



Music recommendation service based on Facial Emotion analysis

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SoHyouun
HyeWoo
SangJun

Agenda



1. Project Overview and Purpose



2. Project teaming and roles



3. How to Collect and Analyze Data



4. System Flow and Architecture



5. Modeling



6. System Operator Guidelines



7. Problems and Solutions



8. Conclusion and Review

01 Project Overview and Purpose

Music recommendation service based on Facial Emotion analysis

- the rapid development of artificial intelligence
- One of the important means of expressing emotions is facial expressions
- Understand by experiencing emotion analysis, deep learning modeling and web server deployment firsthand
- Purpose of consumer UI by creating various and interesting services using API



02 Project teaming and roles

SangJun

- R&D for Web Service Implementation
- Streamlit Web Publishing Job
- Function to upload neutral emotion photos
- AWS Configuration and Web Deployment
- QR code distribution

HeyWoo

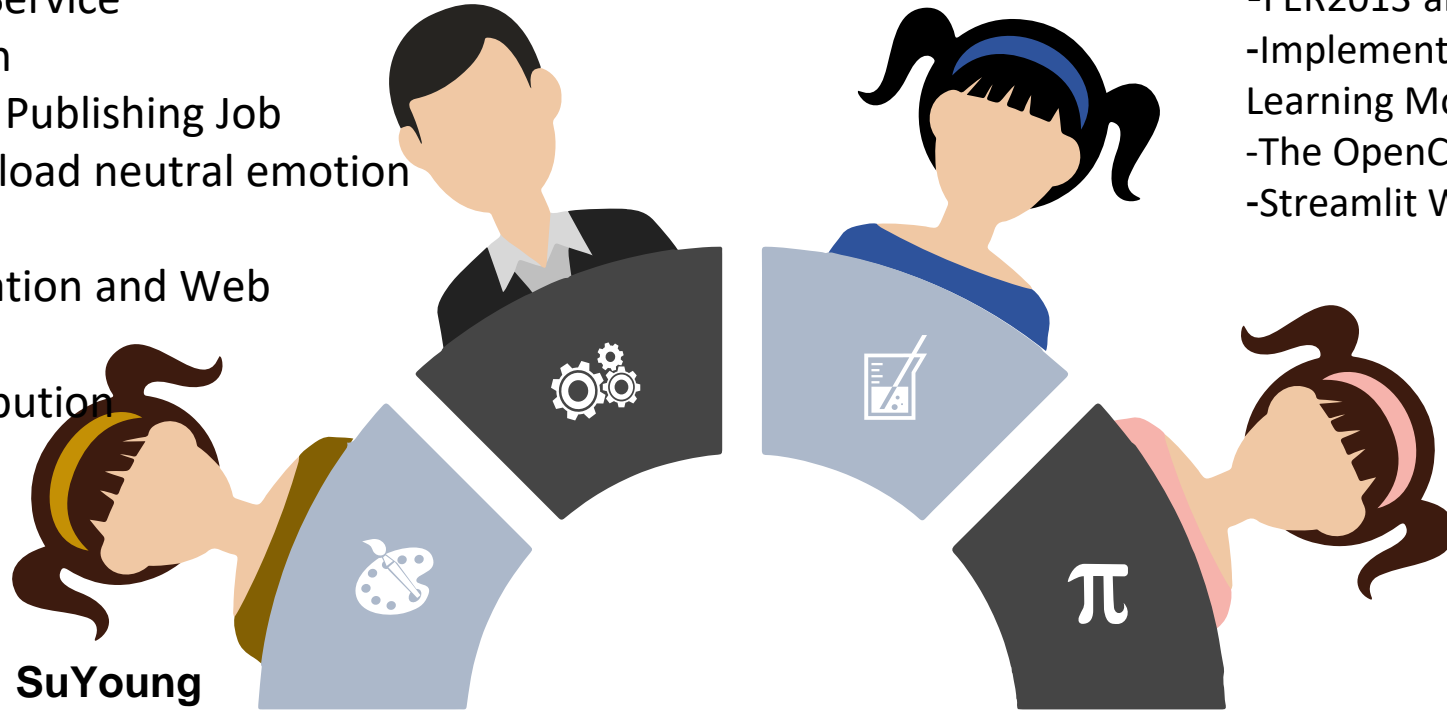
- FER2013 and haarcascade deep learning
- Implementation and Efficiency of Use Learning Model
- The OpenCV setup and capture function
- Streamlit Web Publishing Job

TeamLeader: SuYoung

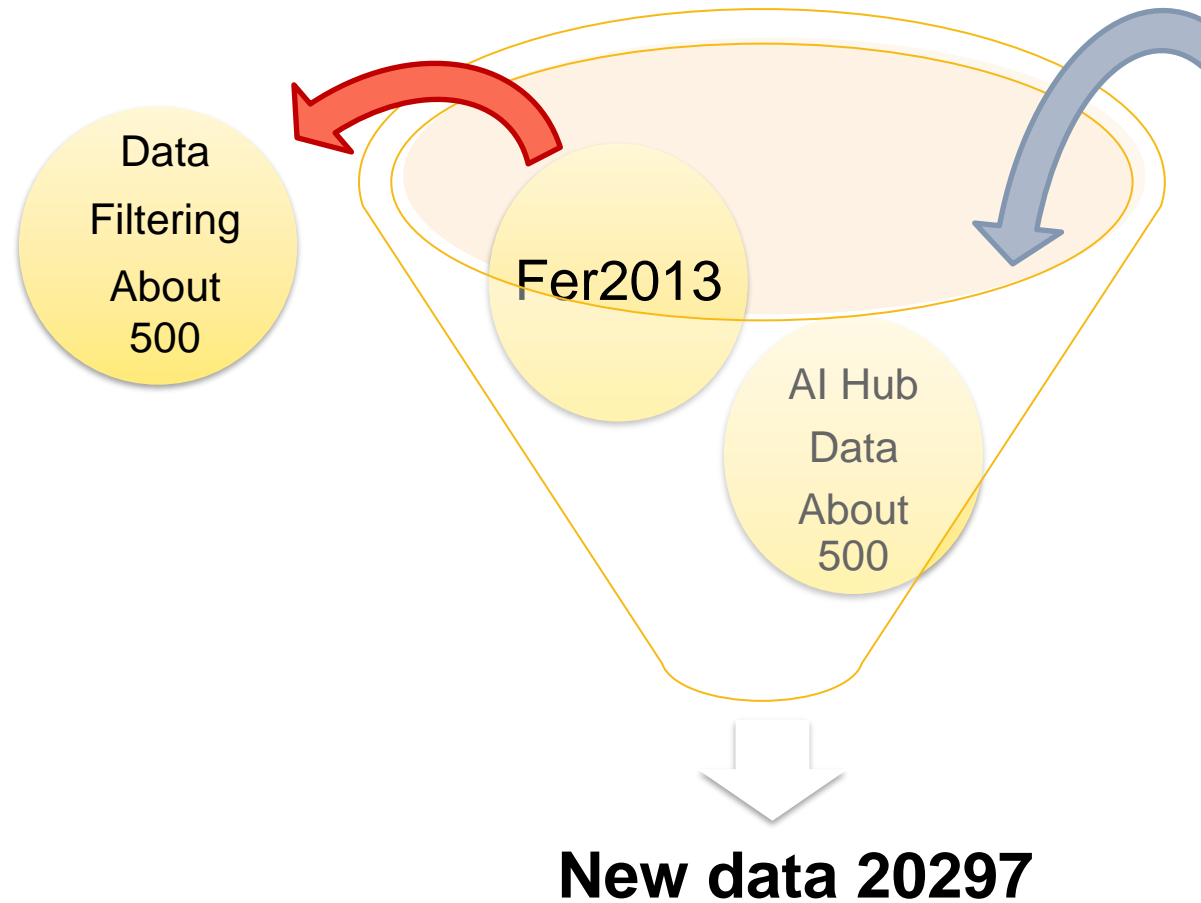
- FER2013 and haarcascade deep learning
- Implementation and Efficiency of Use Learning Model
- The OpenCV setup and capture function
- Streamlit Web Publishing Job
- Presentation

SoHyoun

- R&D for Web Service Implementation
- Streamlit Web Publishing Job
- Implementing Neutral Emotional Detail User Selection
- AWS Configuration and Web Deployment
- QR code distribution

