Application of machine learning to construction injury prediction

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1 Abstract

Construction safety decisions need to be based on objective, empirical data. However, machine learning (ML) has not yet been employed in this context to address safety concerns. In this paper, we apply advanced machine learning models (Random Forest and Stochastic Gradient Tree Boosting) to a detailed safety outcomes dataset collected from textual construction injury reports with the help of a natural language processing (NLP) tool. The models demonstrate high accuracy in predicting injury types and affected body parts($0.236 \leq RPSS \leq 0.436$). The results demonstrate that injuries are not random occurrences; thus, construction safety should be studied empirically, rather than relying solely on subjective data or expert opinions. Predictions about injury severity were less successful, nevertheless, the importance of additional details, such as environmental energy levels, has been indicated. Our research made a significant contribution to providing reliable probabilistic forecasts of accident consequences. A similar data-driven approach had been absent in the field of safety science.

2 References

1. Tixier, Antoine J.-P.; Hallowell, Matthew R.; Rajagopalan, Balaji; Bowman, Dean . (2016). Application of machine learning to construction injury prediction. Automation in Construction, 69(), 102–114. doi:10.1016/j.autcon.2016.05.016