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The Benefits of Classification: An Appointment Case Study

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It is safe to assume that classifying patients and generating multi-type distributions of service duration, instead of using a general distribution for all patients, would yield a better appointment schedule. One way to generate multi-type distributions is by using data mining. CART, for example, will generate the best tree, from a statistical perspective, nevertheless one could argue that most times, right from the base of the tree, the marginal contribution of each split decreases and at some point, for practical uses it is meaningless to continue further deep into the tree. Thus, from an operational perspective, the question arises –what is the benefit of using the whole tree compared to the much shorter (simpler) tree version? We explore and answer this question using an appointment case study. We start by comparing the operational measurements (i.e., end of day, utilization, idle time and over time) using the whole tree for the appointment scheduling vs. applying the shorter tree versions. The results show that for all measurements there is a benefit in bigger trees until a certain point. After that, we can see some benefit, but it is not statistically significant nor meaningful. We further investigate how well the findings are robust under different daily patients mix. It seems that appointment scheduling based on bigger trees works better on average, but it does not have a relative advantage when patients' mix results in loaded days.

Keywords

CART, Appointment Scheduling, Healthcare

Classification

Both methodology and application

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