BMVC 2021

RUTGERS

Ingredients

View Attributes

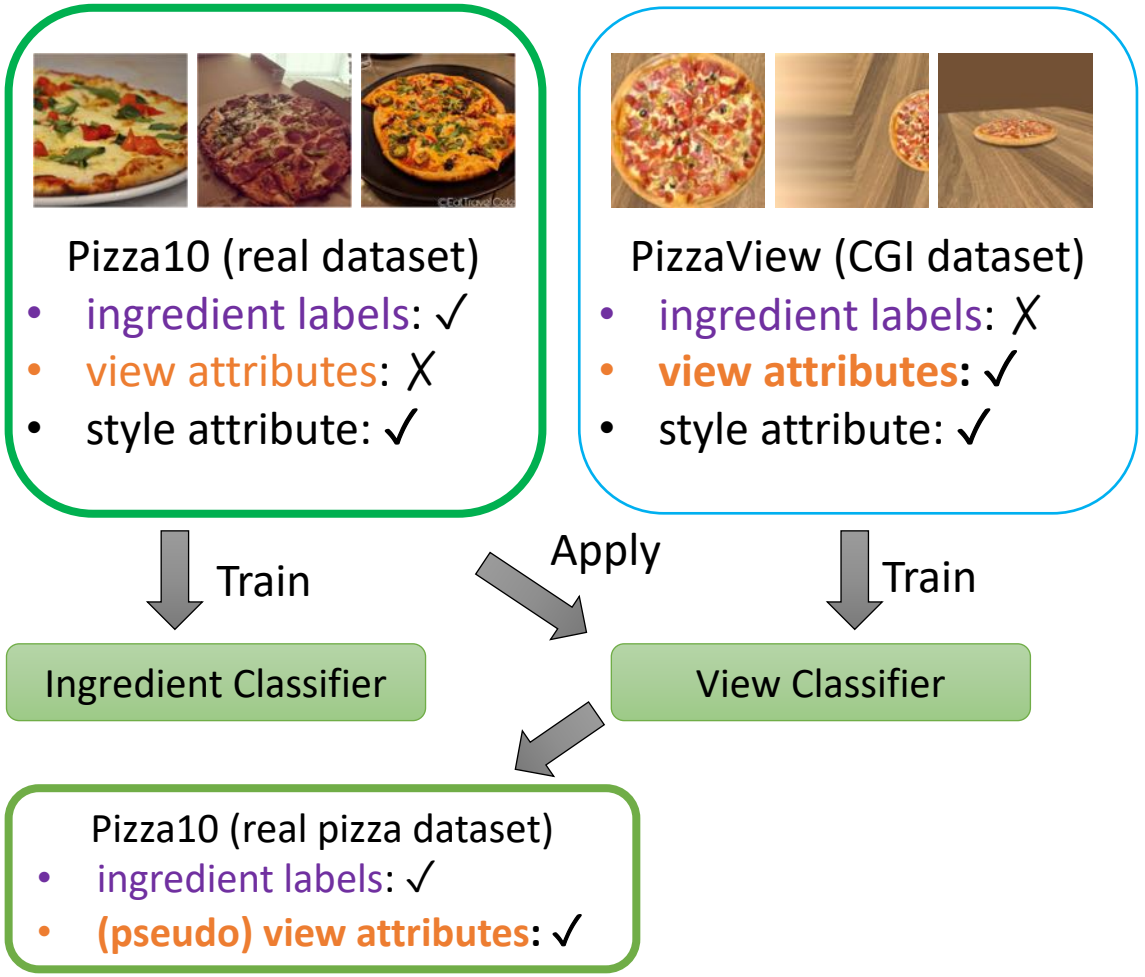
Styles

Multi-attribute Pizza Generator

Cross-domain Attribute Control with Conditional StyleGAN

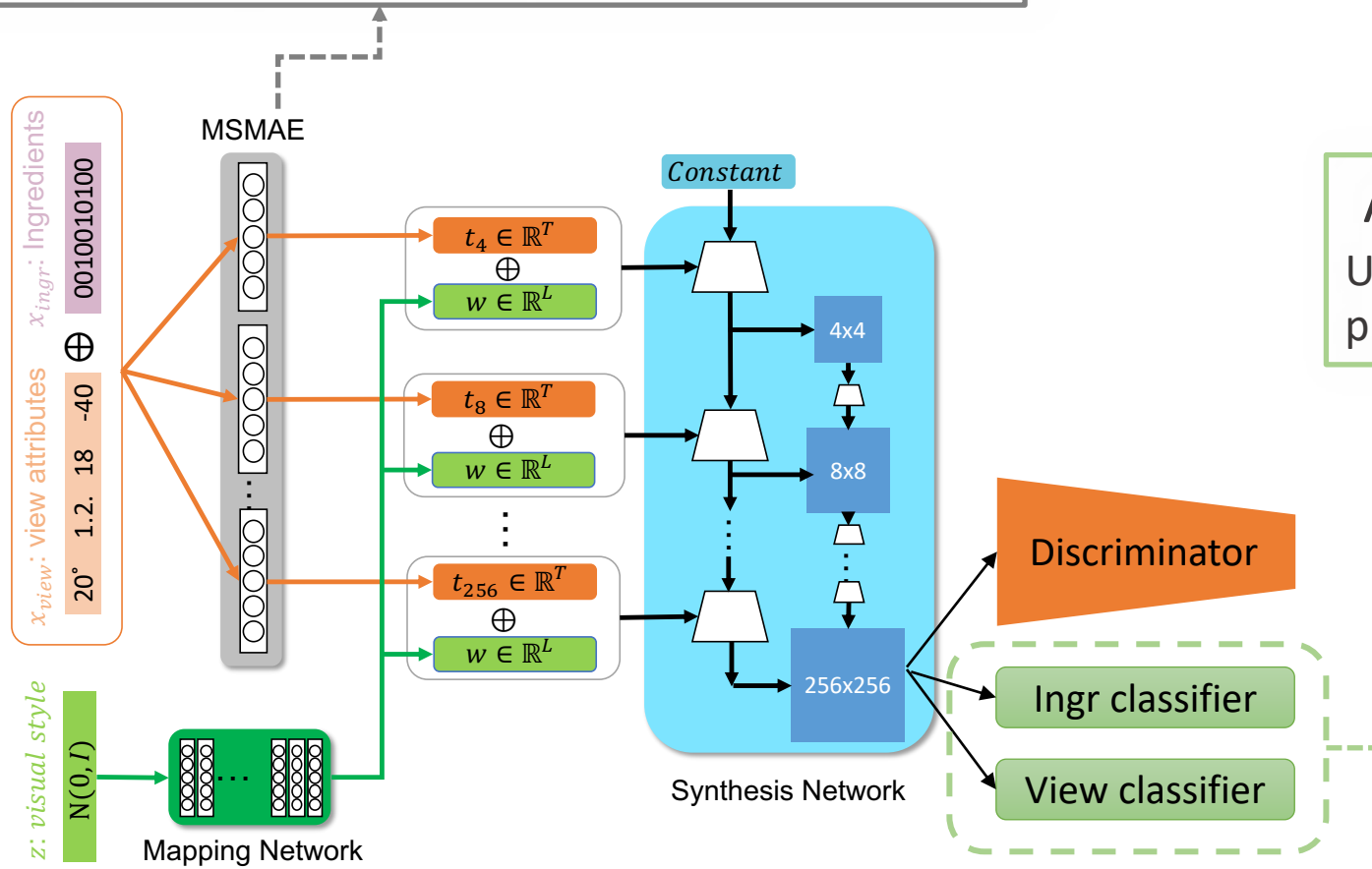
Fangda Han, Guoyao Hao, Ricardo Guerrero, Vladimir Pavlovic

Cross-Domain Training



MSMAE: Multi-Scale Multi-Attribute Encoder

- Conditioned on discrete ingredient labels, continuous view labels, and visual style
- Learn label embedding for each scale (resolution) separately

