2024 CUAI 하계 컨퍼런스 CV 4팀 중간 발표

2024.07.30

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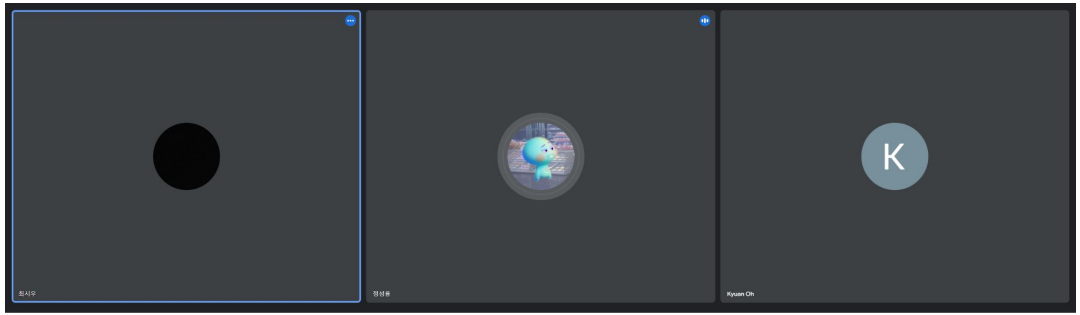
컨퍼런스 팀원 소개



스터디원 1 : 오규안 (AI학과)

스터디원 2 : 최시우 (AI학과)

스터디원 3 : 정성룡 (AI학과)

대회 선정

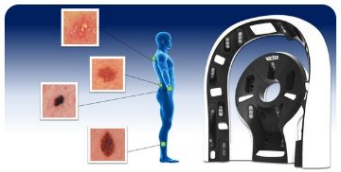
(Kaggle) ISIC 2024 - Skin Cancer Detection with 3D-TBP

INTERNATIONAL SKIN IMAGING COLLABORATION (ISIC) · RESEARCH CODE COMPETITION · 2 MONTHS TO GO

Submit Prediction

ISIC 2024 - Skin Cancer Detection with 3D-TBP

Identify cancers among skin lesions cropped from 3D total body photographs



Overview | Data | Code | Models | Discussion | Leaderboard | Rules | Team | Submissions

Overview

In this competition, you'll develop image-based algorithms to identify histologically confirmed skin cancer cases with single-lesion crops from 3D total body photos (TBP). The image quality resembles close-up smartphone photos, which are regularly submitted for telehealth purposes. Your binary classification algorithm could be used in settings without access to specialized care and improve triage for early skin cancer detection.

Start
10 days ago

Close
2 months to go

Merger & Entry

Competition Host
International Skin Imaging Collaboration (ISIC)

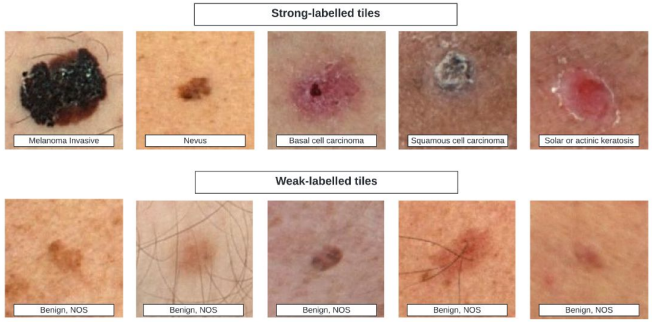
Prizes & Awards
$80,000
Awards Points & Medals

Participation
5,185 Entrants
548 Participants
495 Teams
3,666 Submissions

대회 데이터셋

1. 피부 이미지 데이터

- 약 40만개의 피부 이미지 학습 데이터 구성



2. CSV 데이터

- 55개의 특징 columns (나이, 성별, 병변 색깔, 병변 둘레, 병변의 대칭성 등등)

isic_id	target	patient_id	age_approx	sex	anatom_site_gen...	clin_size_long_di...
401059 unique values	0 1	IP_1117889 2% IP_5714646 2% Other (385608) 96%	55 14% 65 14% Other (287990) 72%	male 66% female 31% Other (11517) 3%	posterior torso 30% lower extremity 26% Other (176129) 44%	1 28.4
ISIC_0015670	0	IP_1235828	60	male	lower extremity	3.04
ISIC_0015845	0	IP_8170065	60	male	head/neck	1.1
ISIC_0015864	0	IP_6724798	60	male	posterior torso	3.4
ISIC_0015902	0	IP_4111386	65	male	anterior torso	3.22
ISIC_0024200	0	IP_8313778	55	male	anterior torso	2.73