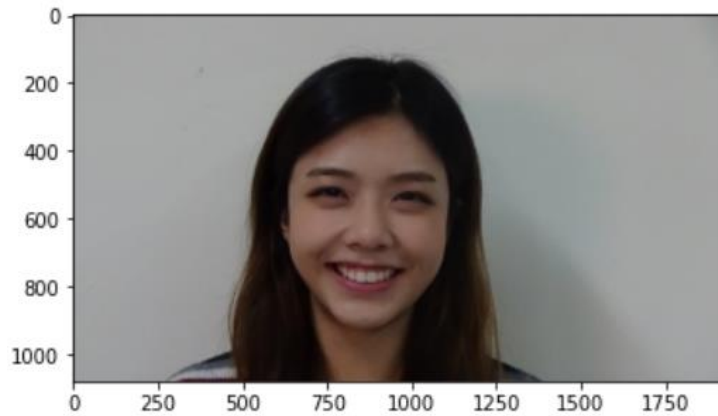


03 How to Collect and Analyze Data



Happiness 7295
Sadness 4839
Surprise 3197
Neutral 4966

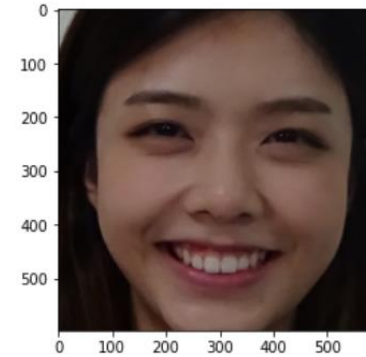
03 How to Collect and Analyze Data



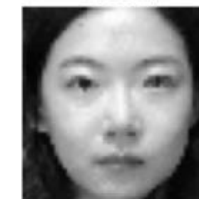
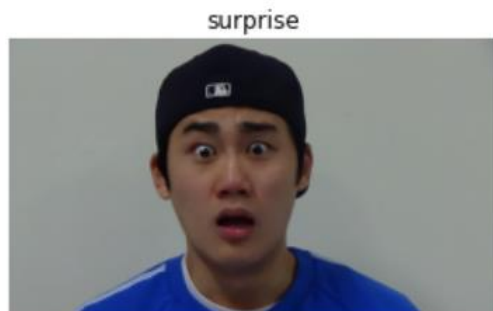
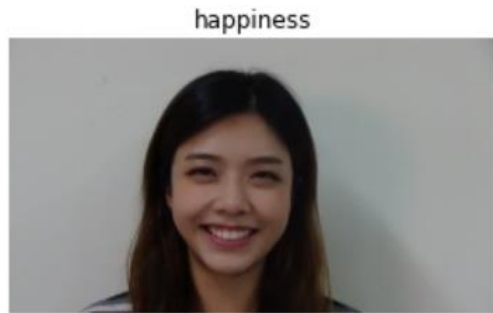
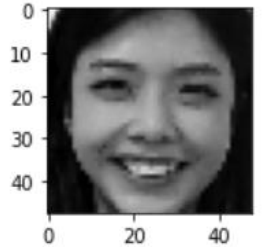
haarcascade



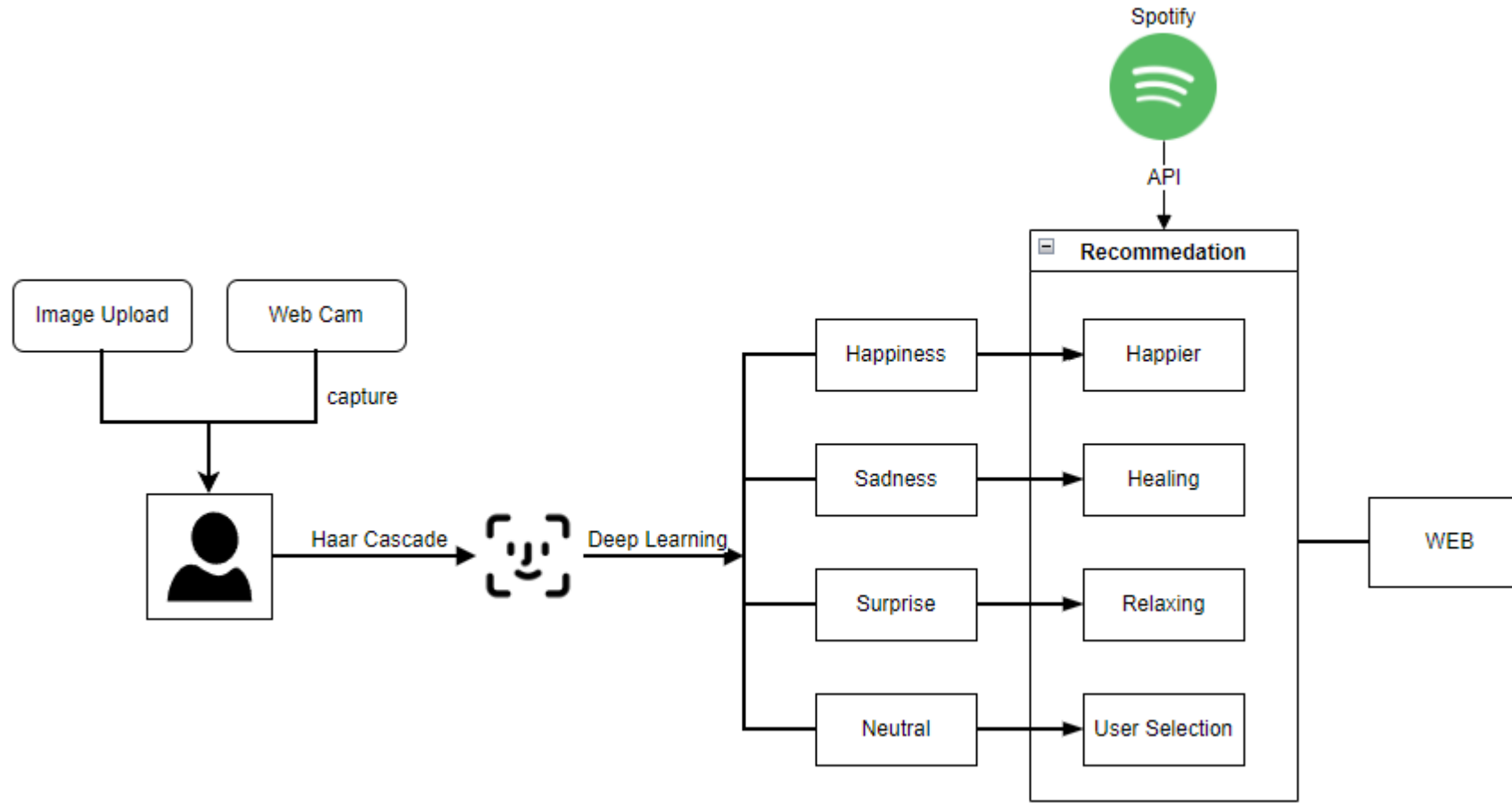
Face crop



GRAYSCALE
RESIZE(48,48)

