Throughout the last years, performance of ambulance services in the Netherlands has been consistently below the nationally-set target (an ambulance present within 15 minutes for 95% of highly urgent 112-calls). In an industry where performance improvements can literally save lives, but resources are very scarce, providers of emergency medical services are continuously looking for ways to deploy available resources more efficiently.

In this thesis an alternative dispatch policy is developed with the objective to improve the on-time performance of highly urgent ambulance requests, given available ambulance capacity. Machine learning was used to capture current dispatch practices in the region ‘Brabant-Zuidoost’ by collecting historic data, extracting human decision rules, and refining them with domain knowledge in a unique post-processing phase. This resulted in a model that is both concise and able to accurately predict current dispatch decisions.

Subsequently, the captured dispatch process was leveraged as a practically relevant basis to improve upon. The resulting alternative policy was evaluated in an advanced simulation developed for this research. Complementing the captured current dispatch policy with two enhancements (see Figure 1) yields a significant improvement of the on-time performance, without the need for increasing ambulance capacity, equivalent to the addition of 7+ weekly eight-hour ambulance shifts.

Figure 1: Two proposed enhancement to the current dispatch policy: re-dispatching ambulances that are currently on its way to less urgent requests if they are closest and reevaluating active dispatch decisions upon service completion of an ambulance.