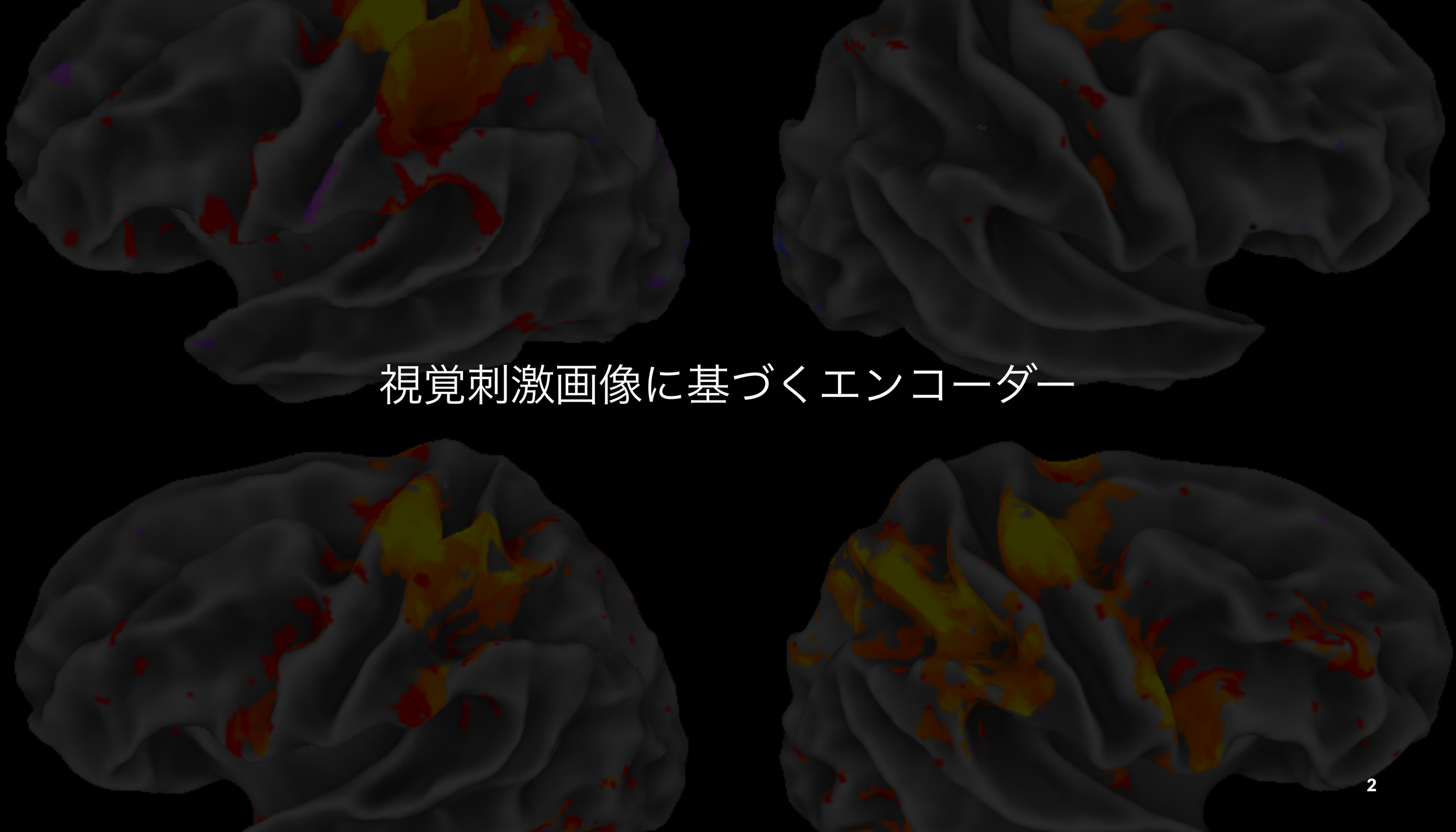
実データで学ぶ人工知能講座

成果発表

秋月佑太



視覚刺激画像に基づくエンコーダー

視覚刺激画像に基づくエンコーダー

特徴量の組み合わせを$3 \cdot 6 \cdot (16 + 64 + 256) = 6048$種類用意する。

```
freqs = [i/max(PIX_W,PIX_H) for i in [16, 32, 64]]

dirs  = [math.pi * i for i in [0, 1/3, 3/2, 1/2, 4/3, 5/3]]

grids = [4, 8, 16]
```

```
def get_X(params, grid_h, grid_w):

    X_tr = fb.G2_getfeatures(ims=raw_tr, fil_paras=params,
                             gridshape=( grid_h, grid_w),
                             mode="reflect", cval=0)

    X_te = fb.G2_getfeatures(ims=raw_te, fil_paras=params,
                             gridshape=(grid_h, grid_w),
                             mode="reflect", cval=0)
    return X_tr, X_te

X_tr_tmp, X_te_tmp = get_X(myparas, mygrid_h, mygrid_w)

X_tr = np.concatenate((X_tr, X_tr_tmp), axis=1)
X_te = np.concatenate((X_te, X_te_tmp), axis=1)
```