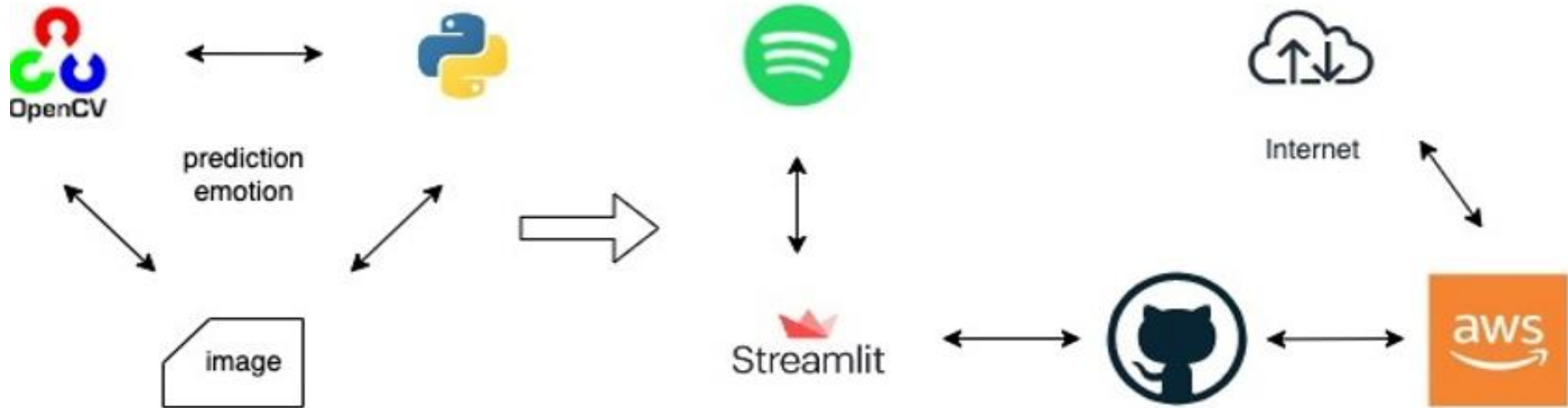


04 System Flow and Architecture



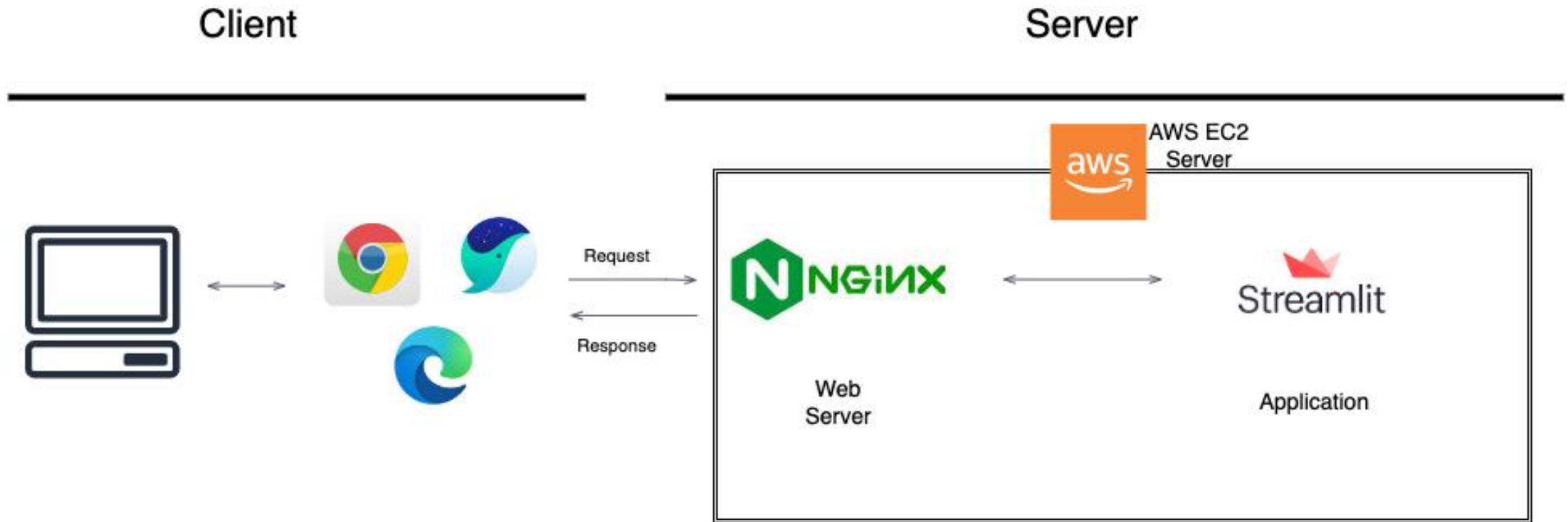
<Flow>

04 System Flow and Architecture



<Function>

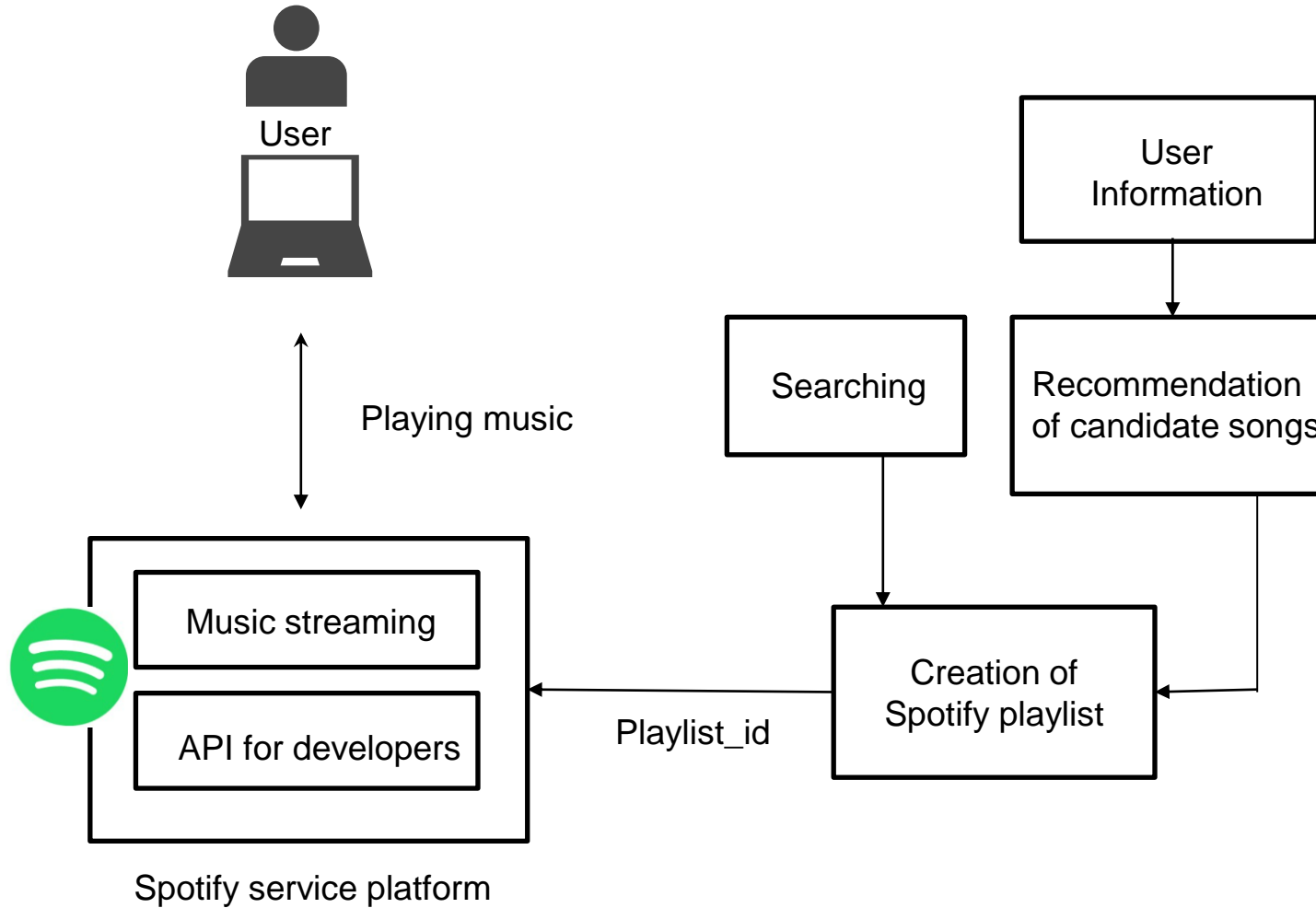
04 System Flow and Architecture



<Architecture>

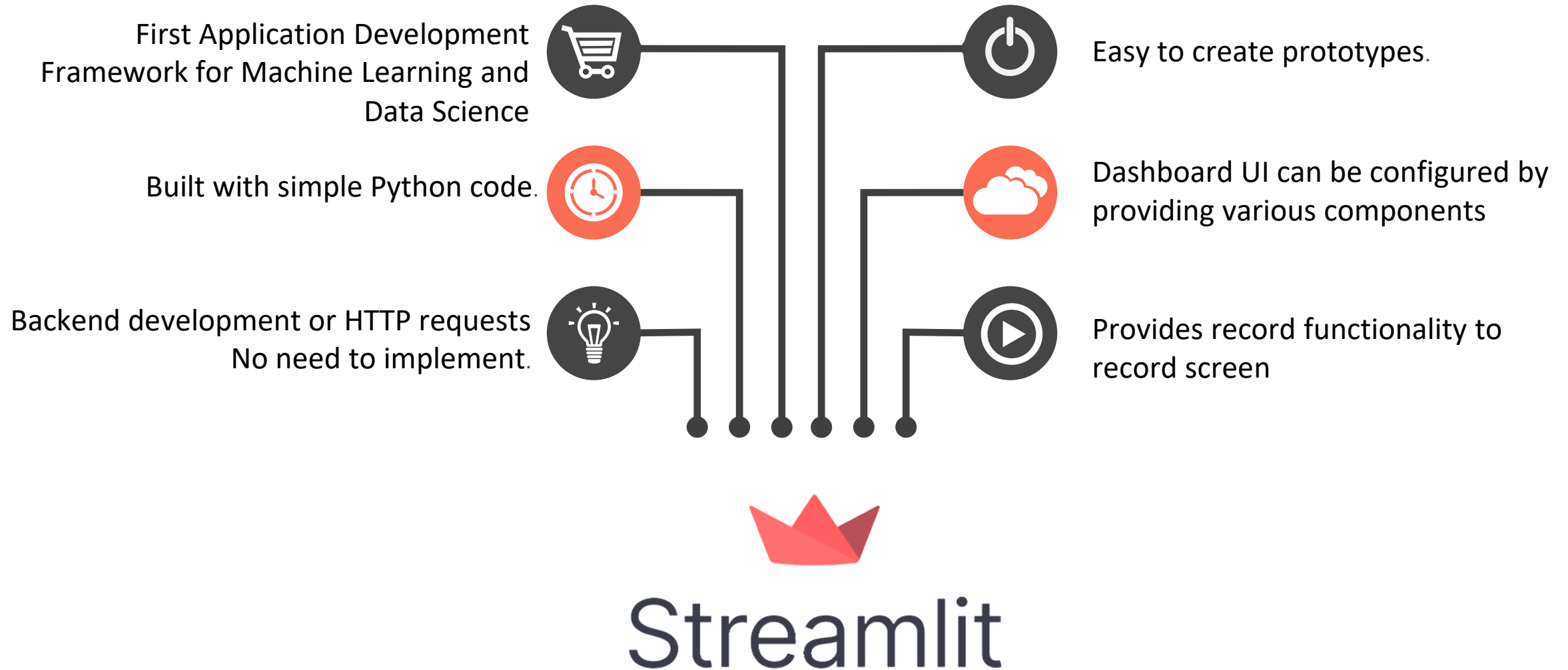
04 System Flow and Architecture

Spotify Music recommendation method



04 System Flow and Architecture

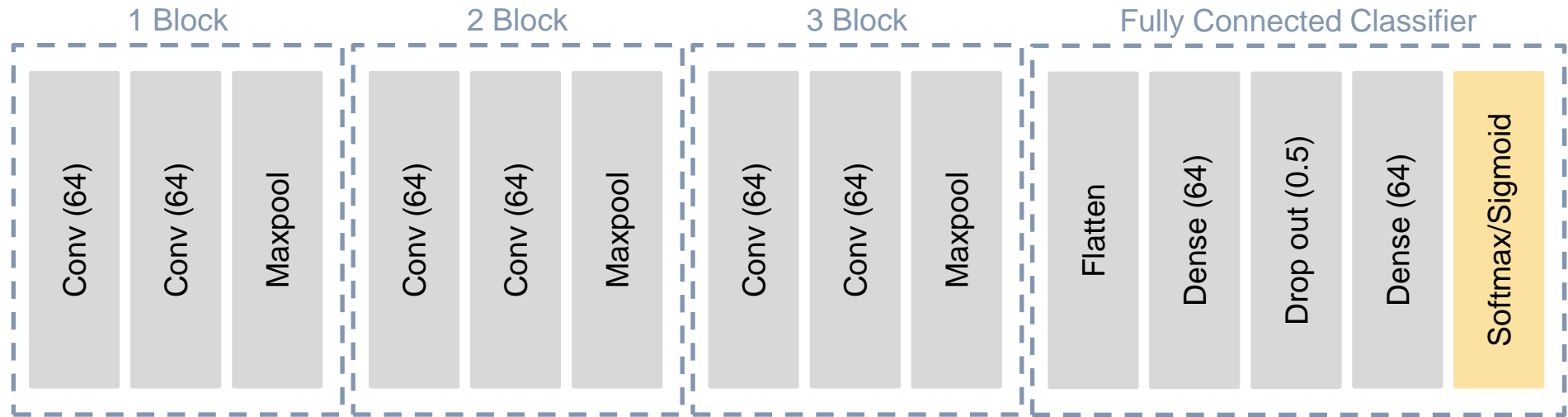
Main Library Streamlit



05 Modeling

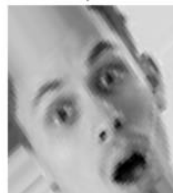
convolution layer + Augment

Categorical crossentropy



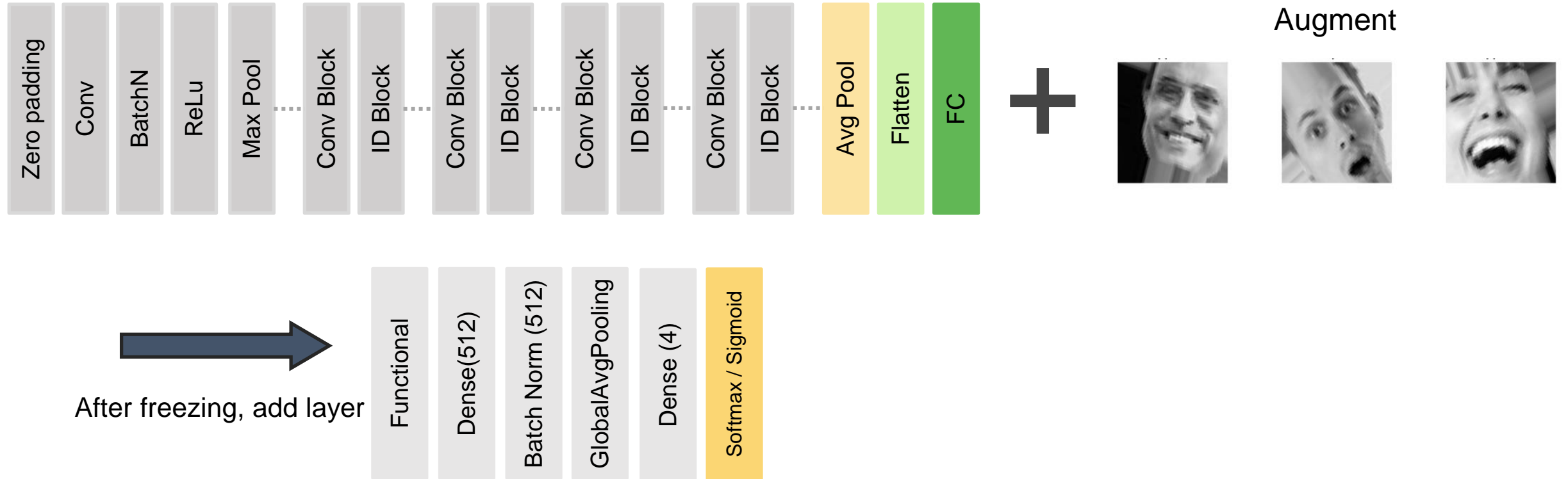
+

Augment



05 Modeling

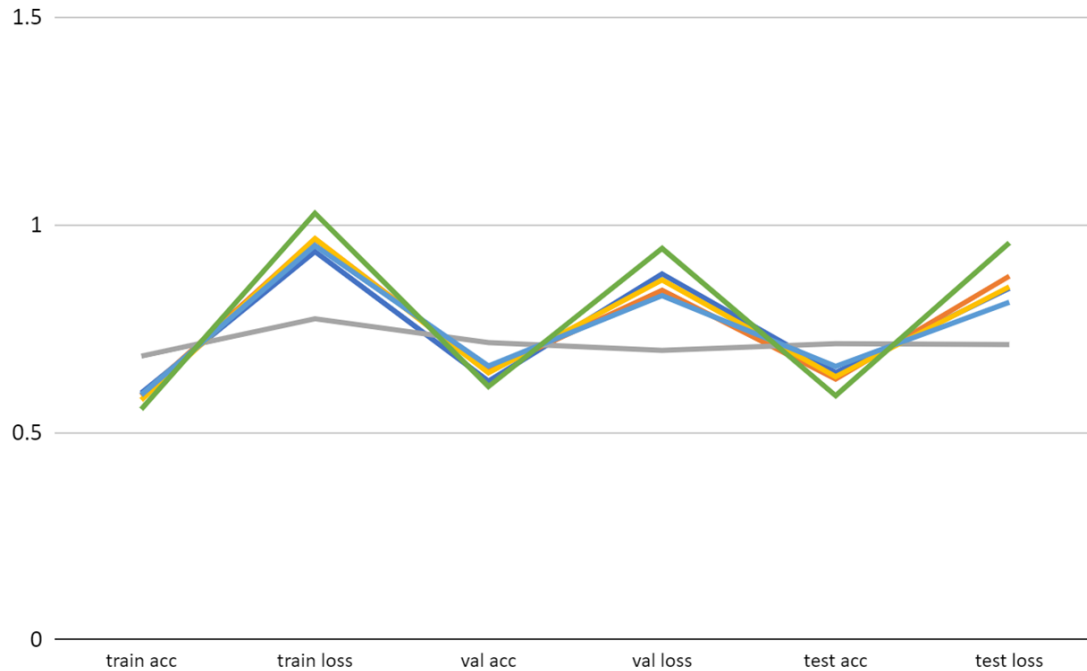
ResnetV50 + Augment



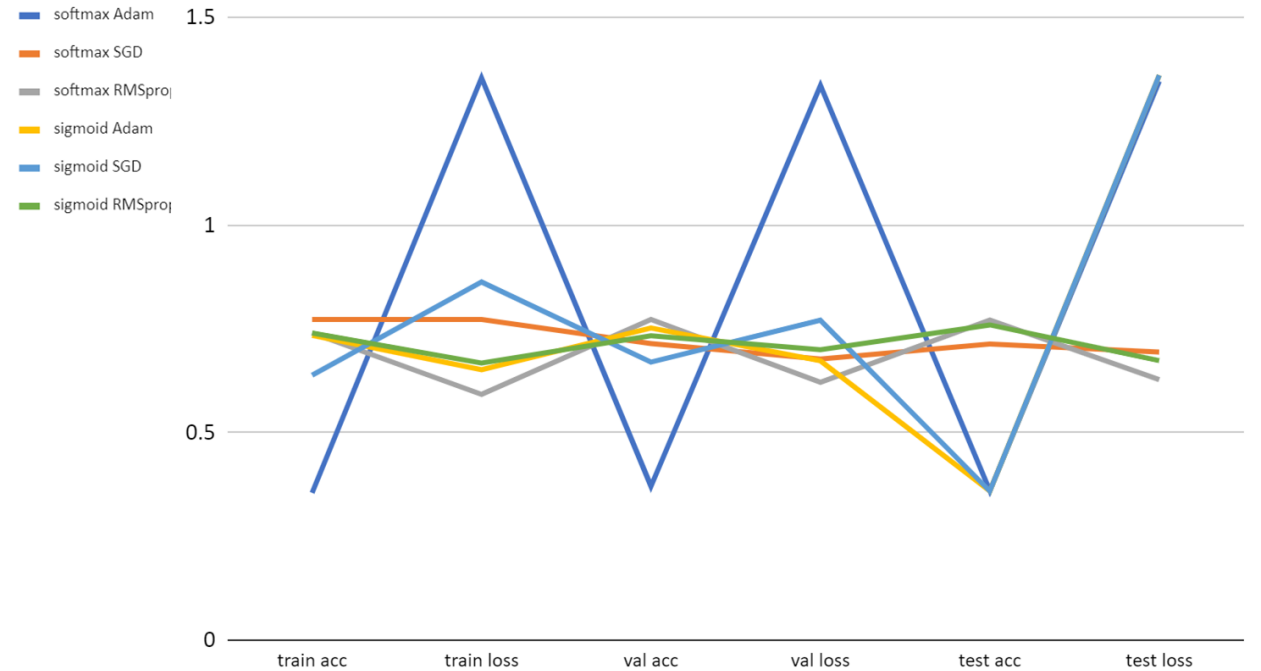
05 Modeling

Convolution layer

이미지 증식 batch size=32



이미지 증식 batch size=64

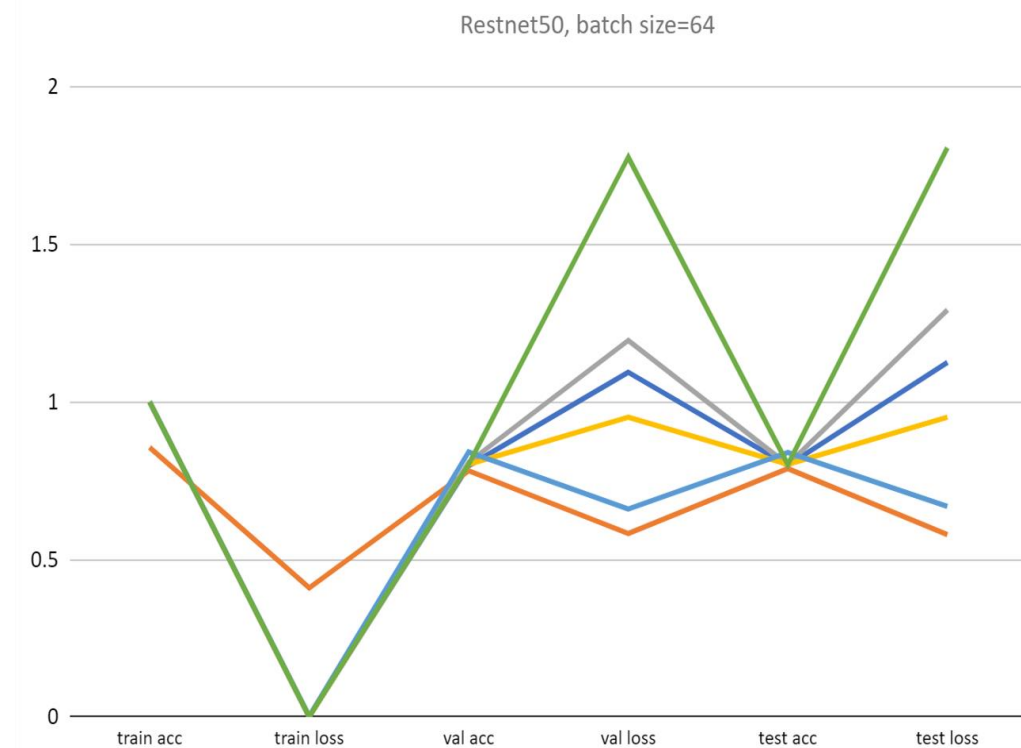
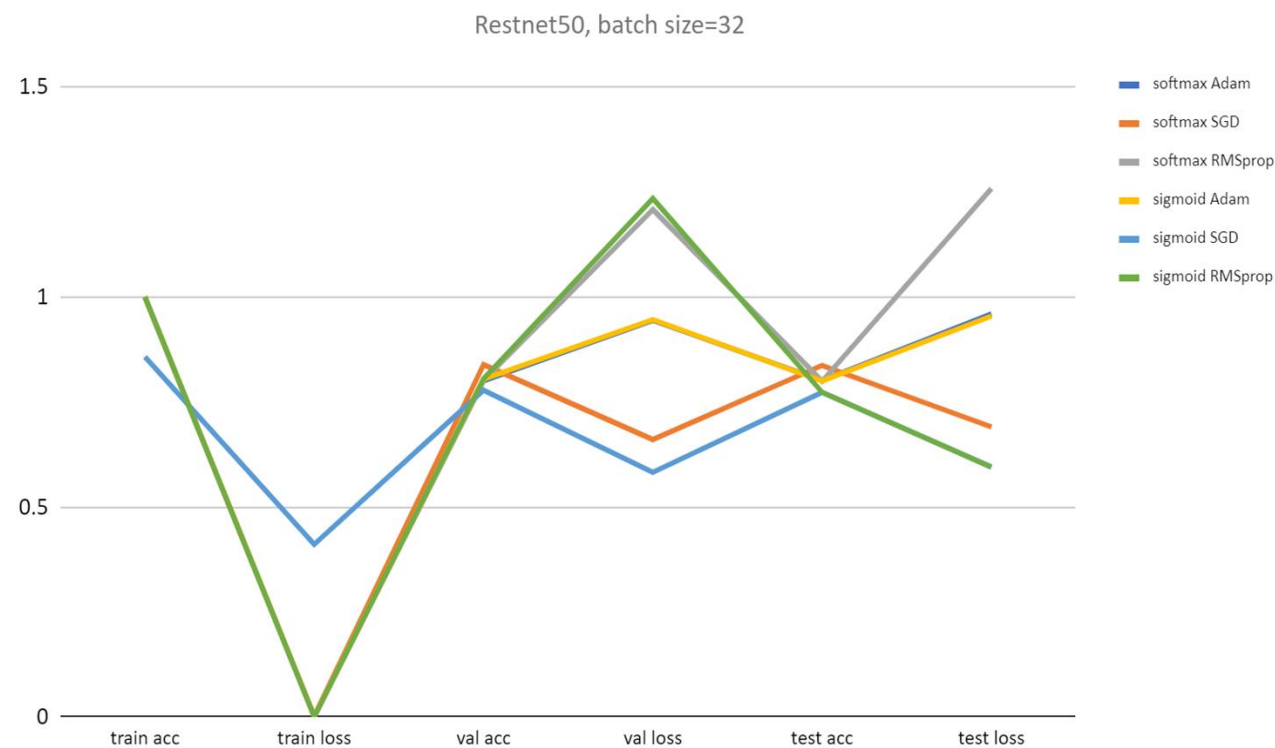


batch/ epoch	Activate	optimizer	train acc	train loss	val acc	val loss	test acc	test loss
64/50	softmax	RMSprop	0.7396	0.5916	0.7722	0.6207	0.7707	0.6273

[Add: Model's acc.xlsx - Google Sheets](#)

