design

User have to try on the design physically to visualize how it would look like.

Task 3: Purchase the design

User will have to manually proceed to checkout via invoice and payment procedures.

Refinement / Derivation of HTA

Type of User 1

0. Purchase Clothing

Plan 0:

Do 1 → 2 → 3 in sequence. If the clothing is unsuitable, repeat Steps 1 and 2 as needed.

1. Choose Clothing Design

1.1 Decide to shop for new clothes

1.2 Decide whether to shop at a mall or outlet

1.3 Identify nearby shopping malls or stores

1.4 Select a preferred mall based on distance and convenience

1.5 Travel to the selected mall

2. Try On Different Clothing Designs

2.1 Enter selected clothing store

2.2 Browse available clothing designs

2.3 Select clothes of interest

2.4 Check size availability

2.5 Bring selected clothes to fitting room

2.6 Try on clothes one by one

2.7 Evaluate fit, comfort, and appearance

2.8 Decide whether to keep or reject each item

Plan 2:

If clothes are unsuitable, return to Step 2.2.

If suitable clothes are found, proceed to Task 3.

- 3. Proceed to Clothing Purchase
- 3.1 Bring selected clothes to cashier
- 3.2 Confirm item details and prices
- 3.3 Choose payment method
- 3.3.1 Cash
- 3.3.2 Debit/Credit card
- 3.3.3 E-wallet
- 3.4 Complete payment
- 3.5 Collect purchased items
- 3.6 Leave the store and return home

Type of User 2

0. Complete Interior Design Project for Client

Plan 0:

Do 1 → 2 → 3.

Repeat Tasks 1 and 2 as needed until the client confirms the final design.

1. Choose Interior Design for the Client

- 1.1 Receive client request for interior design service
- 1.2 Identify client background and requirements
- 1.3 Identify that client has no clear design preference
- 1.4 Develop multiple interior design styles
- 1.5 Create initial design drafts for each style
- 1.6 Arrange meeting with client
- 1.7 Present design drafts to client
- 1.8 Gather client feedback and change requests
- 1.9 Revise design based on feedback

Plan 1:

If client is not satisfied, repeat Steps 1.4–1.9.

If client confirms a design direction, proceed to Task 2.

2. Present Interior Design Concept to Client

- 2.1 Prepare material samples and furniture images
- 2.2 Arrange design presentation meeting
- 2.3 Explain design concept and layout
- 2.4 Show material, colour, and furniture options
- 2.5 Assist client in visualizing the design
- 2.6 Receive client feedback
- 2.7 Identify changes requested by client
- 2.8 Revise design, materials, or furniture selection

Plan 2:

If client cannot visualize or requests changes, repeat Steps 2.1–2.8.

If client approves the final design and materials, proceed to Task 3.

- 3. Assist Client in Purchasing Products
 - 3.1 Identify required furniture and materials
 - 3.2 Source suitable vendors based on design concept
 - 3.3 Compare product specifications, prices, and availability
 - 3.4 Present options to client for confirmation
 - 3.5 Finalize product selection with client
 - 3.6 Coordinate purchasing and ordering from vendors

Type of User 3

0. Purchase a Poster

Plan 0:

Do 1 → 2 → 3 → 4 → 5. If the poster is not suitable, repeat Steps 2–4 until satisfied.

1. Identify the Need for a Poster

- 1.1 Decide the purpose of the poster (decoration, advertisement, education, gift, etc.)
- 1.2 Decide where the poster will be displayed
- 1.3 Determine preferred size and orientation (A3, A2, portrait, landscape)
- 1.4 Decide on an approximate budget

2. Search for Poster Options

- 2.1 Choose purchasing method
 - 2.1.1 Online store
 - 2.1.2 Physical shop
- 2.2 Browse available posters
- 2.3 Filter posters by category (theme, colour, style, artist)
- 2.4 Compare different poster designs

3. Evaluate and Select a Poster

- 3.1 Check poster design suitability
- 3.2 Check size compatibility with display area
- 3.3 Check material type (paper quality, matte/gloss finish)
- 3.4 Check price against budget
- 3.5 Read product details and reviews (if online)
- 3.6 Decide whether the poster meets requirements

Plan 3:

If poster meets requirements, proceed to Task 4.

If not, return to Task 2.

