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Abstract:
During mass casualty incidents, unmanned aerial vehicles (UAVs) are a valuable tool to quickly locate casualties in need of triage. Coverage path planning is the task of finding a path plan for a UAV's sensor footprint to cover an entire search domain. Traditional methods, such as lawnmower patterns, take an overly simplistic look at the sensor footprint, resulting in coverage path plans that are not efficient in the amount of time to cover a search domain or efficient in their distribution of coverage. This thesis proposes a coverage path planning algorithm based on generating a set of stationary vantage points that the UAV will travel to and capture imagery. These vantage points ensure that the coverage path plan achieves a spatial resolution threshold throughout the entire search domain, while also minimizing the amount of unnecessary excess coverage both inside and outside of the search domain. Additionally, an integer linear program is formulated to maximize the portion of the search area covered when UAV search time is limited. Through simulation and experimental testing, the proposed coverage path planner is evaluated for its efficiency of coverage and speed in covering a search domain.

Examining Committee Chair:

Dr. Derek Paley

Members:

Dr. Pratap Tokekar

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Bio:

Ryan's Friend is a master's student in the Department of Computer Science, advised by Dr. Derek Paley. Alec is a member of the Collective Dynamics and Control Laboratory (CDCL), where his research focuses on UAV autonomy.