Magical Rice Bowl: A Real-Time Food Category Changer

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Project HP

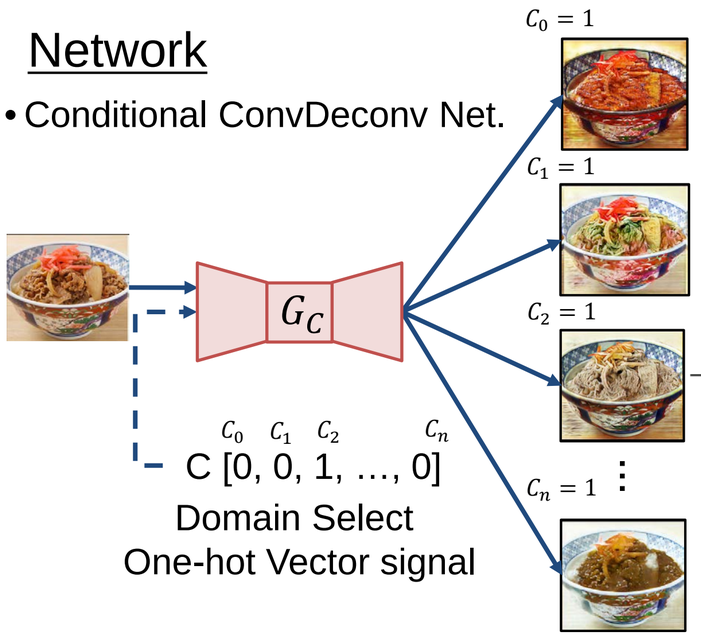
Overview

Multi-Domain Image-to-Image Translation at Food Domain

-Based on a StarGAN[1] with a large-scale food image data collected from the Twitter Stream.

Network

• Conditional ConvDeconv Net.



• We used 230k food images of ten kinds of typical Japanese foods.

• We limited to foods in a bowl.

Table 1: training data

category	image number
chilled noodles	13,499
meat spaghetti	7,138
buckwheat noodle	3,530
ramen	74,007
fried noodles	24,760
white rice	21,324
curry rice	34,216
beef bowl	18,396
eel bowl	5,329
fried rice	27,854
TOTAL	230,053

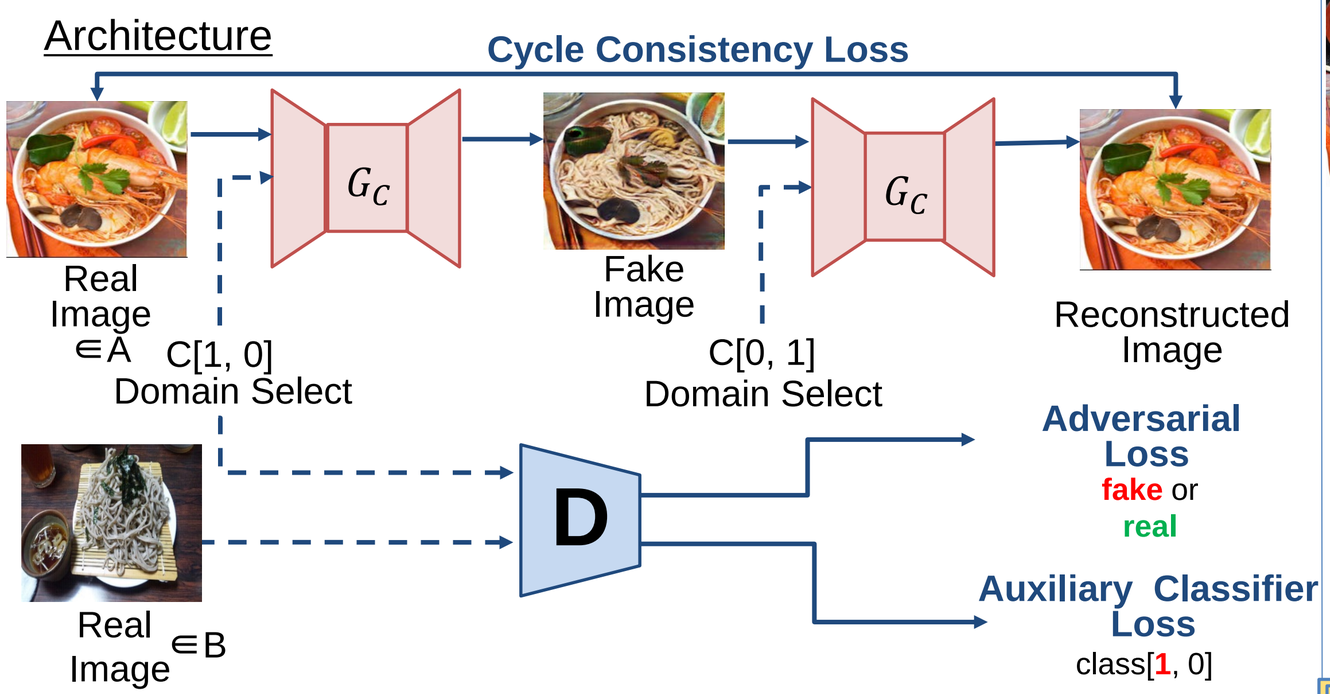
Background

There are many works where **letters** and **faces** are well generated and translated by GANs.

