

Visual Analytics for Workforce Requirements

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OBJECTIVE: The fit of workforce requirements (i.e., when are how many persons with a specific qualification needed) and actual staffing is a crucial element in designing proper shift systems. Understaffing causes high work pressure and quality problems. Overstaffing leads to avoidable costs. In many service industries (e.g., call-centre, care for elderly, retail) workforce requirements vary over the course of the day, the week, and the year. Therefore, temporal structures of workforce requirements are the basis for designing shift systems.

Corresponding analysis, however, is not straightforward. The main tasks are dealing with missing and erroneous data, and identifying temporal patterns of workforce requirements (for example, influence of holidays and seasons). Often no direct measures of workforce requirements exist, but only several indicators for over- and understaffing (e.g., queue length in a check-in area at the airport, overtime by employees).

Proper visual analytics (i.e., interactive visualisations in combination with (semi-)automatic analytical methods) can help to better understand workforce requirement. Interactions with the data ease its exploration, bring specific aspects into the fore, identify erroneous and missing data, and, thereby, support better analysis and prediction of workforce requirements.

METHOD: We investigated more than 50 existing visualizations that may be used as indicators for workforce requirements and built a coherent collection within [TIS] Time Intelligence Solutions®. The system enables users to apply the visualizations and analytical methods easily to new data sets. In a second step, we organized them in a map of methods to help users ‘find’ relevant visualisations and analytical methods for the specific task at hand. Focus group interviews were conducted to refine this map.

RESULTS: The new visualisations (e.g., time map, GROOVE) helped to identify temporal patterns that were not detected with earlier visualisations. The newly developed organisation of these visualisations in a map helped novices and expert users to find relevant visualisations faster. At the same time visualisations are often related to specific analytical approaches of workforce requirements and with substantial development going on in this field one can expect the map to grow.

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