DeepOven: Volume and Quantity Estimation in Cooking

The Capstone Experience

Team Whirlpool

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Project Overview

• Whirlpool is creating a smart oven to make cooking easier and more enjoyable for customers
  • Livestream view of the cavity from the Whirlpool mobile app
  • Food recognition
  • Doneness detection
  • Initial cook time estimation
• DeepOven is a proof of concept that initial cook time can be estimated
• Software can detect food volume, quantity, and rack level using a camera inside the oven cavity.
• These variables will be used in conjunction with Whirlpool’s existing algorithms to calculate an initial cook time estimation
• Visualization of the food volume, quantity, and rack level will be displayed through the web for the Whirlpool development team
System Architecture

Frontend
- React
- JavaScript

Backend
- Flask
- PyTorch
- ML Model
- Python

Node

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Team Whirlpool Alpha Presentation 3
Home Screen

DeepOven: Volume and Quantity Estimation in Cooking
Calculation Results Screen

DeepOven: Volume and Quantity Estimation in Cooking

- Volume Estimation
  Result: 35 cm³

- Food Count
  Result: 1 Food Object Found

- Rack Level Detection
  Result: Detected at Rack Level 2
YOLOv8 Quantity Detection
3D Point Cloud Rendering
What’s left to do?

• Create 3D point cloud meshes of food to train the 3D reconstruction model
• Annotate more images of the oven cavity to train our YOLOv8 quantity detection model to be more accurate
• Provide more training data for the rack level detection CNN model to improve accuracy
Questions?