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Automatic weight adjustment for the nurse rostering problem

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Despite the continuous progression in nurse rostering research over the years, only a few hospitals are benefitting from these advancements in their every-day scheduling. One of the reasons for the limited use of automatic scheduling in practice is the absence of the experience-based intuition that planners apply when manually generating schedules. The relative importance of different objectives reported by the planners does not always coincide with their day-to-day decisions. Furthermore, the planners' decisions are not consistent, as their intuition perceives the quality of a schedule differently for different cases. Therefore, an automatic scheduling approach might require several iterations of adjusting the weights of different objectives to obtain a solution that meets the needs of the planners. We propose a multi-phase method to automatize these iterations, where an initial phase produces a solution, and the subsequent phases analyze the quality of the solution and seek to improve it based on various KPIs. We have defined these KPIs based on a dialog with practitioners and their intuition regarding schedule quality. Consequently, this method generates final weights based on the planners' insights, rather than their perception of the relative importance of different objectives. Automatizing this process should result in a less resource intensive scheduling and thereby act as an encouragement for practitioners to incorporate the research in their everyday scheduling.