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Real-time Control of Ambulance Services

Shane G. Henderson. Joint work with Matthew S. Maxwell and Huseyin Topaloglu

School of Operations Research and Information Engineering, Cornell University

`http://people.orie.cornell.edu/~shane`

Emergency medical service (EMS) providers attempt to provide quick ambulance response to calls for medical attention, along with transport to hospital if necessary. Budgets are invariably tight, so there is great pressure to make the most of EMS resources. Many EMS providers now use some form of ambulance redeployment, which is also known as system-status management or move-up. Redeployment involves moving vehicles in real time in response to real-time system information, in an attempt to better match available ambulances to future calls.

I will describe our efforts in using approximate dynamic programming (ADP) in conjunction with detailed simulation models to make redeployment decisions. I'll also describe our preferred "tuning" methods for ADP, which involve a simulation optimization rather than more traditional regression approaches. Finally, I'll explain why the combination of ADP and simulation may be broadly applicable in service-system applications, and what I view as the primary research challenges involved.