05Modeling

ResnetV50



batch/ epoch	activate	optimizer	train acc	train loss	val acc	val loss	Test acc	test loss
64/50	softmax	SGD	0.8556	0.4095	0.7812	0.5819	0.7883	0.5786

05 Modeling

Make to increase a model acc

Convert Image to Numpy Array



Emotion, Pixel Integration, Save as DataFrame

```
[ ] sample_img=cv2.imread(sample_path, cv2.IMREAD_GRAYSCALE)
cv2_imshow(sample_img)
```



```
▶ sample_img=cv2.resize(sample_img, (48,48))
sample_pix=list(sample_img.ravel())
sample_pix=''.join(str(s) for s in sample_pix)
sample_pix
```

```
↗ '13 19 12 12 8 12 17 14 18 26 18 17 14 19 12 15 19 19 21 23 20 14 12 14 12 10 13 10 11 14 12 14 14 14 13 12 12 12
12 12 13 15 16 16 17 15 14 16 11 17 11 12 8 11 15 12 15 20 14 14 13 16 11 14 13 15 18 20 20 19 16 14 14 13 14 12
12 13 12 13 14 14 13 12 12 12 12 13 15 15 16 17 16 15 16 12 16 11 11 9 10 13 11 12 14 10 10 13 14 11 12 12 15
16 16 18 20 18 13 13 14 13 13 13 13 14 14 14 13 13 12 12 12 13 13 14 15 15 16 18 17 15 17 14 17 13 12 10 10 12 1
0 9 8 8 8 13 10 10 12 9 11 11 10 14 20 22 19 14 16 12 14 14 13 16 14 15 15 15 15 15 14 15 15 16 17 16 16 18 17 16
