

Towards an all-encompassing strategy for police patrol routing: What meal delivery has in common with police patrol

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Police patrol is a complex process and while on patrol, police officers must balance many intersecting responsibilities. Most notably, police must proactively patrol and prevent offenders from committing crime but must also reactively respond to real-time incidents and enforce the law. Since police resources are scarce and the response time for emergency calls has to be minimized, the efficiency of the patrol strategies used, is essential. Many of the existing articles on this topic are either incomplete - they do not cover all the intersecting responsibilities - or oversimplified. The objective of this paper is to systematically review scientific articles on routing and optimization strategies and algorithms. On the one hand, this includes in particular the criminological literature on police patrol. On the other hand, routing and optimization algorithms also occur in research that enhances the response time performance of other emergency responders, as well as in economic models, for example road assistance services and meal delivery services. Commonly used algorithms are genetic algorithms, ant colony algorithms, queuing algorithms, location-allocation algorithms and multi-agent patrolling models. This results in a general strategy or algorithm encompassing all the intersecting responsibilities, applicable to an urban area, apart from some context-specific adjustments.