➡ However, there are few cases of **Food**. So, we challenged **Food transformation**.

Methods

Architecture



-We used StarGAN[1] architecture. Combining loss functions of [2] and [3].

$$L_{acl}^{real} = \mathrm{E}[-logD_{acl}(c'|x)] \qquad L_{acl}^{fake} = \mathrm{E}_{x,c}[-logD_{acl}(c|G(x,c))]$$

$$L_D = L_{adv} + \lambda_{acl}L_{acl}^{real} \qquad L_G = L_{adv} + \lambda_{acl}L_{acl}^{real} + \lambda_{ccl}L_{ccl}$$

$$L_{ccl} = \mathrm{E}_{x,c,c'}||x - G(G(x,c),c')||_1$$

References

[1] Y. Choi, M. Choi, M. Kim, J. Ha, S. Kim and J. Choo, StarGAN: Unified Generative Adversarial Networks for Multi-Domain Image-to-Image Translation, CVPR2018.

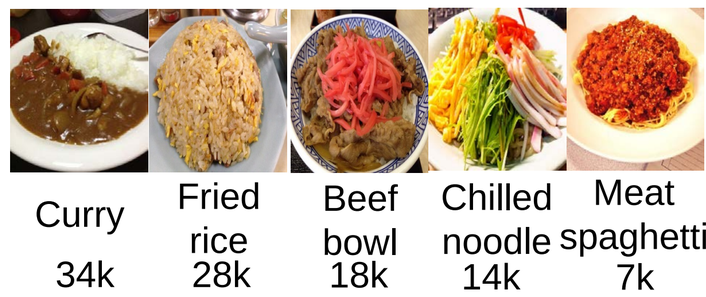
[2] J. Y. Zhu, T. Park, P. Isola and A. A. Efros, Unpaired Image-to-Image Translation using Cycle-Consistent Adversarial Networks. ICCV2017.

[3] A. Odena, C. Olah, and J. Shlens. Conditional Image Synthesis With Auxiliary Classifier GANs. ICML2017.

Experiments

Datasets

Diversity in datasets makes it difficult to generate clear results…



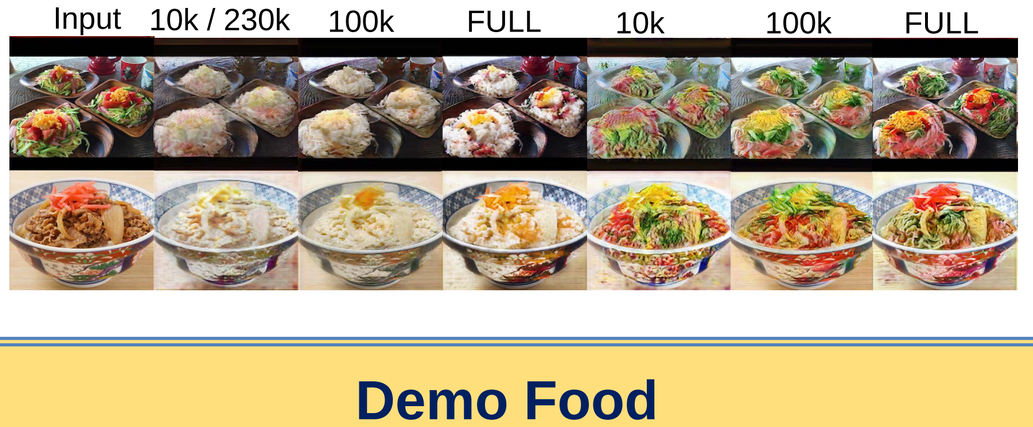
Curry 34k | Fried rice 28k | Beef bowl 18k | Chilled noodle 14k | Meat spaghetti 7k

We focused on **Only Bowl food !**

Ramen 74k | Rice 25k | Buckwheat noodle 3.3k | Eel bowl 5.3k | Fried noodle 25k

Results

The quality heavily depends on the number of training samples.



Demo Food

Bibimbap

Dak galbi

BBQ