18 18 18 15 12 10 9 11 10 7 5 8 7 11 7 9 10 8 8 8 8 10 14 18 19 18 19 14 15 15 13 16 13 16 16 17 18 18 17 17 18 18
18 17 17 18 17 17 18 20 18 16 12 11 8 10 9 7 5 8 7 10 6 9 9 9 9 9 9 8 8 10 12 18 18 15 16 16 16 17 16 16 16 17 18 18
16 16 18 20 20 18 17 18 18 17 20 21 17 17 12 12 9 9 9 7 6 8 8 9 8 9 7 5 6 8 8 8 8 9 12 13 12 13 14 15 17 16 16 15 14
15 17 16 15 15 18 19 20 19 19 19 18 18 21 21 17 18 13 14 9 9 9 6 5 6 7 8 8 8 5 8 9 9 8'
```

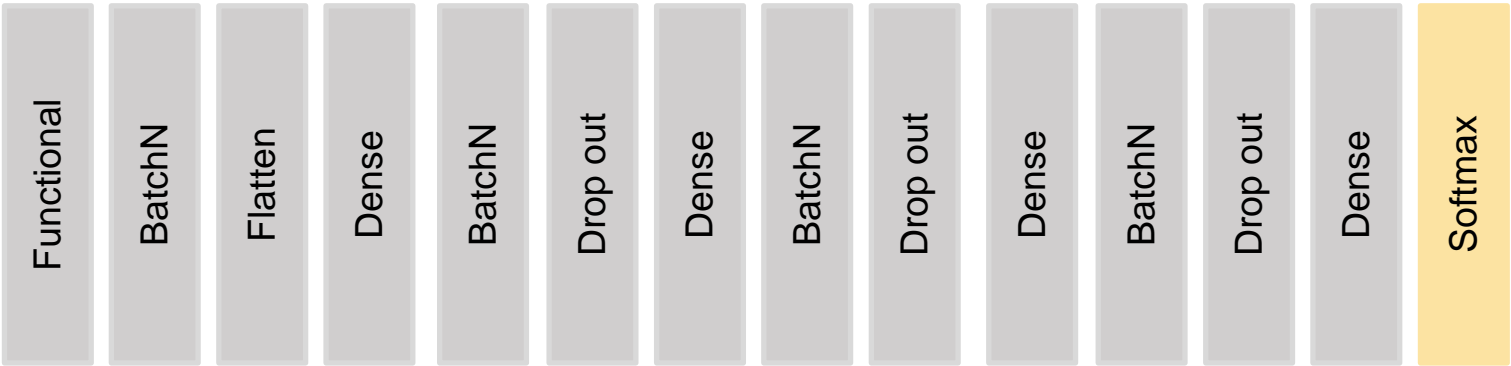
	emotion	pixels
0	5.0	10 8 7 9 10 21 25 37 39 34 45 82 82 82 88 93 9...
1	5.0	69 78 83 92 97 107 124 119 58 32 62 79 106 157...
2	5.0	219 217 218 218 224 151 59 75 51 50 107 163 14...
3	5.0	254 253 255 254 255 255 250 101 33 54 73 74 64...
4	5.0	99 98 82 78 69 56 53 55 51 52 58 67 83 110 118...
...
20292	6.0	47 53 84 119 93 62 51 56 52 56 56 56 57 57 57 ...
20293	6.0	30 23 25 21 28 36 50 77 97 104 110 113 119 127...
20294	6.0	42 31 6 6 0 3 3 0 0 0 10 71 133 169 187 198 20...
20295	6.0	220 221 195 129 122 128 131 123 126 135 140 14...
20296	6.0	118 24 15 16 34 31 56 85 87 89 90 103 106 112 ...

