Use of artificial neural network – ANNET in the estimation of the transit saturation flow, based on the study of intersections of the road system in the cities of Fortaleza and Salvador.

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For this study module was implemented in MATLAB 7.0, with the objective to create various scenarios of the artificial neural network – ANNET using algorithms of different learning, automatic combinations of intermediate layers and functions of transfers. The purpose here was to seek the best architecture for the ANNET to be applied in the estimate of the saturation flow.

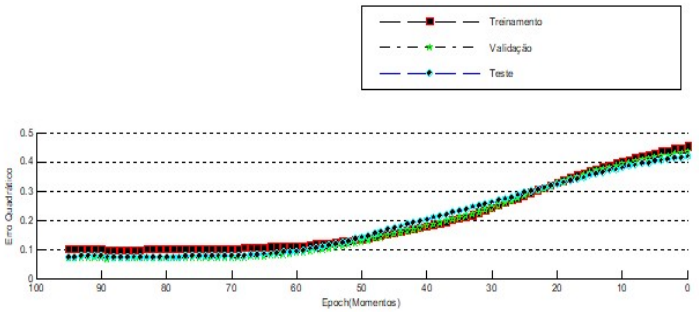
3rd Conference on Statistics and Data Science
Salvador, Brazil (online)
October 28-30, 2021

Verify and analyze the possibility of estimating the saturation flow, from artificial neural networks, as well as the statistical characteristics of these variables for the cities of Salvador and Fortaleza or part of them, and using it, with necessary accuracy (inference) in the information cities, in approaches controlled by traffic lights. In order to investigate the possibility of using neural networks to estimate the FS with data from one region and apply it in the other region.

The database consisted of data collected from the intersections of the cities of Salvador and Fortaleza, such as: grade, width, lane position, traffic composition and volume, movements, turning radius, flow conditions downstream and intersection locations . 96 intersections (2331 occurrences ungrouped at cycle level) were used individually to learn the networks for the city of Salvador and 8 intersections (147 occurrences ungrouped at cycle level) for the city of Fortaleza. The database was aggregated from the representative occurrences of the FS conditions per lane cycle (pattern recognition).

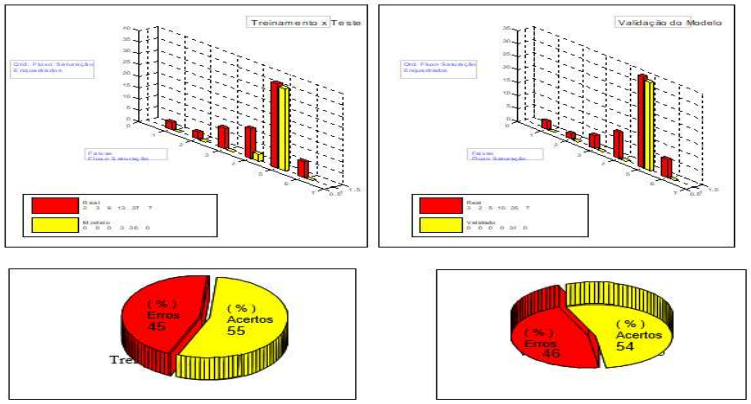
The poor, noisy or incomplete data quality led to the application of a different treatment in data modeling, that is, a processing based on the recognition of classification patterns. This procedure allowed the network to reflect the complexity of the systems more freely.

Gráfico 3 - Minimização do erro treinamento, validação e teste da RN, como reconhecimento de padrão, na simulação I-Fortaleza (117_1).

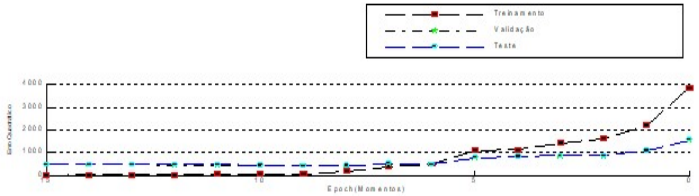


Fonte: Elaborado pelo Autor

Gráfico 4– Fluxo de Saturação Real e Estimado (Modelo) com percentual de erros e acertos para treinamento, validação e teste da RN, como reconhecimento padrão, na simulação I-Fortaleza (117_1).

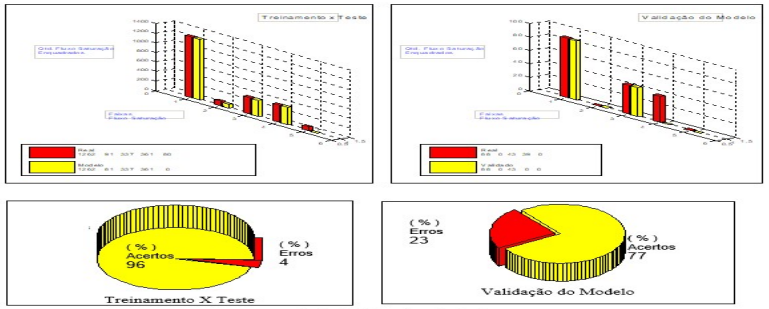


Fonte: Elaborado pelo Autor



Fonte: Elaborado pelo Autor

Gráfico 6 - Fluxo de Saturação Real e Estimado (Modelo) com percentual de erros e acertos para treinamento, validação e teste da RN, como reconhecimento padrão, na simulação II-Salvador (473_1).



Fonte: Elaborado pelo Autor

Results and Conclusions

The built models showed promise for estimating the saturation flux when there are no conditions to measure this factor in the field or when local data are not available.

In these cases, recalibration of the model with regional data can also be performed as previously tested. Once the model is designed to ensure the predictive capacity of ANNs, the built system can in fact be explored as an analysis tool with strong practical appeal, allowing for an accuracy in the generalized estimation of the saturation flow.