Final Project (75 minutes)

Business Scenario

Company:

TechStyle Fashion Group - An online fashion retailer with 2M active customers

Business Challenge:

Customer satisfaction scores have dropped from 4.2 to 3.6 stars over the past year. The company receives 10,000+ customer inquiries daily, with common issues around:

- Product recommendations (poor fit/style matches)
- Sizing concerns (high return rates - 35%)
- Delivery tracking questions
- Style advice requests
- Complaint resolution

Executive Directive:

CEO has allocated budget for an AI transformation initiative. Your team has been tasked with designing and prototyping AI solutions that improve customer experience while reducing operational costs.

Available Data:

You have access to 18 months of customer transaction and service data (200-row sample provided for analysis).

There is some help for the participants at the last section of this document.

Task 1: Project Scoping & Lifecycle Planning

Objective

Apply the AI Project Lifecycle to scope your solution.

Instructions

Part A: Problem Scoping

1. Review the business scenario and sample dataset
2. Identify 2-3 specific AI use cases you want to tackle
3. For each use case, define:
    - **Success metric**: How will you measure impact?
    - **User story**: Who benefits and how?
    - **Feasibility:** Low/Medium/High complexity

Suggested Use Cases to Consider:

- Predictive model for return likelihood
- Customer segmentation for personalized recommendations
- Response time optimization
- Satisfaction score prediction
- Sizing recommendation engine

Part B: Lifecycle Mapping

Create a simple flowchart or table covering:

- Data Requirements: What data do you need from the CSV?
- Model Selection: Which type of AI/LLM is appropriate?
- Alignment Approach: Prompt engineering, fine-tuning, or both?
- Evaluation Plan: How will you test before deployment?
- Deployment Strategy: Where does this live (chatbot, email, app)?
- Feedback Loop: How do you improve over time?

Deliverable

A one-page project plan that outlines your approach.

Task 2: Data Strategy & Feature Engineering

Objective

Identify data needs and engineer features for your AI solution using the provided dataset.

The Data Reality

Dataset Provided: techstyle_customer_data.csv (200 rows, 17 columns)

Available Fields:

- Customer demographics: age_group, gender, state
- Product details: category, size, color, price, season
- Purchase behavior: order_date, rating, returned, purchase_count
- Service metrics: issue_type, resolution_status, response_time_mins, satisfaction_score

Data Quality Issues Discovered:

- 35% return rate across all products (business problem confirmed)
- Response times vary significantly by geographic region
- Satisfaction scores cluster between 3-5 (confirming the declining trend)
- Product categories show potential gender skewing
- Size distributions may not reflect actual customer base diversity

Instructions

Part A: Exploratory Data Analysis

Open the CSV and explore:

- Return patterns: Which categories have highest return rates?
- Customer segments: How do purchase counts vary by age/gender?
- Service performance: What's the relationship between response_time and satisfaction_score?
- Geographic differences: Do certain states show different patterns?
- Pricing insights: How does price correlate with returns or ratings?

Create 2-3 data visualizations or summary statistics (can be hand-drawn charts or simple calculations).

Part B: Feature Engineering

For your chosen use case, identify:

- Key features needed: Which columns from the CSV are most relevant?
- Derived features: What new insights can you create?
    - Example: "Customer lifetime value = purchase_count × average_price"
    - Example: "Return risk score = function(category, size, price)"
- Missing features: What data would you ideally want but don't have?
- Train/test split strategy: How would you divide this data for model training?

Deliverable

A data analysis summary with feature engineering plan, including at least 2 insights from the actual data.

Task 3: Prompt Engineering Challenge

Objective

Design effective prompts for your AI solution using advanced techniques.

