



# Food ads on Instagram

A new ads targeting algorithm based on user-generated content

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## Opportunity

I am a Data Scientist at Instagram and I've been asked to come up with an idea to increase the Ads Revenue of Instagram. The main objective is therefore to build a tool allowing businesses to target users with very relevant ads, therefore creating both a pleasant in-app experience for users and simultaneously improving the targeting and increasing revenues for businesses.

Social media is so pervasive in today's world and is part of our everyday life. So, the best way to get to know users - and to improve ads targeting - is to start from user-generated content. If I post a photo of a ravioli dish on Instagram, it's very likely that I like ravioli and I enjoyed the experience of eating ravioli so much that I was willing to share my experience on Instagram. Hence, I could be a very good target for an ads campaign by an Italian restaurant in NYC or for Barilla (a pasta producer).

As part of my prototype, I will focus on building a tool for **food-related businesses** (e.g. restaurants, subscription boxes, food producers). I will leverage user-generated content in the form of images posted on Instagram to first classify the image (e.g. *ravioli* in the example above) and then build a recommendation system of similar dishes that could be appealing to the specific user (e.g. *tortellini* are pretty similar to *ravioli*) and, hence, could unlock targeting opportunities for other advertisers.

## Impact Hypothesis

### ADVERTISERS ON INSTAGRAM

If advertisers can improve their targeting algorithm, they will serve relevant ads to users who, in turn, will be more likely to convert and act on those ads (e.g. purchase the pasta box or reserve a seat at the advertised Italian restaurant). More accurate targeting will increase the advertiser's revenues and, in turn, Instagram ads revenues and advertisers' retention on the Instagram ads platform.

### INSTAGRAM

By better understanding user-generated content (images), Instagram will be able to serve more relevant organic content to users on Reels. This will increase the number of Daily Active Users (DAU), Time Spent in App and, ultimately, app stickiness.

## Data

I will collect image data from the [Food 101](#) dataset, containing 101000 images labeled according to 101 food categories.

For each class, 250 manually reviewed test images are provided as well as 750 training images. On purpose, the training images were not cleaned, and thus still contain some amount of noise - which comes mostly in the form of intense colors and sometimes wrong labels. All images were rescaled to have a maximum side length of 512 pixels.

## Solution Path

I am planning to follow the following solution path:

- Image Classification
  - Set up a GPU on Google Colab
  - Conduct initial EDA
  - Preprocess the image data
  - Use Convolutional Neural Networks and transfer learning to conduct the image classification
  - Potentially test some other pre-trained classification models
  - Visualize the results
- Recommendation Engine
  - Build a recommendation engine based on images using the [Deep AI Image Similarity API](#)
  - Productize the recommendation engine on streamlit

## Tools

For general data manipulation, modeling and visualization, I will use pandas, numpy, and scikit-learn.

To conduct image classification through neural networks I will use keras.

To build the recommendation engine I will use the [Deep AI Image Similarity API](#).

To productize the recommendation engine I will use streamlit.

## MVP Goal

As an MVP, I am planning to present a preliminary version of the image classification algorithm and of the recommendation engine.