

Ref	Title	Year	Dataset description	Methods	Results	Pros	Cons	Future Work
1	Classification of types Roasted Coffee Beans using Convolutional Neural Network Method	2024	<b>Total Images:</b> 1600  <b>Dark beans:</b> 400 <b>Green beans:</b> 400 <b>Light beans:</b> 400 <b>Medium beans:</b> 400  <b>URL:</b> <a href="https://www.kaggle.com/datasets/gpiosenka/coffee-bean-dataset-resized-224-x-224">https://www.kaggle.com/datasets/gpiosenka/coffee-bean-dataset-resized-224-x-224</a>	CNN	74.26 %	Mobile NetV2 allows efficient deployment on mobile/edge devices	No mention of data augmentation or class balance handling.	Use larger and more diverse datasets with realworld conditions.  Apply data augmentation and regularization to reduce overfitting.
				Mobile NetV2	94.79 %			
				VGG19	90.4%			
2	Enhancing coffee bean classification: a comparative analysis of pre-trained deep learning model	2025	<b>Total Images:</b> 1600  <b>Dark beans:</b> 400	AlexNet	95.75 %	Delivers a comprehensive comparison across 10+ pretrained CNN architecture	High accuracy may overlook real world complexities, lacking tests on	Extend evaluation to include external or in-field datasets to validate model generalization.
				LeNet	60.75 %			

			<b>Green beans:</b> 400 <b>Light beans:</b> 400 <b>Medium beans:</b> 400  <b>URL:</b> <a href="https://www.kaggle.com/datasets/gpiosenka/coffee-bean-dataset-resized-224-x-224">https://www.kaggle.com/datasets/gpiosenka/coffee-bean-dataset-resized-224-x-224</a>	HRNet Google Net Mobile V2 ResNet (50) VGG Darknet Dense Net	96.50 % 97.75 % 99.25 % 58.05 % 100% 98.25 % 97.75 %	s, guiding optimal model selection	varied environments or unseen data.	
3	Deep Convolutional Neural Network for Coffee Bean Inspection	2021	<b>Total images:</b> 4626  <b>Good beans:</b> 2150  <b>Bad beans:</b> 2476	ResNet (18) Lightweight Student Model without KD	93% 73%	Lightweight, explainable, and energy-efficient CNN model with 91% accuracy, ideal for embedded systems.	Limited dataset diversity (only 4,626 images) and low generalization across varied real-world lighting or background conditions.	Expand dataset with varied conditions; enhance robustness and deploy system on low-power devices like Raspberry Pi or Jetson Nano.

				3.Light weight Student Model with	91%			
4	Smart agriculture: real time classification of green coffee beans by using a convolution neural network	2020	<b>Total images:</b> 72,000  <b>Good beans:</b> 36,000  <b>Bad beans:</b> 36,000	Custom CNN	94.63 %	High accuracy system (94.63%) with real-time defect detection using CNN and IP camera integration.	False positive rate (bad bean as good): 4.41%	Add back-side inspection, robotic sorting, and deploy on low-cost edge devices like Jetson Nano.
5	Custom experimental dataset of coffee beans (images in RGB, converted to grayscale)	2025	<b>Total Images:</b> 900  3 Categories	ResNet-101	100%	Extremely high accuracy (100%) achieved using transfer learning with ResNet-101 and feature integration	Dataset is experimental and small; high accuracy may not generalize well to real-world or diverse data.	Combine multiple transfer learning techniques and fine-tune specific CNN layers to enhance generalization and scalability.
6	An Intelligent System for Coffee Grading and Disease Identification	2020	<b>Total images:</b> 562	CNN	89.1%	Effective even with small, real-world datasets using transfer learning and ensemble CNNs.	Performance affected by dataset shift due to inconsistent imaging conditions.	Develop better domain adaptation strategies to handle dataset shift across sources.

7	Coffee Grading with Convolutional Neural Networks using Small Datasets with High Variance	2020	<b>Total Image:</b> 2109  12 Categories	Cascade d CNN with CS Ensemble	89.1%	Ensemble methods reduce variance and improve performance	High sensitivity to initial training conditions	Treat problem as regression instead of classification
8	Refining Content Based Segmentation for Prediction of Coffee Bean Quality	2023	<b>Total Image:</b> 800	Hybrid Model (Region Growing + CBIR using GLCM texture features)	85.4%	Improved precision vs previous traditional methods	Moderate dataset size (800 images total)	Compare with deep learning (CNN-based) approaches

### Reference

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