計算が終わりそうにないことが判明

フィルターを絞っていこうと思います

転移学習

転移学習

- モデルを変える（VGG16→InceptionV3）
- FC層を増やす（２層→３層）
- バッヂサイズを変える（64→16, 32, 128）
- 目的関数を変える（SGD→Adam, RMSprop）

Accuracyが95%を超えず、劇的な精度向上に繋がらなかった。

普通にやっても埒が開かなそう

↓

学習率の減衰がないSGDをまわし続ければ

いつかは95%を超える？

ループを回して探索

- モデル: VGG16
- FC層: ３層(1024, 512, 256)
- バッヂサイズ: int(random.uniform(1, 32))
- 目的関数: SGD(学習率はrandom.uniform(0.001, 0.00001))

```
for i in range(200):

    model = model_maker()

    lr         = random.uniform(0.001, 0.00001)
    batch_size = int(random.uniform(1, 32))

    model.compile(loss='categorical_crossentropy', metrics=['accuracy'],
                  optimizer=optimizers.SGD(lr=lr, momentum=0.0, decay=0.0))

    hist = model.fit_generator(
        train_generator, steps_per_epoch = nb_train_samples/batch_size,
        validation_steps = nb_validation_samples/batch_size,
        nb_epoch = nb_epoch, validation_data = validation_generator,
        callbacks=[checkpointer])

    model.save("ex1/model" + str(i) + ".h5")

    f.write(','.join(str(i), str(lr), str(batch_size), str(checkpointer.best), '\n'))
```

i	learning_rate	batch_size	val_acc
0	0.0005985245440408503	18	0.939999988079
1	0.0007297833731549363	5	0.941666670144
2	0.0007835998516742715	22	0.941666663289
3	0.0007997032000723217	22	0.941666665475
...			
10	0.0009461718658244601	21	0.946666670144
...			

これでも0.95の壁は越えられないのでモデルを変えて検証中...

