TensorFlow is a free and open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library, and is also used for machine learning applications such as neural networks

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A retrospective data set of patients (n=76) who underwent CAS from 2007 to 2014 was used as input (training cohort) to a back-propagation ANN using TensorFlow platform. PHD was defined when systolic blood pressure was less than 90mmHg or heart rate was less 50 beats/min that lasted for more than one hour. The resulting ANN was prospectively tested in 33 patients (test cohort) and compared with MLR or SVM models according to accuracy and receiver operating characteristics (ROC) curve analysis.

No significant difference in baseline characteristics between the training cohort and the test cohort was observed. PHD was observed in 21 (27.6%) patients in the training cohort and 10 (30.3%) patients in the test cohort. In the training cohort, the accuracy of ANN for the prediction of PHD was 98.7% and the area under the ROC curve (AUROC) was 0.961. In the test cohort, the number of correctly classified instances was 32 (97.0%) using the ANN model. In contrast, the accuracy rate of MLR or SVM model was both 75.8%. ANN (AUROC: 0.950; 95% CI [confidence interval]: 0.813-0.996) showed superior predictive performance compared to MLR model (AUROC: 0.796; 95% CI: 0.620-0.915, p<0.001) or SVM model (AUROC: 0.885; 95% CI: 0.725-0.969, p<0.001).

The ANN model seems to have more powerful prediction capabilities than MLR or SVM model for persistent hemodynamic depression after CAS. External validation with a large cohort is needed to confirm our results [1].

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Jeon JP, Kim C, Oh BD, Kim SJ, Kim YS. Prediction of persistent hemodynamic depression after carotid angioplasty and stenting using artificial neural network model. Clin Neurol Neurosurg. 2017 Dec 5;164:127-131. doi: 10.1016/j.clineuro.2017.12.005. [Epub ahead of print] PubMed PMID: 29223792.