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IoT A

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**Smart Kinetics and HCI**

**CIA-2**

**Design Explanation Document**

**Key UI/UX decisions**

**1. Dark Mode Support (Enhanced for Accessibility)**

* **Decision:**The application includes a toggleable dark mode that supports persistent theme settings using localStorage. This allows users to switch between light and dark themes via an intuitive sun / moon toggle button. The preference is stored so that the chosen mode remains active even after page refresh or browser restart**.**
* **Implementation Details:**
  + Global Theme Context: The mode is managed via React’s Context API, allowing all components to adapt instantly.
  + Tailwind Utility Classes: Dark styles are applied using classes like dark:bg-gray-900, dark:text-white, etc.
  + Chart Adaptation: Recharts and Nivo charts are styled to retain legibility, including label text colors, tooltip backgrounds, and axis markers.
* **High Contrast for Low Vision:**
  + Tailwind classes and component styles have been adjusted to meet WCAG contrast guidelines, ensuring a minimum contrast ratio of 4.5:1.
  + Text on dark backgrounds uses pure white or light gray (text-white, text-gray-200).
  + Input fields, labels, tooltips, and legends are given dark backgrounds with light text for sharp contrast.
  + Focus states are clearly visible using focus:outline-none focus:ring to support keyboard navigation.
  + Placeholder text and disabled states use contrasting shades (dark:placeholder-gray-300, etc.) to remain readable.
* **Impact on Usability:**
  + Visual Comfort: Reduces eye fatigue, particularly in low-light or nighttime usage.
  + Accessibility: Greatly improves usability for individuals with visual impairments or light sensitivity.
  + Persistence: Users don't have to re-toggle every time they open the app—it's saved automatically**.**
* **User-Centric Benefit:**This design ensures that all users—including those with low vision, color perception challenges, or who simply prefer a darker interface—can comfortably interact with the application, improving inclusivity and user satisfaction**.**

**2. Responsive Design (Mobile-First Approach)**

* **Decision:**The layout uses a mobile-first responsive grid system that adapts dynamically to device screen sizes.
* **Implementation Details:**
  + Utilizes Tailwind’s responsive classes like md:grid-cols-2, flex-wrap, and space-y-3 to adjust grid and spacing.
  + Charts and dashboards maintain responsiveness using ResponsiveContainer from Recharts and ResponsiveHeatMap from Nivo**.**
* **Impact on Usability:**
  + Ensures consistent user experience whether on a laptop, tablet, or smartphone.
  + Eliminates horizontal scrolling and layout breakage on smaller screens.
  + Improves accessibility for users who rely on mobile devices for interaction.

**3. Color-Coded Priorities (Visual Hierarchy & Alerts)**

* **Decision**:  
  Messages and tasks are **visually categorized** based on priority using strong, recognizable color codes (Red = Urgent, Yellow = Important, Gray/Neutral = Normal).
* **Implementation Details**:
  + Messages are styled using Tailwind utility classes:
  + bg-red-200 / bg-red-900 for urgent
  + bg-yellow-100 / bg-yellow-900 for important
  + bg-white / bg-gray-800 for normal
* **Impact on Usability**:
  + Supports **visual scanning**—users can immediately identify high-priority items without reading every detail.
  + Helps reduce **decision fatigue** by guiding attention to the most important elements.
  + Improves productivity by minimizing time spent triaging tasks.

**4. Smart Search and Filtering (Contextual Navigation)**

* **Decision:**Users can filter chat messages by keywords, sender name, and message priority, and search results are highlighted inline.
* **Implementation Details:**
  + Uses multiple controlled inputs (searchTerm, searchSender, searchPriority) with filters applied dynamically via .filter() in React.
  + Matching terms in message bodies are wrapped with highlight spans using Tailwind styles (e.g., bg-yellow-200 dark:bg-yellow-600).
* **Impact on Usability:**
  + Enables quick access to historical conversations, critical decisions, and important references.
  + Reduces time spent scrolling through irrelevant data.
  + Enhances efficiency for high-volume communication environments, especially in group projects.

