**TASK-2**

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| |  | | --- | | **Application Domain** |  |  | | --- | |  | | |  | | --- | | **Complex Problem Identified** |  |  | | --- | |  | | Justification |
| 1. Automotive Industry – Autonomous Vehicle Navigation in Urban Areas | Autonomous vehicles (AVs) struggle with real-time decision-making in highly dynamic urban environments due to unexpected obstacles, unpredictable human behaviour, and changing traffic conditions. | Ensuring safety and reliable navigation in complex city environments is crucial for widespread AV adoption.  Requires advancements in AI, machine learning, sensor fusion, and real-time data processing.  Addresses issues like pedestrian safety, accident prevention, and traffic optimization. |
| 1. Healthcare – AI-Based Early Disease Diagnosis | Developing an AI-powered system that can accurately diagnose diseases such as cancer, Alzheimer’s, and cardiovascular conditions at an early stage using medical imaging, genetic data, and patient history. | Early detection increases treatment success rates and reduces healthcare costs.  Requires handling large datasets, image processing, and deep learning models for accurate predictions. Ethical concerns like data privacy, AI bias, and patient trust need to be addressed. |
| 1. Renewable Energy – Efficient Energy Storage Solutions | Renewable energy sources like solar and wind are intermittent, meaning energy storage systems (like batteries) must efficiently store and distribute power based on demand. However, current battery technologies face limitations in capacity, efficiency, lifespan, and environmental impact. | Essential for transitioning to sustainable energy solutions and reducing dependence on fossil fuels.  Requires advancements in solid-state batteries, supercapacitors, and hydrogen storage.  Addresses grid stability, energy loss, and raw material shortages (like lithium and cobalt). |