National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Return Seminar- Development of Automated Millet Classification system using Computer Vision and Machine Learning
Speaker	: Sagar Loni
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Venue	: CH-306
Date and Time	: 08 Jan 2025 (16.40)
Abstract	: Objective: Development of classification model for millets using computer vision and machine learning Methodology: The dataset (7000 images) of 14 different classes of major and minor millets (processed and unprocessed) images were prepared using computer vision system. Four pre-trained models (MobileNet, InceptionResNetV2, InceptionV3, DenseNet201) were selected for classification task. These models are trained for 50 epochs and were assessed using accuracy, precision, recall, and F1-score. The comparative analysis also employed training time, AUC-ROC, and convergence metrics. The fine-tuning procedure was finalized with adjustments to the learning rate, the number of trainable layers, and the batch size. In addition, python language based scikit-learn library was used for automation of computer vision system. Results and Conclusions: Among the all four models MobileNet and DenseNet201 models were exhibited same results during transfer learning, with higher accuracy of 0.971 each and losses of 0.116 and 0.130, respectively. There was no significant difference between these two models for the precision, recall, F1 score, and AUC-ROC values. MobileNet model was selected for fine tuning on the basis of loss (0.116), model size (16 MB) and training time (18.59 min). The fine-tuned model was optimised with the learning rate of 1×10−5, 10 trainable layers and batch size of 32 with accuracy of 0.992 and loss of 0.110. Furthermore, the fine-tuned model was validated with unknown datasets.