**5. Keyboard Accessibility**

* **Decision:**The app supports keyboard shortcuts (Ctrl + Enter to send messages)
* **Implementation Details:**
  + Uses useEffect() to add a keydown event listener for shortcut behavior.
  + ARIA labels (e.g., aria-label="Type a message") are applied to all actionable form controls.
* **Impact on Usability:**
  + Boosts productivity for power users who prefer keyboard-based navigation.
  + Aligns with accessibility guidelines, promoting inclusivity**.**

**Charts and Statistics**

**1)**  **Pending Work Tracker (Pie Chart)**

**A graph with a pie chart

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AI-generated content may be incorrect.**

* **Purpose**:  
  Visualizes the distribution of tasks across priority levels — **High**, **Medium**, and **Low** — to help users quickly understand how their to-do list is weighted.
* **What it Displays**:  
  Each slice of the pie corresponds to a priority level, and its size reflects the number of tasks in that category. The slices are color-coded (e.g., purple for high, pink for medium, blue for low).
* **Why It Matters**:
  + Users can **visually assess urgency** without scanning through lists.
  + Teams can identify if too many tasks are classified as high priority, signaling the need for re-prioritization.
* **Usability Benefits**:
  + Encourages proactive decision-making by focusing user attention on time-sensitive tasks.
  + Managers can better distribute workload based on priority categories.
  + Supports sprint planning or daily stand-ups with a quick overview of task weight.

**2. Notifications Dashboard (Donut Chart)**

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* **Purpose**:  
  Displays different types of in-app notifications such as **Mentions**, **Deadlines**, **Meeting Reminders**, and **Project Updates** to help users track ongoing communication and alerts.
* **What it Displays**:  
  A donut-style pie chart that shows how notifications are distributed across categories. Each slice includes a percentage label (e.g., Mentions: 25%) and is color-matched with the legend.
* **Why It Matters**:
  + Notifications can easily be missed in fast-paced environments. This chart centralizes them in a digestible format.
  + Helps users prioritize responses (e.g., mentions may need immediate attention).
* **Usability Benefits**:
  + Prevents information overload by **categorizing alerts** clearly.
  + Improves collaboration by drawing attention to **team mentions** and upcoming **deadlines**.
  + Keeps the user interface clean while still providing high informational value.

**A graph with a line and a dotted line

AI-generated content may be incorrect.A graph with a line and a number of months

AI-generated content may be incorrect.3. Performance Improvement Analysis (Line Chart)**

* **Purpose**:  
  Illustrates **monthly performance trends**, such as productivity, task completion rate, or progress metrics over time.
* **What it Displays**:  
  A line graph where:
  + The X-axis represents time (e.g., months like Jan, Feb, Mar, Apr).
  + The Y-axis shows a performance metric (e.g., task completion percentage).
  + Each point on the line represents a snapshot of performance that month.
* **Why It Matters**:
  + Users and managers can **track improvements** or declines over time.
  + Helps assess the impact of new workflows, team changes, or tools introduced.
* **Usability Benefits**:
  + Motivates users by showing **visual proof of progress**.
  + Encourages data-driven retrospectives.
  + Supports performance reviews with clear trend lines.

**A graph of a work overview

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* **Purpose**:  
  Compares the **quantity and type** of completed work across teams or categories such as Development (Dev) and Documentation (Docs).
* **What it Displays**:
  + Each bar represents a work item (e.g., "Bugs Fixed", "Features Developed").
  + The bar is **stacked** to show the contribution of different sub-categories (e.g., dev vs docs).
* **Why It Matters**:
  + Gives a clear overview of **team workload contributions**.
  + Identifies **imbalances** (e.g., overemphasis on development but under-delivered documentation).
* **Usability Benefits**:
  + Aids in workload balancing.
  + Improves collaboration between cross-functional teams.
  + Assists managers in distributing future tasks more fairly.

**5. Workload Distribution Analysis (Heatmap)**

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* **Purpose**:  
  Shows how work is distributed across different teams and weekdays. Useful for **resource optimization** and avoiding burnout.
* **What it Displays**:  
  A grid (heatmap) where:
  + Each row represents a **team** (Team A, B, C).
  + Each column represents a **day** (Mon–Fri).
  + Each cell’s color intensity represents workload (the darker the cell, the heavier the workload).
* **Why It Matters**:
  + Highlights which teams are **overloaded or underutilized**.
  + Shows which **days are busiest**, helping with capacity planning.
* **Usability Benefits**:
  + Facilitates better **task assignment** and **schedule planning**.
  + Encourages more **even workload distribution**.
  + Prevents team burnout and helps in understanding weekly trends.

**6. Project Success and Failure Analytics (Grouped Bar Chart)**

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* **Purpose**:  
  Provides a post-project snapshot of outcomes — successful vs failed tasks — across multiple projects.
* **What it Displays**:
  + Each project (e.g., Project A, B, C) is shown on the X-axis.
  + Two bars per project: one for **Success**, one for **Failure**.
  + Y-axis shows the number of tasks or milestones completed vs. missed.
* **Why It Matters**:
  + Enables clear performance review per project.
  + Helps in identifying recurring issues, underperforming teams, or risky processes.
* **Usability Benefits**:
  + Facilitates **retrospective analysis**.
  + Helps managers make **informed decisions** for future planning.
  + Encourages teams to **reflect and adapt** based on results.