20297 rows × 2 columns

05Modeling

ResnetV50

Sparse categorical crossentropy



+



Augment



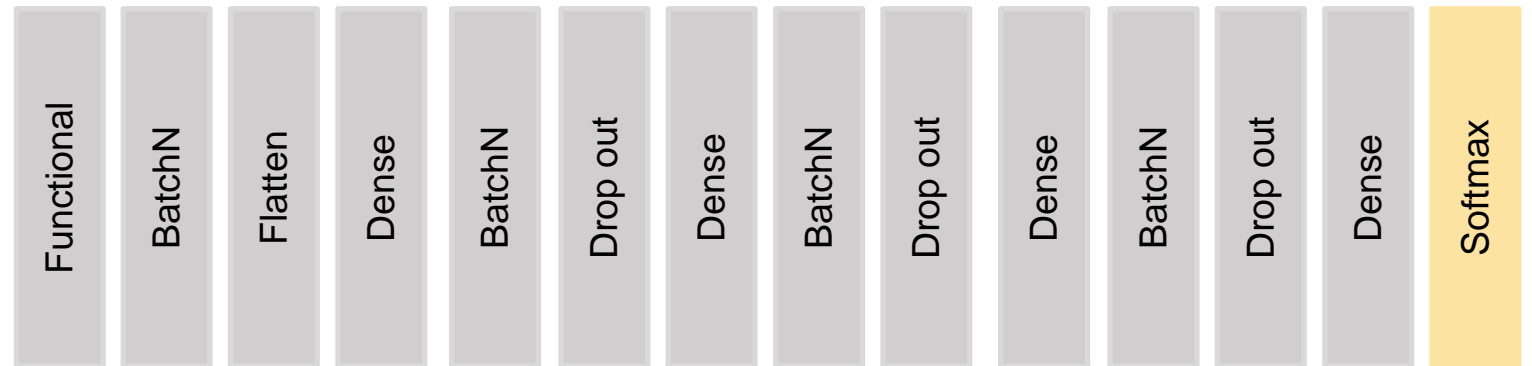
batch/ epoch	activate	optimizer	train acc	train loss	val acc	val loss	test acc	test loss
64/50	softmax	SGD	0.3115	1.8336	0.405	1.2954	0.3927	1.3192

05 Modeling

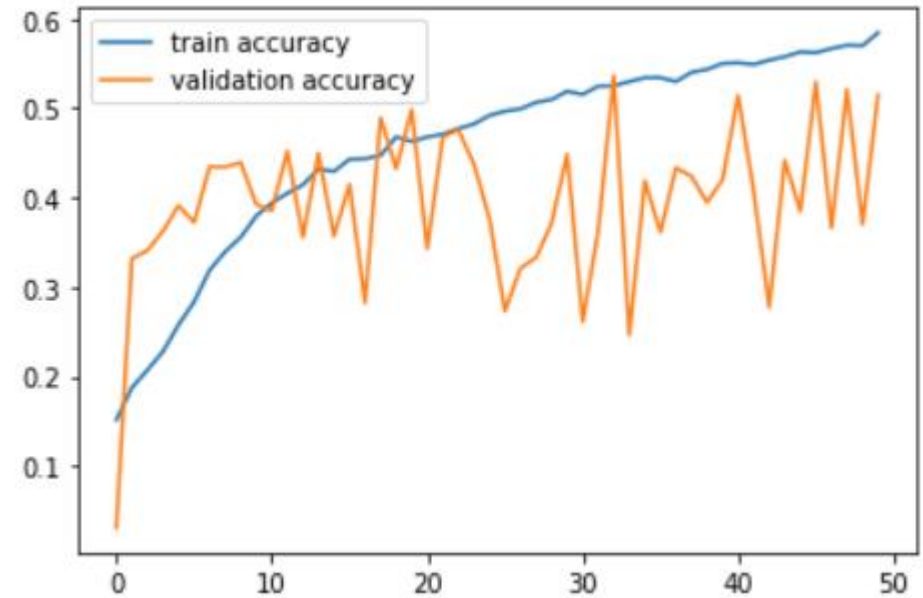
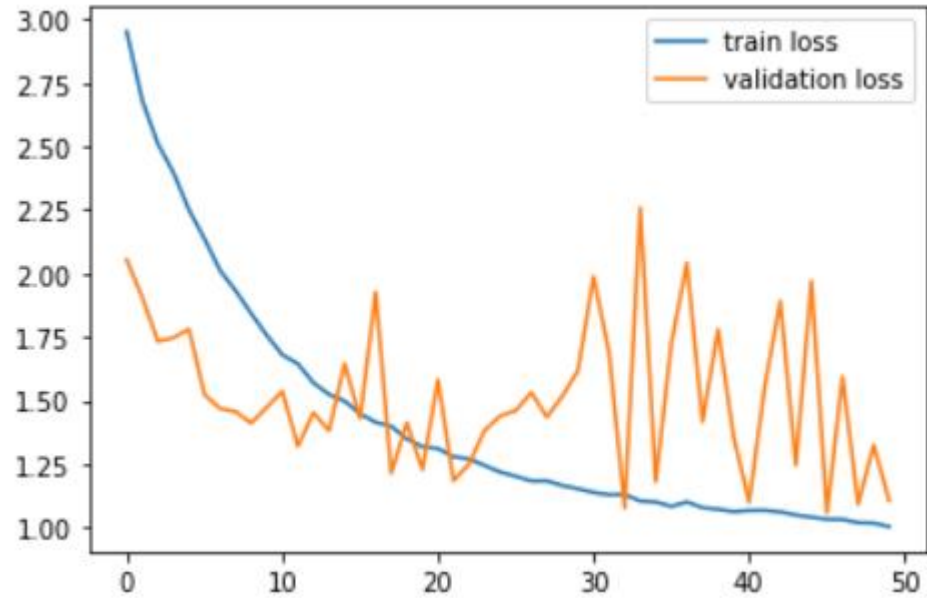
Fine tuning

Sparse categorical crossentropy

After releasing the freeze, except the
bottom 9 layer and freeze again
Add New Layer Again



05 Modeling

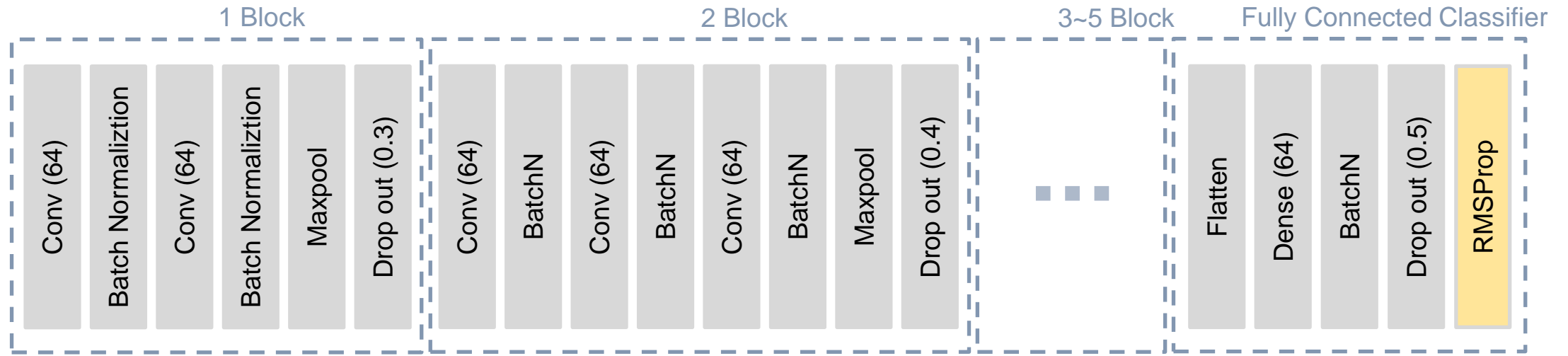


batch/ epoch	activate	optimizer	train acc	train loss	val acc	val loss	test acc	test loss
64/50	softmax	Adam	0.5845	1.0043	0.5149	1.1067	0.5178	1.1257

