

O 49. EXAMINING RELATIVE VARIABLE IMPORTANCE (RIV) AND ESTIMATION THE STRENGTH OF INTERACTION EFFECTS (SIE) OF PARTICULATE MATTER (PM₁₀) CONCENTRATION AT CITY OF KONYA, TURKEY

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ABSTRACT: One of the most important climatic elements in a certain area is snow. The amount and depth of this paper investigated the use of stochastic boosted regression trees (BRTs) to draw an inference about particulate matter (PM₁₀) concentrations at Konya city in Turkey. A total one calendar year 2020 data of 8784 hourly PM₁₀ concentrations, gases (Nitrogen Dioxide (NO₂), Sulphur Dioxide (SO₂) and Carbon Monoxide (CO)) data were gathered from the Konya City air quality monitoring station and the meteorological data wind speed (ws), wind directions (wd), temperature (temp), pressure and relative humidity (rh)) data were captured from Konya Airport meteorological station. Data were analysed statistically by using a comprehensive package, R Software and its packages to understand the variability and trends. An artificial intelligent approach named the Stochastic Boosted Regression Trees technique were used as a response variable and time systems and meteorological parameters were analysed in advance stage. The BRT model development process with algorithm development were done to achieved the lowest root mean squared error (RMSE) with high coefficient of determinant (R²) value for the linear relationship between the number of samples and number of trees (*nt*) of 4485 for OOB, 9999 for CV and 8103 for test were found. **The performance** of the boosting model was assessed, by comparing the fraction of predictions within two factor (FAC2), coefficient of determination (R²) and the index of agreement (IOA) of the model. It was found that the FAC2 was 0.82, the R² values were above 0.50 (R = 0.74), and Index of Agreements (IOA) was 0.70 which fall range are within an acceptable for model performance. It was found that **Relative Variable Importance (RIV)** that influenced PM₁₀ was SO₂ (27 %), O₃ (23.5 %), NO₂ (20.6 %) and temperature (10.36). This can be link to the location of these chosen station is co-inside closed to an arterial road that link these cities to the other, whereby a lot of motor vehicles the source emission strength due to city development in Konya City. The Estimation of the strength of interaction effects (SIE H-Index) can assess the relative strength of interactions variables were found up to 0.27 for CO and O₃ interactions, followed by 0.23 for Temperature and Humidity, and 0.124 for NO₂ and SO₂. Results showed that the model developed was within the acceptable range and could be used to understand particles formation and identify important parameters that influence for estimating particle concentrations for the year 2020 in Konya city and this can be applied to other datasets.

Keywords: *Boosted regression trees, Air pollution, Relative Variable Importance (RIV), strength of interaction effects (SIE)*