

Automatic Estimation Of Food Calories And Nutrients

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Objectives

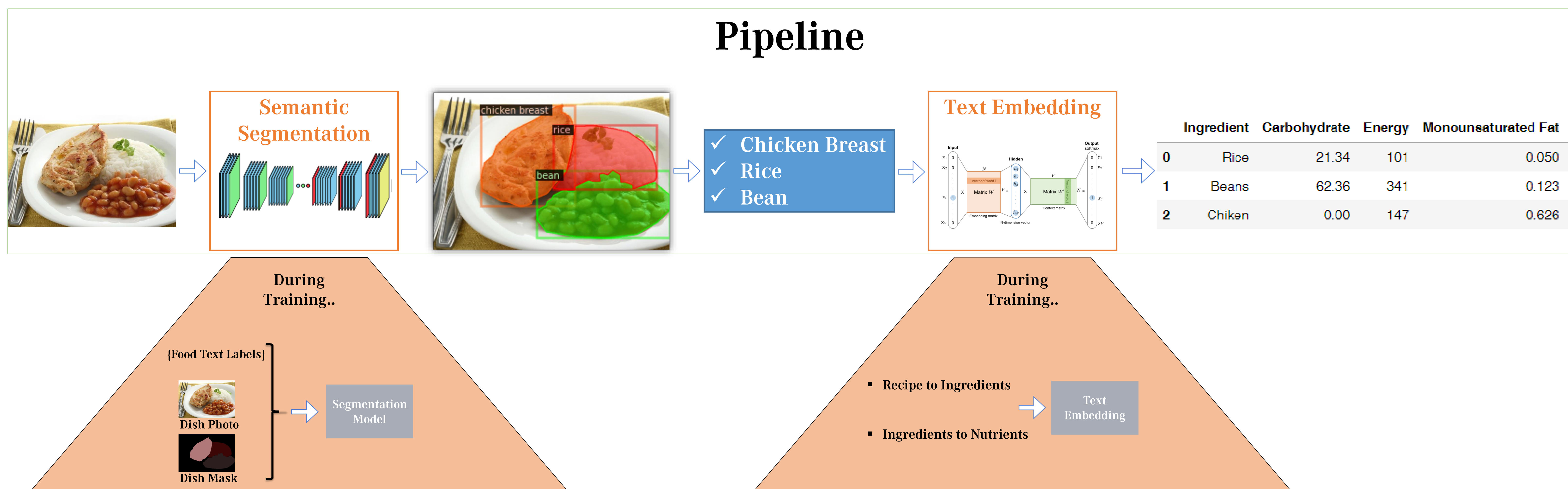
- Design algorithms for food intake tracking of medical patients, as diet influences on the treatment; also of a more general interest as a tool to control healthy diet
- Reduce the burden of manually weighing and calculating what we eat

Methods

- Images are more accessible and great way to show what we eat
- The advance in ML and CV will help leverage the burden
- Explore fine-grain Segmentation to gain better insight on the dish photo
- Multi Modality, between Text and Images, enriches Learning and Prediction of Calories and Nutrients

State of the Art

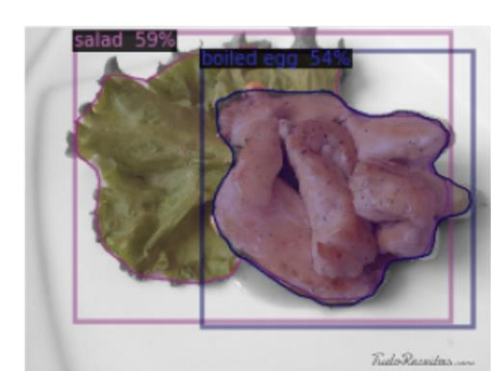
- Datasets with only Classes of Food Images:
 - Food101, iFood, Recipe1M+[5], pic2Kcal[6]
- Datasets with Segmentation Masks:
 - Food201, Myfood, FoodPix[3]
- Less Segmentation data compared to Classification
- Multi-modality
 - Ingredients and Recipes names for food image Classification[4]
 - Less present in Segmentation



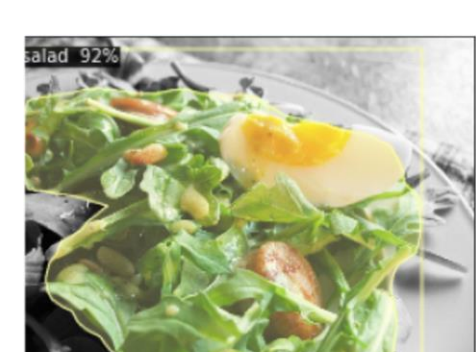
Some Challenges



Over Segmentation



Good Segmentation
But misclassification



Missing Instances

Forthcoming Research

- Seeking domain adaptation in the form of a generalization to a variety of cuisines
- Deeper investigation of multimodal approaches
- Tackling the Challenge of Food Volume Estimation
- Building a comprehensive dataset with Segmentations Masks and Recipe/Ingredients information
- The aim for a Realtime output with Videos

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References

- [1] U.S Department of Agriculture food database. <https://fdc.nal.usda.gov/downloaddatasets.html>.
- [2] Kaiming He et al. Mask r-cnn, 2017, <https://arxiv.org/pdf/1703.06870.pdf>
- [3] Kaimu Okamoto et al. Uec-foodpix complete: https://mm.cs.uec.ac.jp/uecfoodpix/210110okamoto-ka_0.pdf
- [4] Amaia Salvador et al., Learning cross-modal embeddings for cooking recipes and food images, 2017.
- [5] Amaia Salvador et al. Recipe1M dataset, <http://pic2recipe.csail.mit.edu/>
- [6] Robin Ruede et al., pic2Kcal, <https://arxiv.org/pdf/2011.01082v1.pdf>