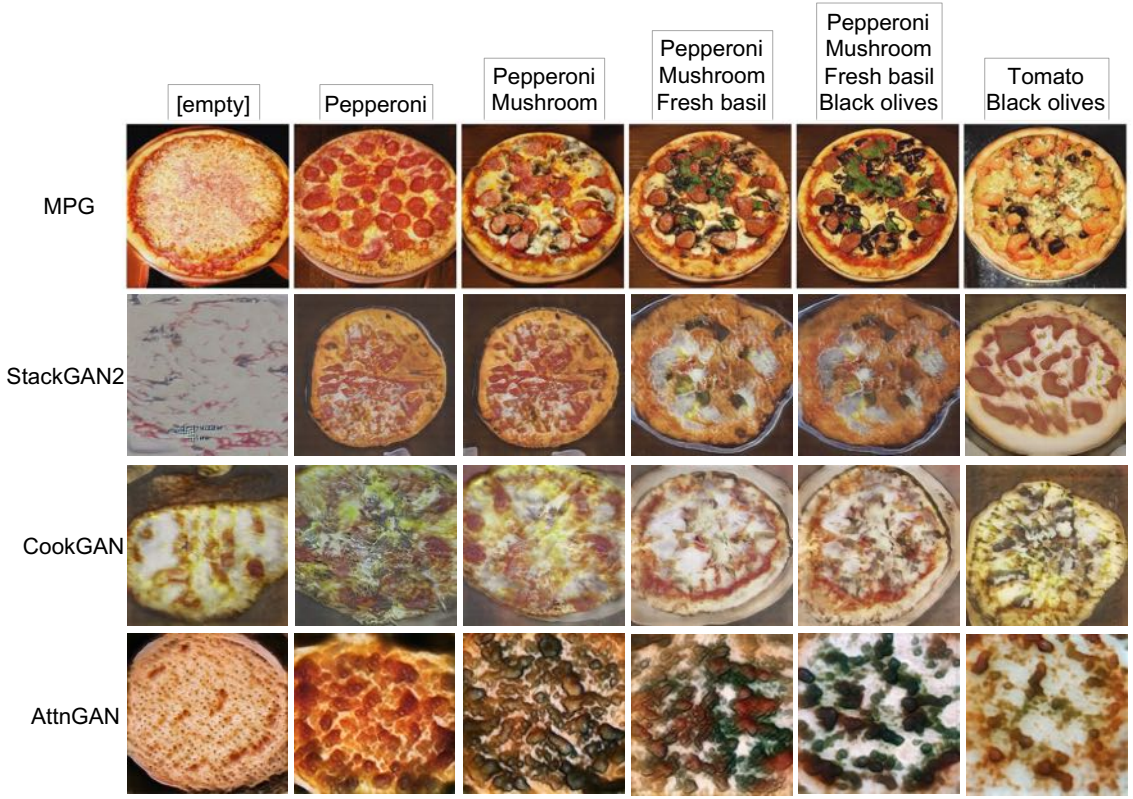


AR: Attribute Regularizers

Use attribute classifier trained in previous step to regularize image

Results

Model	FID↓	mAP_{ingr} ↑	$RMSE_{angle}$ ↓	$RMSE_{scale}$ ↓	$RMSE_{dx}$ ↓	$RMSE_{dy}$ ↓
StackGAN2 [30]	63.51	0.3219	-	-	-	-
CookGAN [1]	45.64	0.2796	-	-	-	-
AttnGAN [29]	74.46	0.5729	-	-	-	-
MPG	**7.44**	**0.9998**	**3.39**	**0.09**	**4.28**	**4.09**
MPG-MSMAE	8.13	0.9987	3.69	0.16	4.76	4.24
MPG-MSMAE *	9.37	0.9867	5.32	0.21	6.94	9.12
MPG-AR	7.48	0.2404	17.04	0.34	15.54	14.94
ingr_cls on *Pizza10*	-	0.6804	-	-	-	-
view_reg on *PizzaView*	-	-	1.70	0.03	1.81	1.84



Interpolation

Ingredients

View Attributes

Styles

Contribution

Real dataset – Pizza10
(ingredient attributes)

3D-based dataset - PizzaView
(geometric attributes)

MPG
(MSMA-Encoder + Attrib Reg)

leverage two domains (real+3d), which have different labeled attributes, with different attribute ranges,

project|code|demo: http://foodai.cs.rutgers.edu

SCAN ME