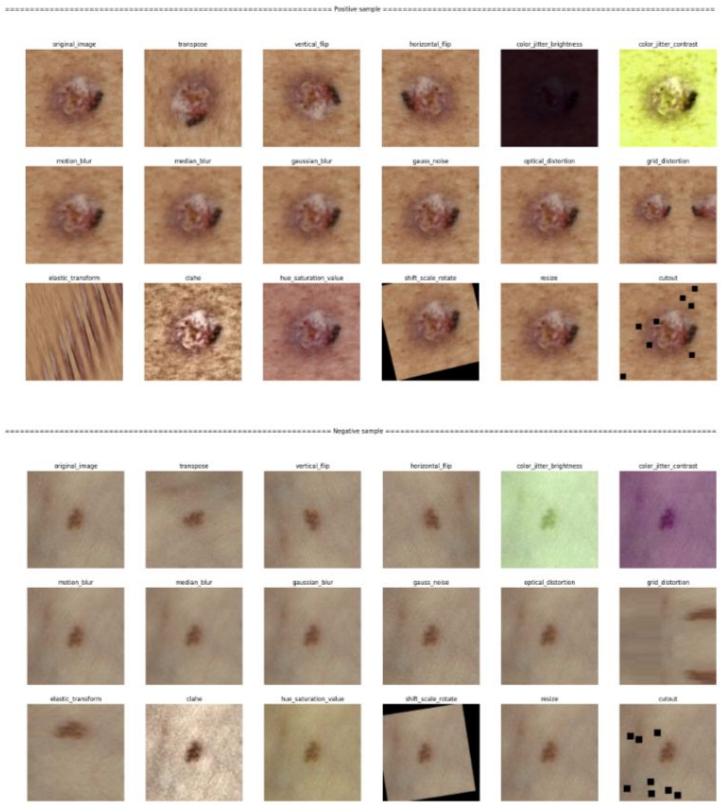
Ensemble Learning (Catboost + LGBM)

