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| S.NO | Application  Domain | Complex Problem Identified | Justification |
| 1 | Healthcare | Personalized Medicine and Treatment Optimization | Personalized medicine requires identifying the best treatment for individuals based on their unique genetic makeup, lifestyle, and environmental factors. This problem involves handling large-scale data integration (e.g., genomic data, clinical data, and patient history) and complex decision-making algorithms. The variability in patient responses to treatments makes this highly complex, requiring precise data analytics, AI models, and real-time treatment adjustments. |
| 2 | Supply Chain and Logistics | Dynamic Supply Chain Optimization in Real-Time | Managing supply chains is inherently complex due to fluctuating demand, uncertain supply, transportation constraints, and geopolitical influences. The optimization involves balancing cost, speed, and inventory management while considering these unpredictable variables. Real-time data analysis and machine learning models are needed to anticipate disruptions and adjust logistics strategies dynamically, making it a highly complex and resource-intensive task. |
| 3 | Autonomous Vehicles | Real-Time Decision Making and Navigation in Unstructured Environments | Autonomous vehicles (AVs) face the challenge of navigating in complex, unpredictable environments (e.g., city streets, construction zones) while ensuring safety. The complexity arises from integrating real-time data from sensors (LIDAR, cameras), mapping, environmental changes (weather, road conditions), and the vehicle's AI algorithms for decision-making. AVs must also account for human behavior in other vehicles and pedestrians, which makes real-time decision-making extremely challenging. |