

# Recipe Generation from Food Images Using Deep Learning

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**Abstract:** Food imagery has become a dominant mode of content sharing on digital platforms, inspiring interest in automatic food recognition and recipe generation. This research explores the possibility of converting a food image into a usable cooking recipe—including a list of ingredients and detailed preparation instructions—using deep learning. A comprehensive system is proposed that integrates convolutional neural networks (CNNs) for image feature extraction, multi-label classification for ingredient detection, and transformer-based models for instruction generation. The system leverages inverse cooking models and attention mechanisms to produce coherent and accurate recipes. Evaluation of the model shows an overall recipe generation accuracy of 86%, indicating the potential of deep learning in culinary applications and smart kitchen systems.

**Keywords:** Deep learning, food recognition, recipe generation, image-to-text, inverse cooking, neural networks