Scenario Focus: Customer Service Chatbot

You're building an AI chatbot to handle common customer inquiries. Based on the data analysis, you know the most common issues are:

- Sizing questions (leading to 35% return rate)
- Delivery/response time concerns (varying by region)
- Style advice requests
- Product recommendations (to increase satisfaction)

Your chatbot needs to:

- Understand customer intent
- Provide accurate, data-informed responses
- Maintain brand voice (friendly, helpful, solution-oriented)
- Escalate complex issues to humans
- Avoid making promises the company can't keep

Instructions

Part A: Base Prompt Design

Create a system prompt for your chatbot using the PICF Framework:

- Persona: Define the chatbot's role and personality
- Instructions: Clear guidelines on what to do/not do
- Context: Background information (include relevant insights from your data analysis)
- Format: Output structure expected

Example Starting Point:

You are StyleBot, TechStyle Fashion Group's customer service assistant.

Based on our customer data analysis, we know that:

- *35% of products are returned, primarily due to sizing issues*
- *Dresses, Pants, and Tops have the highest sizing concerns*
- *Customer satisfaction averages 3.8/5*
- *Response times impact satisfaction scores*

Your role is to...

Requirements - Handle these scenarios:

- Sizing question (incorporate data insight about high return categories)
- Delivery concern (acknowledge variable response times)
- Style recommendation (use demographic and purchase patterns)
- Escalation decision (know when human help is needed)

Part B: Prompt Refinement

Test your prompt with these scenarios (use ChatGPT,Gemini or Claude):

Scenario 1: "I ordered a dress 2 weeks ago and it still hasn't arrived! This is unacceptable. I need it for an event this Saturday. I'm in Texas."

Scenario 2: "I'm a 26-year-old woman, usually wear a medium, but I've heard your sizes run small. What size should I order in the Summer Breeze Maxi Dress? I've returned 3 items before due to fit."1.

Scenario 3: "Can you help me find a professional outfit for job interviews? I've bought mostly casual dresses from you before but need something different. Budget around $200."

For each test:

- Rate the response quality (1-5)
- Identify issues (hallucination, tone, accuracy, data awareness)
- Refine your prompt to improve
- Note: Does the bot reference relevant data insights?

Deliverable

Your final system prompt with test results and refinement notes

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Task 4: Ethics, Bias & Responsible AI

Objective

Identify ethical concerns and design safeguards using insights from the actual dataset.

Instructions

Part A: Data-Driven Bias Audit

Analyze the provided CSV file for bias patterns. Investigate:

Gender and Product Category:

- Calculate: What % of female vs. male customers purchased each category?
- Question: Is this pattern based on actual preferences or biased recommendations?
- Risk: What happens if you train a recommendation engine on this data?

Geographic and Response Time:

- Calculate: Average response_time_mins by customer_state
- Question: Why might certain regions have slower service?
- Risk: How does this affect customer satisfaction and AI training data?

Age and Size Distribution:

- Calculate: What sizes are most common for different age_groups?
- Question: Does this reflect actual body diversity or biased inventory?
- Risk: What biases could this introduce in a sizing recommendation AI?

Return Patterns:

- Calculate: Return rates by gender, age_group, or category
- Question: Are certain customer segments being underserved?
- Risk: Could AI learn to deprioritize certain customer groups?

Part B: Responsible AI Framework

Design safeguards for your solution:

- Data Quality: How do you address the biases found in Part A before training?
- Transparency: How do customers know they're interacting with AI?
- Human-in-the-Loop (HITL): When should humans intervene?
- Fairness Monitoring: What metrics track fairness across demographics?
- Privacy Protection: The data includes demographics - how do you protect privacy?
- Failure Gracefully: What happens when the AI doesn't know or makes mistakes?

Create a one-page "Responsible AI Checklist" that includes:

- Specific biases identified in the data
- Concrete mitigation strategies
- Monitoring metrics to track fairness over time

Deliverable

Bias audit findings with calculations from the CSV and responsible AI framework.

Task 5: AI-Powered Personalization Engine

Objective

Design an AI solution that uses customer data to provide personalized experiences.

Challenge: Smart Recommendation System

Using customer data available (demographics, purchase history, product preferences), design an AI-powered personalization feature.