ヒートマップ

Food101[1]のデータから**15種類**の食べ物を抜き出して転移学習。

それぞれ750枚の学習データがある。

[1] Food-101 – Mining Discriminative Components with Random Forests website

対象となる画像

pho

donuts

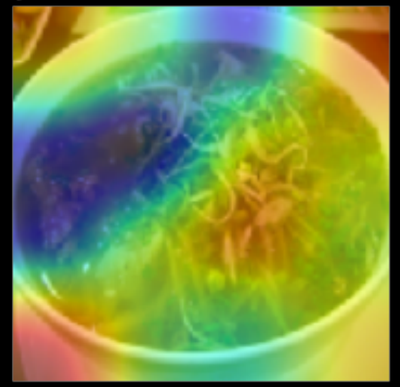
hot_dog

omelette

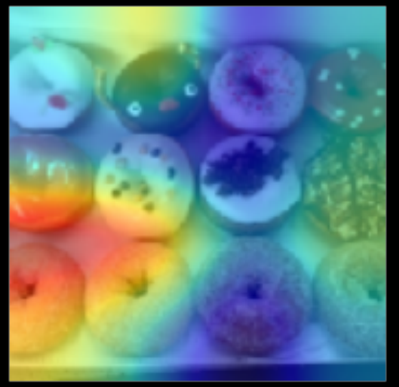
caesar_salad

vanilla

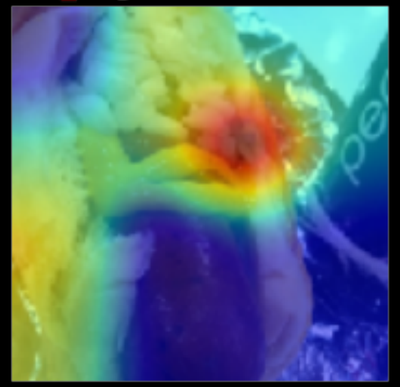
pho
pho



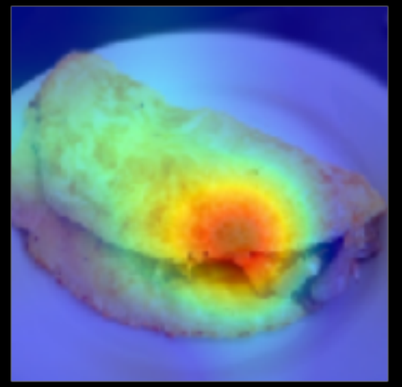
donuts
donuts



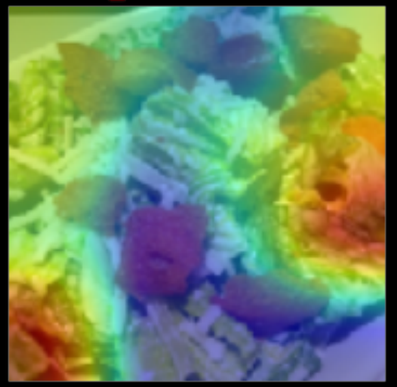
hot_dog
hot_dog



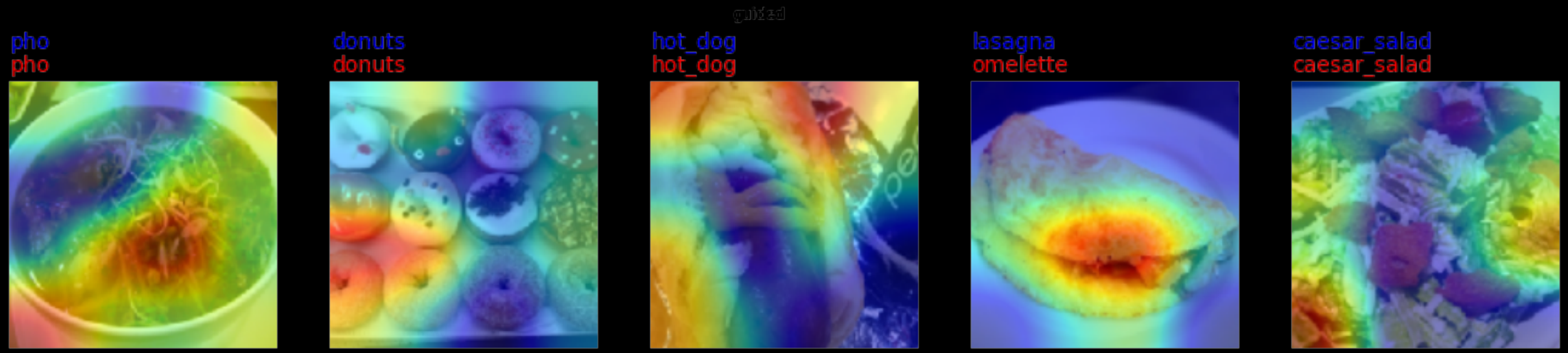
lasagna
omelette



caesar_salad
caesar_salad



guided


guided
pho
pho
donuts
donuts
hot_dog
hot_dog
lasagna
omelette
caesar_salad
caesar_salad

relu

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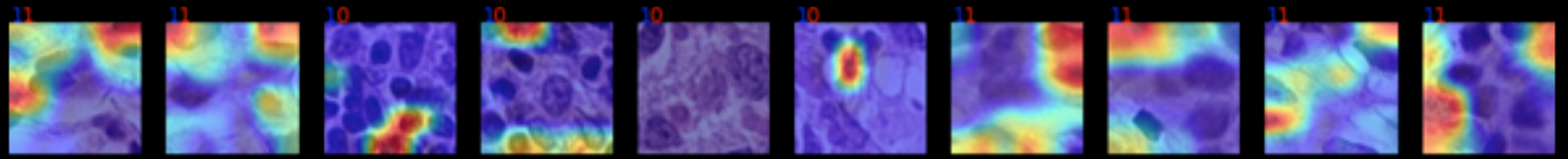
caesar_salad
caesar_salad

vanilla



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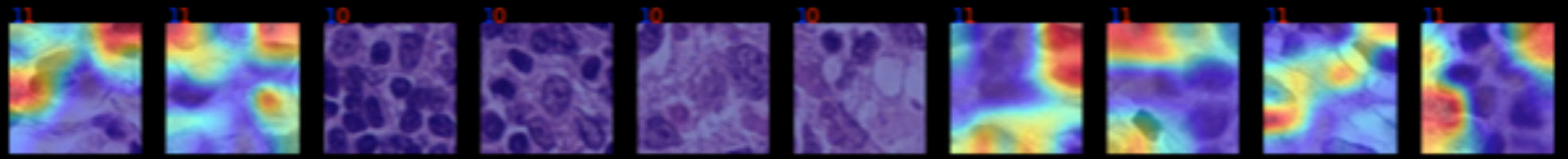

relu