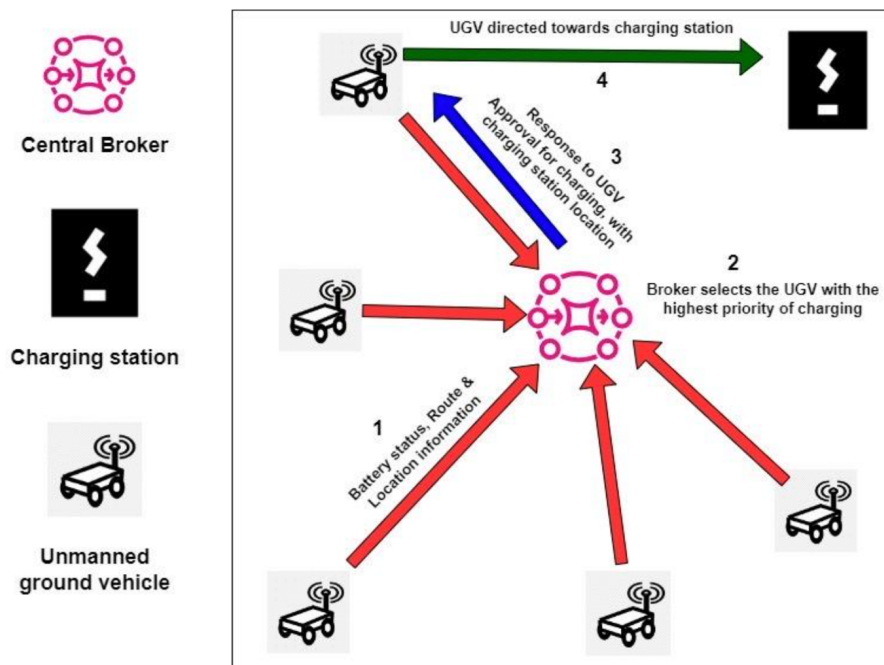


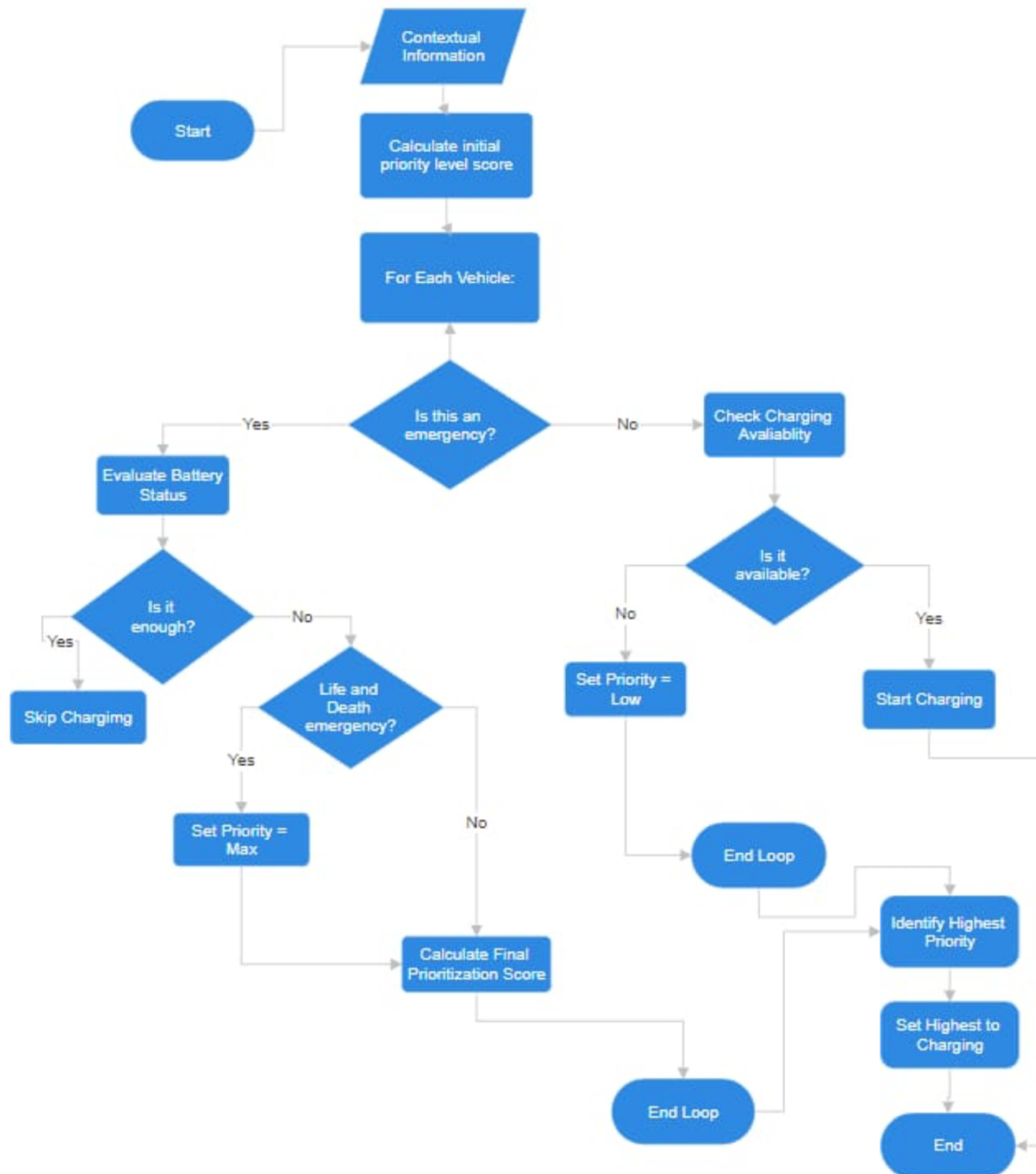
Summary:

