113_Artificial Intelligence for Prediction of Performance and Emission Parameters of CI Engine using Bio-Fuel

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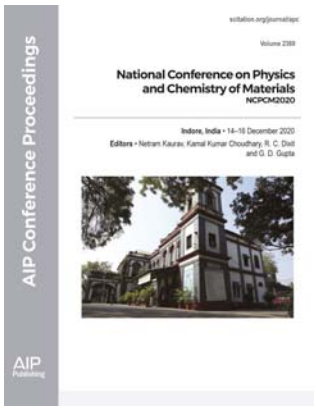

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These proceedings will be of interest to: Scientists, researchers, PhD students, post-doctoral fellows, condensed matter physicists, materials scientists, and nanotechnologists.

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Artificial Intelligence for Prediction of Performance and Emission Parameters of CI Engine Using Bio-Fuel

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Abstract. The objective of this work is to find the performance and emission parameter of different blends of Karanja biodiesel with diesel and compare these parameters with pure diesel. This study investigates the potential of Karanja oil as a source of biodiesel. The objective of this work is to find the performance and emission parameters of 10 %, 20 %, 30 %, 40 %, and 50 % of blends with biodiesel and compared various parameters with diesel. The results showed that Brake Thermal Efficiency (BTE) decreases with an increase in the percent of biodiesel and Brake Specific Fuel Consumption (BSFC) decreases with an increase in the percent of biodiesel. Hydrocarbon (HC) and carbon monoxide (CO) emission reduces with an increase in blend percent whereas Nitrous oxide (NOx) emission increases with an increase in blend percent. Neural networks obviate the need to use complex mathematically explicit formulas, computer models, and impractical and costly physical models. In this work we use Neurosolution software for prediction of performance and emission parameters, separate models were developed for performance parameters as well as emission parameters. To train network, load, blend percentage, calorific value, the viscosity of fuel & air-fuel ratio was used as input value whereas engine performance parameters like brake thermal efficiency, brake specific fuel consumption & exhaust gas temperature were used as output value for performance model and engine exhaust emission such as NOx, CO, and HC values were used as the output parameters for emission model. Artificial Neural Network (ANN) results showed that there is a good correlation between the ANN predicted values and the experimental values for various engine performance and exhaust emission parameters. It is observed that the ANN model can predict the engine BTE, BSFC with a correlation coefficient of about 0.998435668, 0.990616392, and 0.993346689 respectively for performance model and emission model CO, HC and NOx predict with a correlation coefficient of 0.986098699, 0.991243454 & 0.9855593.

NOMENCLATURE

BTE	Brake Thermal Efficiency	C_p	Specific heat at constant pressure	HS	Hybrid System
BSFC	Brake Specific Fuel Consumption	C_v	Specific heat at constant volume	IP	Indicated Power, kW
HC	Hydrocarbon	D	Diameter of cylinder	M_f	Mass of fuel in the cylinder
CO	Carbon monoxide	DI	Direct Injection	MSE	Mean Square Error
NOx	Oxides of Nitrogen, ppm	C_v	Specific heat at constant volume	N	Speed (RPM)
ANN	Artificial Neural Network	FL	Fuzzy Logic	PME	Pongamia Methyl Ester
CI	Compression-Ignition	GA	Genetic Algorithms	R	Coefficient of Correlation

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This is to certify that Dr./Prof./Mr./Ms. **GANESH S. WAHILE** *from* **Vidyavardhini College of Engineering & Technology, Vasai** *has participated in the National Conference on Physics and Chemistry of Materials (NCPCM2020) during 14th- 16th December, 2020 and presented a paper entitled* **Artificial Intelligence for Prediction of Performance and Emission Parameters of CI Engine using Bio-Fuel** .

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