

CS 5463

Survey Topic Proposal

Johnathan Edwards

Due 2/24/2025

My survey will examine the existing body of work on energy-efficient machine learning models designed for edge devices, with a potential emphasis on applications in autonomous drones. In recent years, interest has surged in bringing machine learning to the edge – where power consumption, memory capacity, and computational resources are significant constraints. A noteworthy development in this area is TinyML, which focuses on running machine learning algorithms on ultra-low-power devices like microcontrollers, thereby pushing these constraints to their limits.

The proposed survey will begin by outlining the fundamental concepts of edge computing, introducing the resource constraints involved in deploying machine learning models on these devices and the trade-offs between model performance and resource availability. It will then explore the various techniques and methodologies currently employed to adapt machine learning models for such environments.

To add practical context, the survey will highlight common applications of these methods. Of particular interest to me is the use of ML in autonomous drones and drone swarms. If there is sufficient relevant literature, the scope will focus on the state-of-the-art in drone applications, showcasing how ML solutions are employed in this domain.