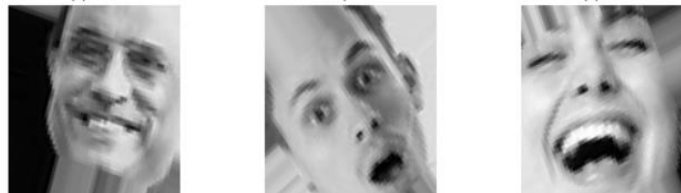
05 Modeling

Convolution layer + Augment

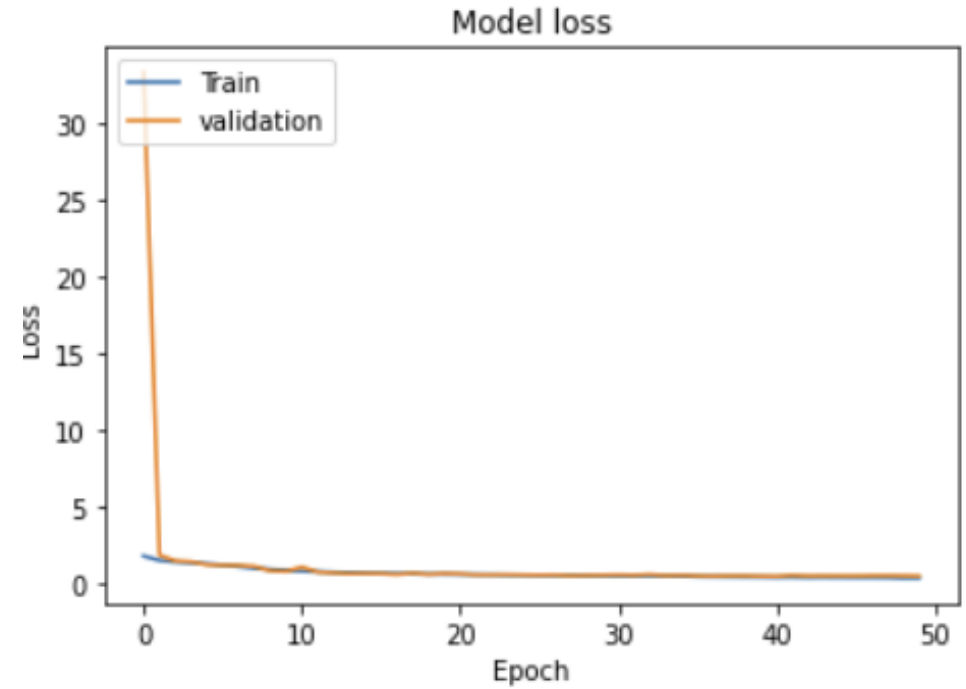
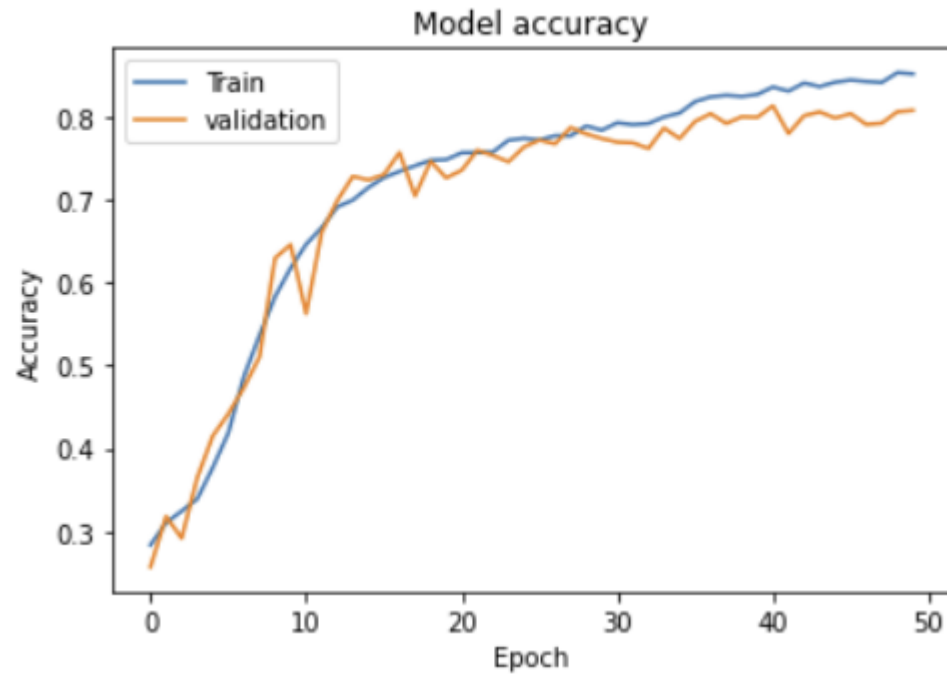
Categorical crossentropy



Augment



05 Modeling



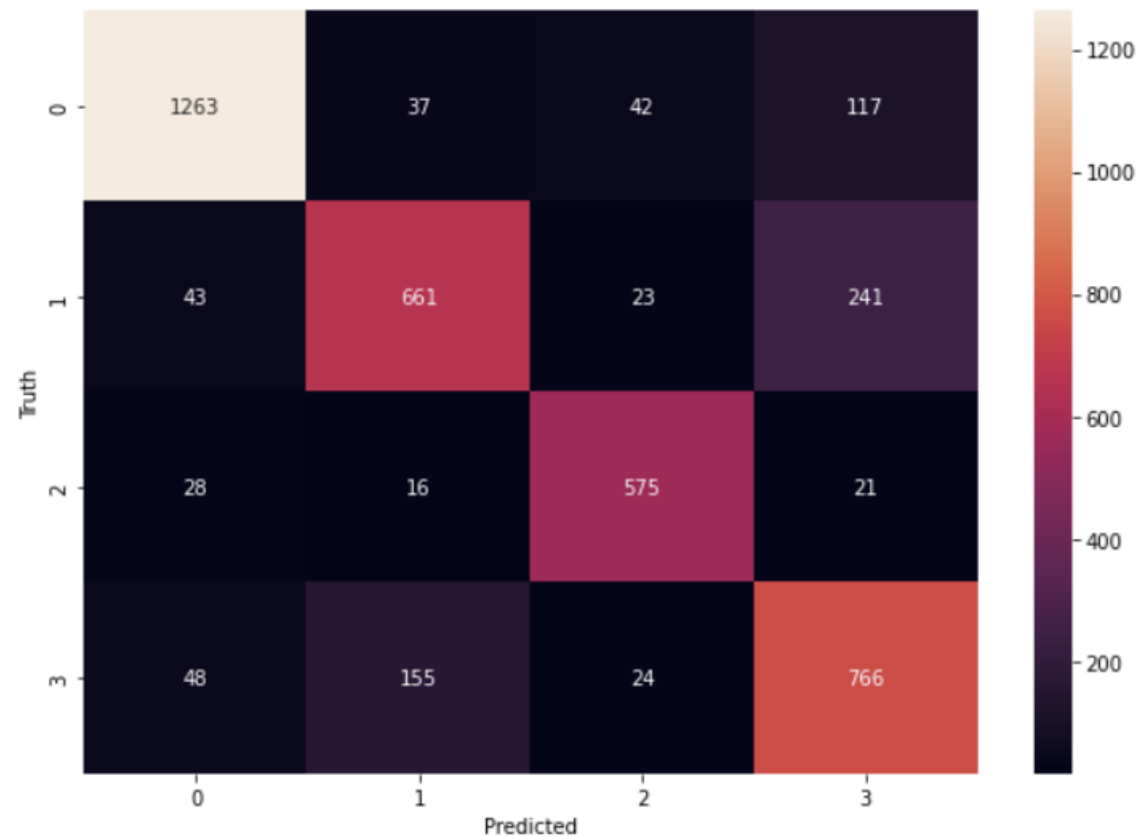
batch/ epoch	activate	optimizer	train acc	train loss	val acc	val loss	test acc	test loss
64/50	softmax	RMSprop	0.8513	0.3879	0.8073	0.5149	0.8081	0.5113

05 Modeling

Confusion matrix

	presicion	recall	f1-score	support
(Happiness) 0	0.91	0.87	0.89	1459
(Sadness) 1	0.76	0.68	0.72	968
(Surprise) 2	0.87	0.90	0.88	640
(Neutral) 3	0.67	0.77	0.72	993
accuracy			0.80	4060
macro avg	0.80	0.80	0.80	4060
weighted avg	0.81	0.80	0.81	4060

Text(69.0, 0.5, 'Truth')

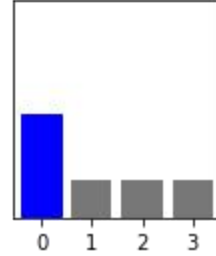


05 Modeling

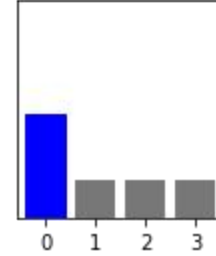
Image test prediction



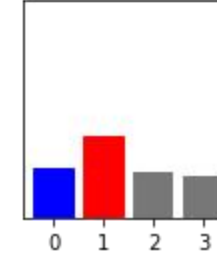
happiness 48%



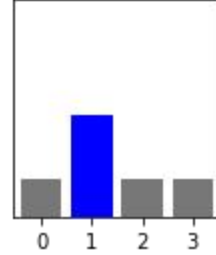
happiness 48%



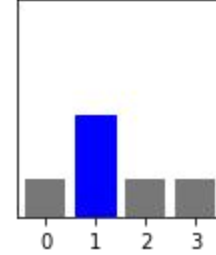
sadness 38%
real emotion : happiness 23%



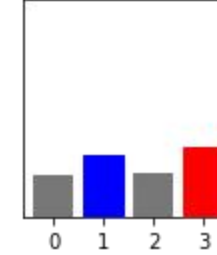
sadness 47%



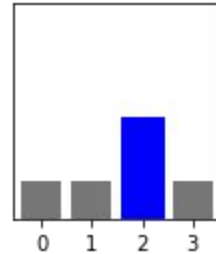
sadness 47%



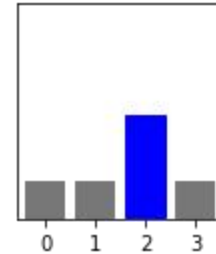
neutral 32%
real emotion : sadness 29%



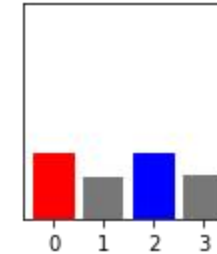
surprise 47%



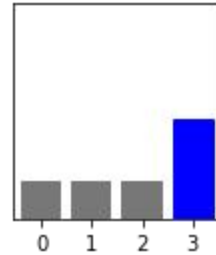
surprise 47%



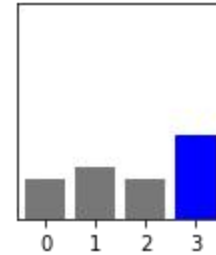
happiness 31%
real emotion : surprise 30%



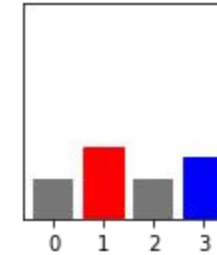
neutral 46%



neutral 38%



sadness 34%
real emotion : neutral 29%



06 System Operator Guidelines

Main



감정 분석 음악 추천 서비스

Face
image
capture

얼굴이미지 캡처

당신의 얼굴 사진을 캡처합니다.