Image data =>

- EfficientNet
- Augumentation + EVA
- Gray Scale + EVA
- Cutout + EffcientNext

Meta data => LGBM + Catboost Ensemble => Output

Image Augmentation



다양한 augmentation 기법

Transpose

Flip

Blur

Noise

Distortion

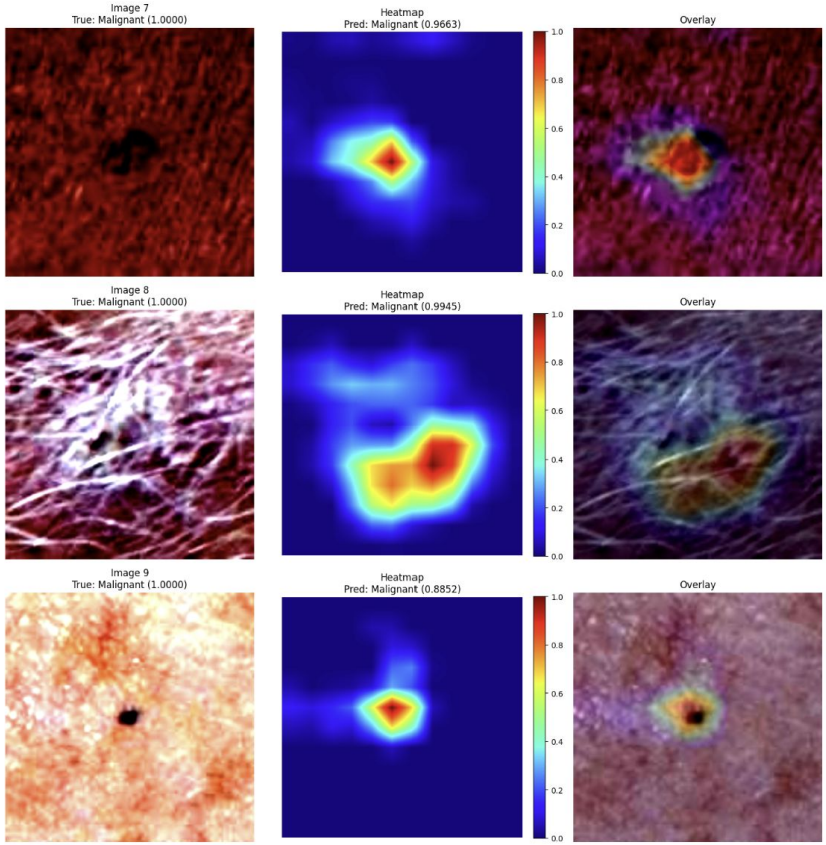
Resize

Cutout

Gray Scale + ABCD Rule

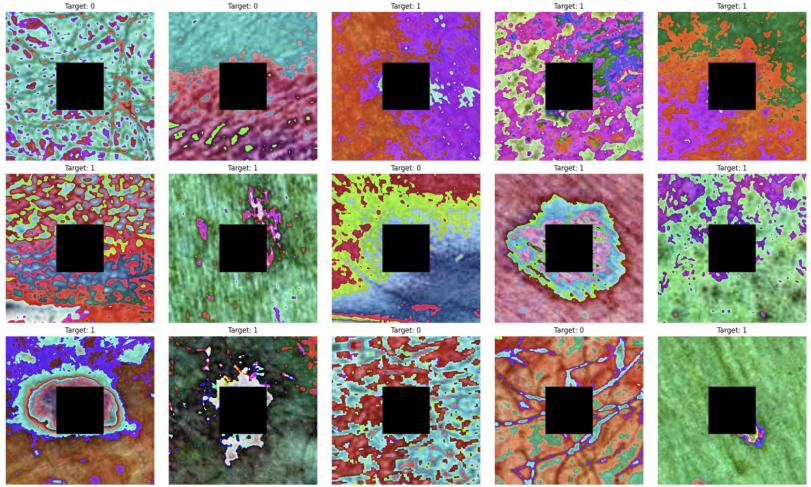
Asymmetry와 Border, Diameter 부분에 집중한 피처 추가

Grad-CAM



Grad CAM을 통해 확인해본 결과, 이미지의 중간 부분에 집중한다는 것을 알수있다

Cut Out




```python
class CenterCutout(A.DualTransform):
    def __init__(self, size=50, always_apply=False, p=0.5):
        super(CenterCutout, self).__init__(always_apply, p)
        self.size = size

    def apply(self, img, **params):
        h, w, c = img.shape
        x1 = w // 2 - self.size // 2
        y1 = h // 2 - self.size // 2
        x2 = x1 + self.size
        y2 = y1 + self.size

        img[y1:y2, x1:x2, :] = 0  # Cutout 중앙 부분
        return img

    def get_transform_init_args_names(self):
        return ("size",)
```

이미지의 가장자리 부분을 학습한 피쳐 추가

Evaluation

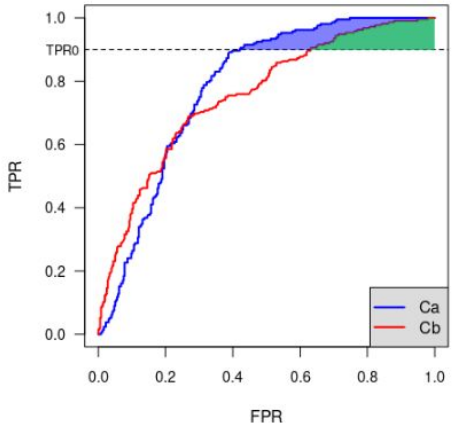
Evaluation

Primary Scoring Metric

Submissions are evaluated on **partial area under the ROC curve (pAUC)** above 80% true positive rate (TPR) for binary classification of malignant examples. (See the implementation in the notebook ISIC pAUC-aboveTPR.)

The receiver operating characteristic (ROC) curve illustrates the diagnostic ability of a given binary classifier system as its discrimination threshold is varied. However, there are regions in the ROC space where the values of TPR are unacceptable in clinical practice. Systems that aid in diagnosing cancers are required to be highly-sensitive, so this metric focuses on the area under the ROC curve AND above 80% TRP. Hence, scores range from [0.0, 0.2].

The shaded regions in the following example represents the pAUC of two arbitrary algorithms (Ca and Cb) at an arbitrary minimum TPR:



Validation

LGBM

```
fold: 0 - Partial AUC Score: 0.18440
fold: 1 - Partial AUC Score: 0.19115
fold: 2 - Partial AUC Score: 0.19541
fold: 3 - Partial AUC Score: 0.18113
fold: 4 - Partial AUC Score: 0.19111

LGBM Score: 0.18730
```

Cat Boost

```
fold: 0 - Partial AUC Score: 0.18232
fold: 1 - Partial AUC Score: 0.18916
fold: 2 - Partial AUC Score: 0.19586
fold: 3 - Partial AUC Score: 0.18116
fold: 4 - Partial AUC Score: 0.18998

CatBoost Score: 0.18770
```

향후 계획

1. 모델 선택 및 학습 후 성능 평가
2. 최종 모델 제출
3. 코드 정리 및 문서화
4. Short-Paper 작성 & 발표 영상 준비

감사합니다