Unmanned Ground Vehicles (UGVs) and Autonomous Electric Vehicles (AEVs) are key components in modern transportation systems, spanning military operations, civilian applications, and the transition towards sustainable urban mobility. As these vehicles become increasingly prevalent, the need for advanced Decision Support Systems (DSS) tailored to their unique requirements grows exponentially. The project explores the current state of UGV and AEV DSS, addressing recent advancements, key challenges, and future research directions. The study identifies critical areas for innovation and improvement through a comprehensive examination of infrastructure constraints, technological limitations, and user perspectives. Key objectives include implementing a proof of concept based on a patent filed by Prince Sultan University titled "Context-Aware Collaborative Charging Method for Autonomous Electric Vehicles" (co-invented by Dr. Muddesar Iqbal, and Dr. Dhafer Almakhlles). The scope of the work in our senior design project includes the development of an efficient Battery Management System, partially implementing the patent by developing and implementing the fixed charging station prioritization algorithms, collaborative charging strategies for UGV fleets, and the integration of contextual data for informed decision-making to provide priority queuing mechanisms at fixed sharing stations. The document also highlights the importance of addressing pragmatic concerns such as cost, safety, and environmental sustainability in DSS design. By addressing these challenges and objectives, and assessing the community's engagement with emergent transportation innovations, a survey was executed to ascertain levels of awareness of electric and autonomous vehicles, the impact of traffic congestion on individual welfare, and the propensity towards the adoption of novel transportation technologies, the report aims to contribute to the ongoing discourse on autonomous systems and pave the way for a more sustainable and technologically advanced future in transportation.

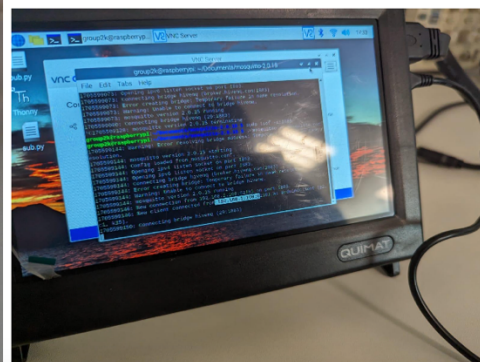
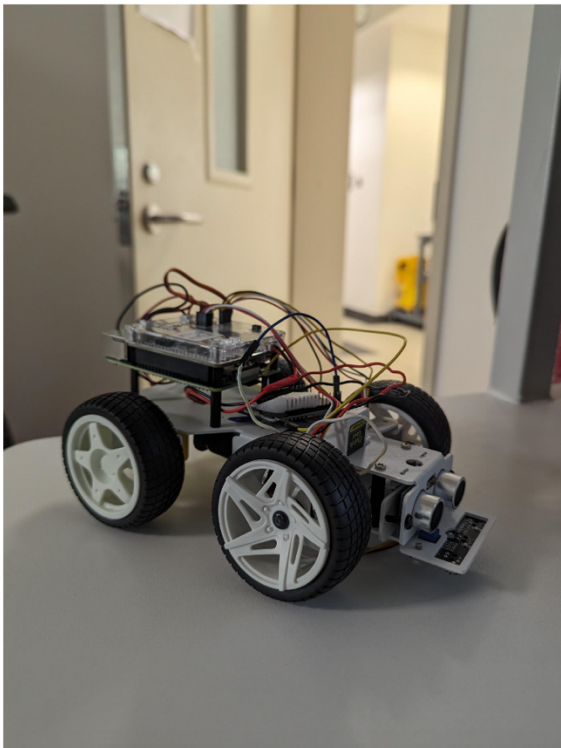
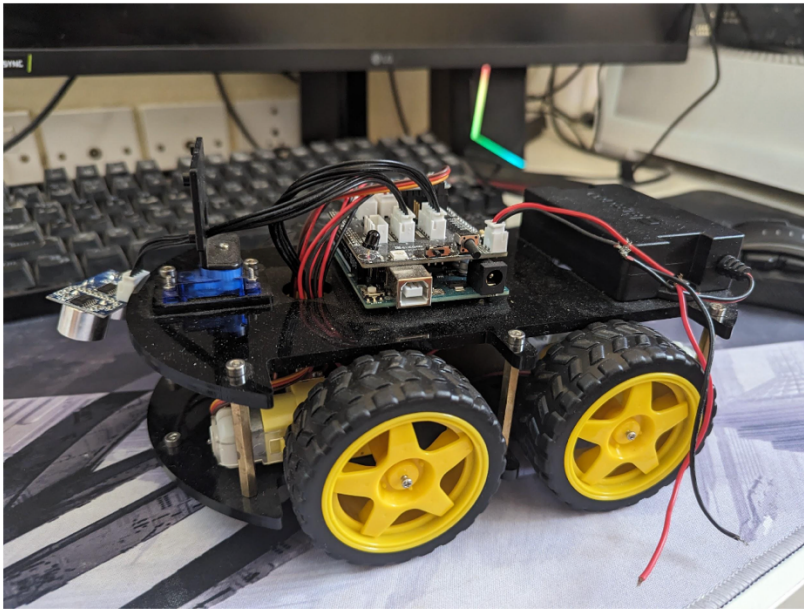
Designed Model:



Project Architecture Design



Project Implementation Flow Chart



Final Prototype