4. Make the Purchase

- 4.1 Add poster to cart or bring it to cashier
- 4.2 Review order details (size, quantity, price)
- 4.3 Choose payment method
 - 4.3.1 Cash
 - 4.3.2 Debit/Credit card
 - 4.3.3 Online payment
- 4.4 Complete payment

Discussion on Findings from Task

Task 1: Choose Design

Across all three scenarios, the main inconvenience during the design selection stage is the amount of time and effort required to make decisions without clear preferences. Persona must travel to shopping malls and visit multiple stores to view available clothing designs, which is both time-consuming and inconvenient. Similarly, the interior design client lacks a clear vision of the desired style, resulting in the persona having to prepare multiple design options within a limited timeframe, increasing workload and pressure. In the poster-purchasing scenario, although the process is online, the customer still spends significant time browsing, filtering, and comparing designs across multiple platforms. In all cases, users experience high cognitive load due to uncertainty, limited clarity, and the need to evaluate many alternatives before making an initial decision.

Task 2: Try on Design

A common inconvenience in the second task is the difficulty in visualizing how the selected design will appear in reality. persona needs to physically try on multiple clothing items because it is hard to imagine how they will look on him, which extends the shopping process. In the interior design scenario, the client struggles to visualize the final design using only 2D drawings and material samples, leading to repeated design revisions and delayed renovation timelines. Likewise, the poster buyer relies on images, descriptions, and reviews to judge suitability, as the actual product cannot be seen beforehand. This lack of accurate visualization causes repeated trial-and-error cycles, uncertainty, and additional time spent refining choices across all three scenarios.

Task 3: Purchase Design

During the purchasing stage, inconveniences mainly relate to logistical effort, waiting time, and the risk of dissatisfaction. persona must queue at the cashier and transport the purchased clothes home, which adds to the overall effort of shopping. For the interior design project, persona faces challenges in sourcing suitable furniture from multiple vendors, which involves coordination, availability checks, and potential delays. In the poster scenario, the customer must wait for delivery and only discovers potential issues, such as damage or mismatched expectations, after receiving the product. Across all cases, the final purchase stage involves dependency on external factors and carries the risk that the product may not fully meet expectations once obtained.

Requirement Specification for Task

Task 1: Choose Design

Functional Requirement

The system shall provide users with guided design selection features, such as personalized recommendations, filtering options, and example previews, to help users quickly narrow down suitable designs based on their preferences, constraints, and context. The system should allow users to specify basic requirements such as style, budget, size, and purpose to reduce unnecessary browsing and repeated decision-making.

Non-Functional Requirement

The system shall be easy to use, time-efficient, and responsive, enabling users to identify suitable design options with minimal cognitive effort. The interface should present information clearly and allow fast navigation to reduce user fatigue and frustration.

Description and Justification

This requirement addresses the inconvenience of high time consumption and uncertainty during the design selection stage, as seen in clothing shopping, interior design planning, and poster selection. By guiding users through structured choices and filtering options, the system reduces the cognitive load caused by too many alternatives and unclear preferences. This improves decision efficiency while minimizing the need for physical travel, repeated consultations, or extensive browsing.

Task 2: Try on Design

Functional Requirement

The system shall provide realistic visualization tools that allow users to preview designs in context before finalizing decisions. This includes features such as virtual try-on for clothing, 3D interior design previews, or scaled mock-ups for posters displayed within a simulated environment. Users should be able to modify options and instantly view the results.

Non-Functional Requirement

The system shall deliver accurate, high-quality visual representations with smooth interaction and minimal loading time. Visual outputs must be consistent and reliable to ensure users can trust what they see.

Description and Justification

This requirement directly resolves the difficulty users face when imagining how a design will look in real life. Poor visualization leads to repeated trials, design revisions, and delays, as seen in all three scenarios. By offering realistic and interactive previews, users can make informed decisions earlier, reducing trial-and-error cycles, saving time, and increasing confidence in their choices.

Task 3: Purchase Design

Functional Requirement

The system shall support a streamlined purchasing process that includes clear confirmation of selected items, transparent pricing, secure payment options, and real-time tracking of order or delivery status. It should also provide easy access to post-purchase support such as order modification, return, or exchange.

Non-Functional Requirement

The system shall be reliable, secure, and efficient, ensuring that transactions are completed without errors and that user data is protected. Purchase and delivery processes should be predictable and clearly communicated.

