**TASK-3**

**Case Study**: Reducing Patient Waiting Time in Hospitals Using AI-Powered Queue Management

**Problem Statement**

Hospitals often face long patient waiting times, leading to patient frustration, overcrowding, and operational inefficiencies. The challenge is to optimize hospital queues using AI to reduce waiting time while maintaining high-quality care.

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| **Design Thinking Phase** | **Application to the problem** | **Solution Found** |
| 1. **Scope** | - Identified long patient wait times as a critical issue.  - Data showed an average wait time of 2.5 hours per patient.  - Causes: inefficient scheduling, unpredictable emergency cases, and uneven doctor distribution. | Goal: Reduce patient waiting time by at least 40% using AI-driven queue management. |
| 1. **Empathize** | - Conducted interviews with patients, doctors, and staff.  - Patients expressed frustration over unclear wait times and delays.  - Doctors noted that emergencies disrupt scheduled appointments. | Key Insight: Patients want real-time queue updates, while doctors need better scheduling flexibility. |
| 1. **Define** | - Reframed the problem: "How might we create a dynamic queue system that minimizes wait times and adapts to emergencies?"  - Identified two main factors:  1. Predictable patients (scheduled appointments).  2. Unpredictable patients (emergency cases, walk-ins). | Focus shifted to an AI-based system that dynamically adjusts patient priority while keeping waiting times low. |
| 1. **Ideate** | Brainstormed multiple solutions:  1. AI-powered Queue System: Uses machine learning to predict and adjust wait times.  2. Patient Mobile App: Provides real-time queue updates and estimated wait time.  3. Automated Doctor Scheduling: Adjusts appointment slots dynamically based on emergency cases. | Chose to prototype AI Queue System & Mobile App as the top solutions. |
| 1. **prototype** | - Developed a pilot AI-powered hospital queue system:  1. Predicts wait times based on patient volume and doctor availability.  2. Adjusts schedules dynamically for emergencies.  3. Sends real-time updates via a mobile app. | Tested the prototype in a medium-sized hospital with 1,000+ patients per day. |
| 1. **Validation** | - A/B Testing Results:  1. Wait times reduced by 45%.  2. 85% of patients found the mobile app useful for queue tracking.  3. Doctors reported smoother workflow with automated scheduling. | The validated solution was ready for larger-scale implementation. |
| 1. **Implementation** | - Rolled out AI-powered queue management in three hospitals.  - Integrated system with existing hospital management software.  - Launched a public awareness campaign to educate patients on using the mobile app. | Hospitals saw a significant reduction in wait times, leading to higher patient satisfaction and improved efficiency. |