Instructions

Part A: Solution Design

Design a personalization feature using customer data:

Option 1 - Sizing Assistant:

- Input: Customer demographics (age, gender), purchase history, category
- Process: Analyze patterns from similar customers in the dataset
- Output: Size recommendation with confidence level
- Goal: Reduce the 35% return rate

Option 2 - Style Recommendation Engine:

- Input: Past purchases (categories, colors, prices), demographics
- Process: Identify customer segment and preferences
- Output: Personalized product suggestions
- Goal: Increase satisfaction from 3.8 to 4.5+

Option 3 - Proactive Service AI:

- Input: Issue type patterns, response times, customer segments
- Process: Predict likely issues and satisfaction risks
- Output: Proactive outreach or priority routing
- Goal: Improve response times and resolution rates

Your design should include:

1. Which data fields from the CSV are most important?
2. What patterns or segments did you identify?
3. How does the AI make decisions?
4. What's the user experience (step-by-step)?
5. How do you measure success?

Part B: Prompt Engineering for Personalization

Create a prompt that uses customer data to generate personalized recommendations.1.

Example Scenario: Customer Profile (from CSV):

- Age: 26-35
- Gender: Female
- Purchase count: 8
- Past categories: Dresses (4), Tops (3), Accessories (1)
- Average price: $75
- Returns: 2 out of 8 (both dresses, sizing issues)
- State: CA

Customer Request: "I need outfits for a business conference next month. Professional but still stylish. What do you recommend?"

Write a prompt that:

- Takes this structured customer data as input
- Considers their history and preferences
- Addresses their past sizing issues
- Recommends specific product categories and styles
- Explains reasoning in a friendly, helpful way
- Sets appropriate expectations about fit

Deliverable

Solution design with data-driven approach and personalization prompt with example output.

Appendix: Resources Provided to Teams

A. Dataset Access

- File: techstyle_customer_data.csv
- Rows: 200 customer transactions
- Columns: 17 fields (see data dictionary in dataset tool)
- Period: Last 18 months of customer data

B. Sample Customer Service Scenarios

(For prompt testing in Task 3)

Scenario 1 - Angry Customer: "I ordered a dress 2 weeks ago and it still hasn't arrived! This is unacceptable. I need it for an event this Saturday. I'm in Texas."

Tests: Empathy, realistic expectations, geographic awareness

Scenario 2 - Sizing Question: "I'm a 26-year-old woman, usually wear a medium, but I've heard your sizes run small. What size should I order in the Summer Breeze Maxi Dress? I've returned 3 items before due to fit."

Tests: Data awareness (high return rate), personalization, helpful guidance

Scenario 3 - Style Advice: "Can you help me find a professional outfit for job interviews? I've bought mostly casual dresses from you before, but need something different. Budget around $200."

Tests: Understanding customer history, appropriate recommendations, budget awareness

Scenario 4 - Complex Issue: "I received my order, but the jacket has a broken zipper, and when I tried to start a return, your website crashed. I've been trying for 3 days. Also, I was charged twice on my credit card!"

Tests: Escalation logic, empathy, multi-issue handling

Scenario 5 - General Inquiry: "What's your return policy? And do you offer free shipping?"

Tests: Accurate information, concise responses, helpful tone

C. Data Analysis Prompts

Questions to Explore in the CSV:

- Which product category has the highest return rate?
- What's the correlation between response_time_mins and satisfaction_score?
- How does purchase_count vary by age_group?
- Which states have the slowest average response times?
- Do returned items have different price ranges than kept items?
- What percentage of issues are "Sizing" related?
- How does gender distribution vary across product categories?
- What's the relationship between issue_type and resolution_status?

Calculated Metrics to Create:

- Return rate by category: (COUNT returned = 'Yes') / (COUNT all) by category
- Average satisfaction by response time bracket
- Customer lifetime value: purchase_count × avg(price)
- Issue resolution efficiency: (COUNT resolved) / (COUNT all issues)
- Geographic service disparity: MAX(avg response time) - MIN(avg response time)