Description and Justification

This requirement addresses inconveniences related to delays, coordination issues, and post-purchase dissatisfaction. In all scenarios, users face uncertainty after payment, whether waiting in queues, sourcing vendors, or awaiting deliveries. A transparent and dependable purchasing system reduces anxiety, minimizes waiting time, and ensures that users remain informed and supported throughout the final stage of the process.

A set of Established Design Requirement

The AiPro application shall be designed to support users throughout the entire design decision-making process by minimizing time consumption, reducing cognitive load, and improving visualization accuracy. The application must provide intelligent design guidance that helps users identify suitable options quickly based on their preferences, budget, and contextual constraints. By incorporating personalized recommendations and advanced filtering mechanisms, AiPro enables users to make informed design choices without excessive browsing or repeated consultations.

To address the difficulty users face in visualizing final outcomes, AiPro shall incorporate immersive visualization features such as virtual try-on, 3D previews, and real-time design simulation via projection mapping and holographic technology projector within actual spaces. These features allow users to view designs in context and make adjustments instantly, reducing trial-and-error cycles and unnecessary revisions. The visual outputs must be accurate, responsive, and consistent to ensure users can trust the representation of the final product.

In addition, AiPro shall provide a seamless and reliable purchasing workflow that integrates product sourcing, transparent pricing, secure payment methods, and post-purchase support. Users must be able to confirm selections, track orders, and manage changes efficiently within the application. The system must prioritize usability, responsiveness, data security, and reliability to ensure a smooth end-to-end experience.

Overall, AiPro is designed to bridge the gap between imagination and reality, enabling faster decisions, fewer delays, and higher user satisfaction across design selection, visualization, and purchasing stages.

Proposed Updated HTA

Type of User 1

Task 1: Browse and Select Clothing Category

- 1.1 User opens app
- 1.2 Initiates AI assistant
- 1.3 Selects category, then Clothing category
- 1.4 Select a design of interest

Task 2: Try-On Using AR Projection

- 2.1 System detects user's body template
- 2.2 User selects a specific clothing item
- 2.3 AI prepares projection
- 2.4 Item is projected; color/size variations previewed

Task 3: Purchase and Checkout

- 3.1 Tap shopping cart to show all the items for the design
- 3.2 Show price of each item
- 3.3 Tap which item you wish to adjust and put in comment
- 3.4 Tap confirm after adjustment, it will be display in the breakdown
- 3.5 Tap Proceed Checkout for purchase confirmation

Type of User 2

Task 1 : Choosing design for the client

- 1.1 Open the AI Assisted Mini Visual Projector app on the phone or laptop
- 1.2 Navigate to the Interior Design Category
- 1.3 Showing design for different subcategories
- 1.4 Select a design of interest

Task 2 : Show ID design

- 2.1 Preparing to display in the 3D projection
- 2.2 Tap on display 3D on the section of the application
- 2.3 Review on the design look on the app
- 2.4 Tap Project and it will display in the space provided
- 2.5 Adjust any imperfection or design fault
- 2.6 Tap back to go back to the design selection
- 2.7 Do adjustment and then click Project 3D
- 2.8 The adjustment will show and afterward click Project to display the change

Task 3 : Help client purchasing product

- 3.1 Tap shopping cart to show all the items for the design
- 3.2 Show price of each item
- 3.3 Tap which item you wish to adjust and put in comment
- 3.4 Tap confirm after adjustment, it will be display in the breakdown
- 3.5 Tap Proceed Checkout for purchase confirmation

Type of User 3

Task 1: Browse and Select Clothing Category

- 1.1 User opens app
- 1.2 Initiates AI assistant
- 1.3 Selects category, then Merchandise category
- 1.4 Select a design of interest

Task 2: Try-On Using AR Projection

- 2.1 System detects the space/wall template
- 2.2 User selects a specific poster
- 2.3 AI prepares projection
- 2.4 Item is projected; color/size variations previewed

Task 3: Purchase and Checkout

- 3.1 Tap shopping cart to show all the items for the design
- 3.2 Show price of each item
- 3.3 Tap which item you wish to adjust and put in comment
- 3.4 Tap confirm after adjustment, it will be display in the breakdown
- 3.5 Tap Proceed Checkout for purchase confirmation