Dynamic Routing Of uNmanned-aerial and Emergency Team Incident Management

Abstract

Unmanned aircraft vehicles (UAVs) have been actively used for crash scene reconstruction and Lancashire fire and rescue. However, there has been a lack of application of UAVs to emergency (ambulatory) response vehicles (ERVs) and a successful usage will lead to a quicker response to emergency site to save lives, reduce secondary crash occurrences, which are more frequent than disasters, and reduce delays to the vulnerable users. UAVs can be coordinated with ERVs, but without an automated framework, it is challenging to adopt to the revision of FAA rules that already have been announced to accommodate more advanced operations. To maximize the efficiency, this project will make a new generation of research in UAV-guided ERV Routing and with a real-world validation with a small example at VTTI test site. In a two-step stochastic dynamic program, UAV will be operated to provide the useful information on traffic condition of potential ERV routes. We will provide the framework to apply our model to catastrophic emergency scenarios (e.g., hurricane) when some traffic sensors are not working properly and require more UAVs assistance. Markov processing model will be developed to predict evolving traffic condition and future dependent emergencies in high performance computing and visualization environments.

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