캡처 진행을 하시려면 SHIFT+C를 눌러주세요!

이미지업로드

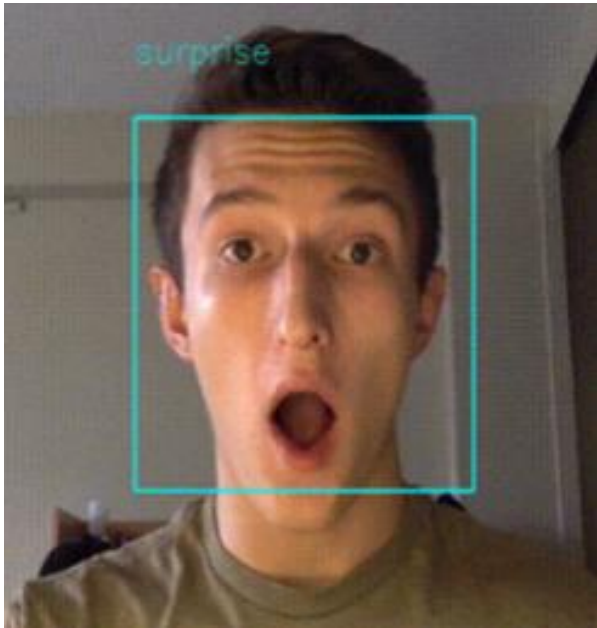
Photo upload

새로운 노래 추천

Other songs
recommendation

06 System Operator Guidelines

After Capturing, analyze facial emotions from the camera



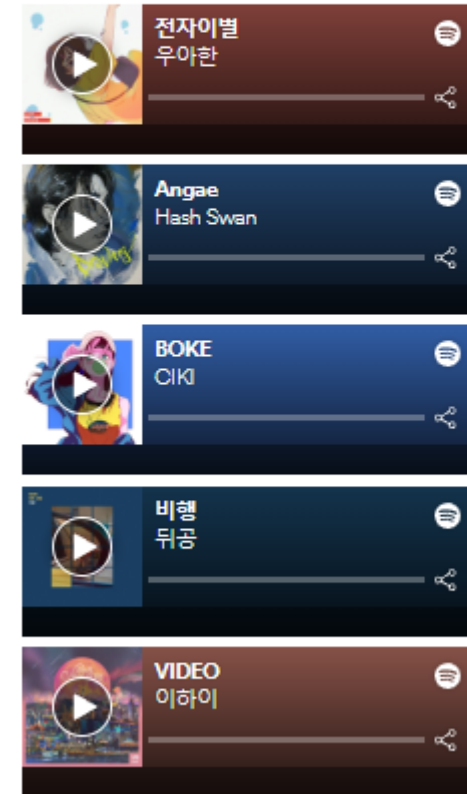
A song recommendation to calm your heart down for your surprised feelings



어이쿠! 많이 놀라셨나요?

당신을 진정시켜줄 노래입니다.

기분 좋은 하루 보내세요~



06 System Operator Guidelines

사진 업로드 기능

Photo Upload function

사진을 드래그 해보세요!

Upload Images



Drag and drop file here

Limit 200MB per file • PNG, JPG, JPEG

Browse files



img.jpg 115.7KB



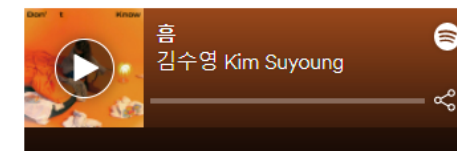
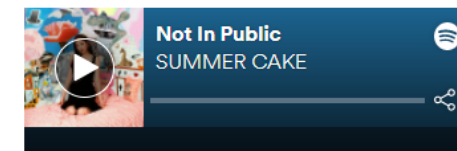
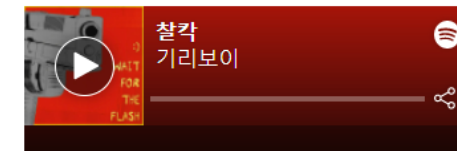
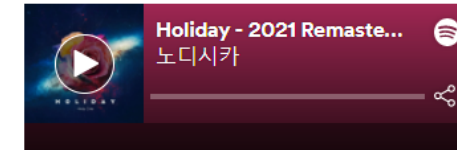
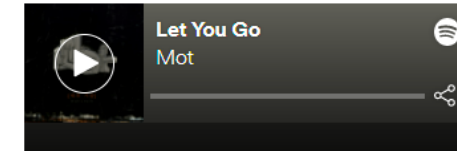
```
{  
  "filename": "img.jpg"  
  "filetype": "image/jpeg"  
  "filesize": 118462  
}
```



기분이 좋으시네요.

당신을 행복하게해 줄 노래입니다!

기분 좋은 하루 보내세요^^



Recommend a happy song for happy emotions

06 System Operator Guidelines

Neutral Emotion Selection Function

×

원하시는 무드를 선택하세요 Choose the mood

Choose an option ▾

모닝커피 Morning coffee

휴식 Relaxing

운동 Exercise

감수성자극 Heart Touching Songs


원하시는 무드를 선택하세요


휴식 × ▾


Multiple selection possible


File Saved


별일없으세요?
당신에게 행복을 줄 노래입니다.
기분 좋은 하루 보내세요~
당신을 위한 휴식하면 들을 음악

 Use Me
bobae

 내일이 오면
김우주

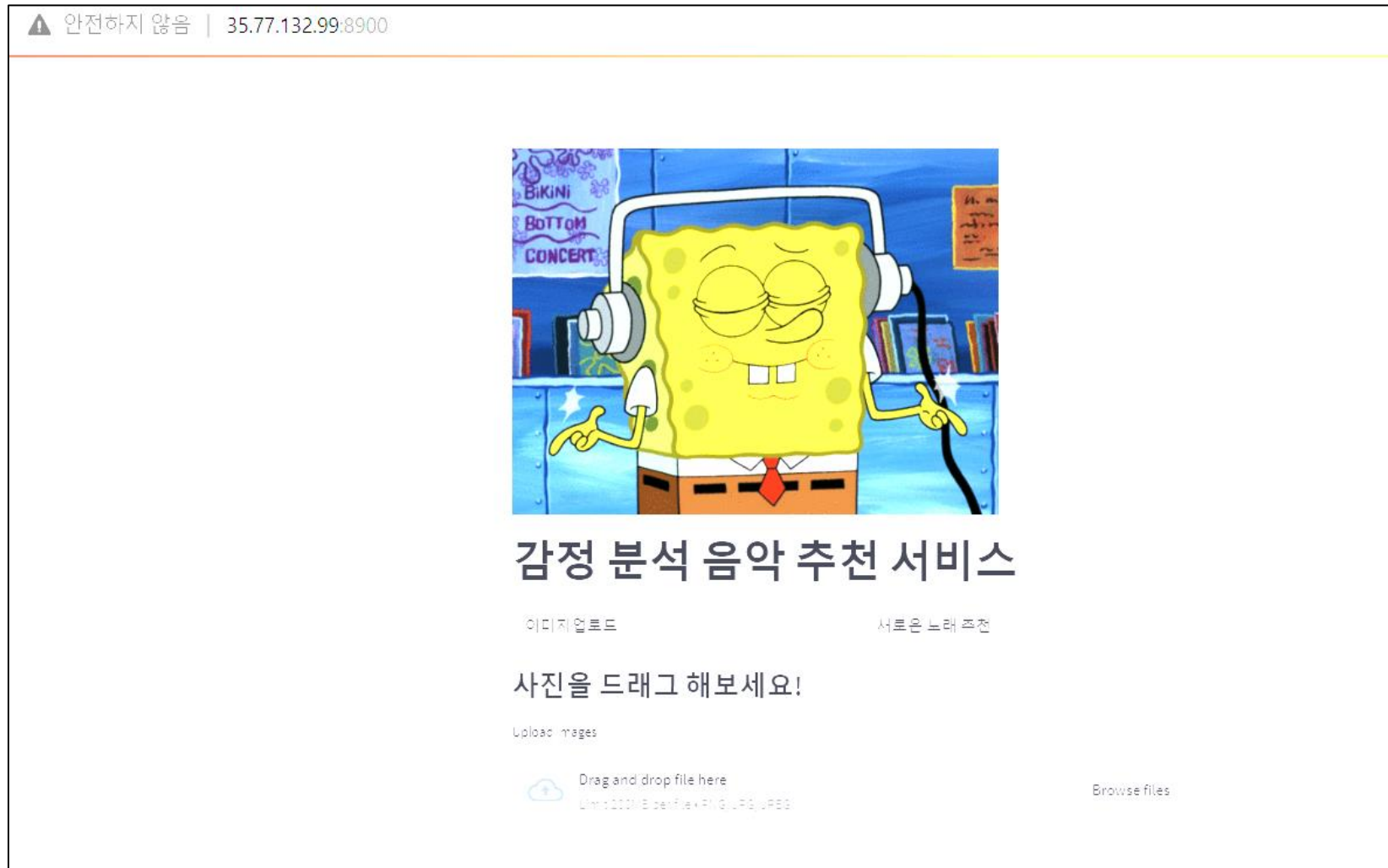
 마음 다해 사랑하는 일 (w...
Jung ji Young

 Moontanroad - solo ver...
D.no

 내일이 오면
김우주

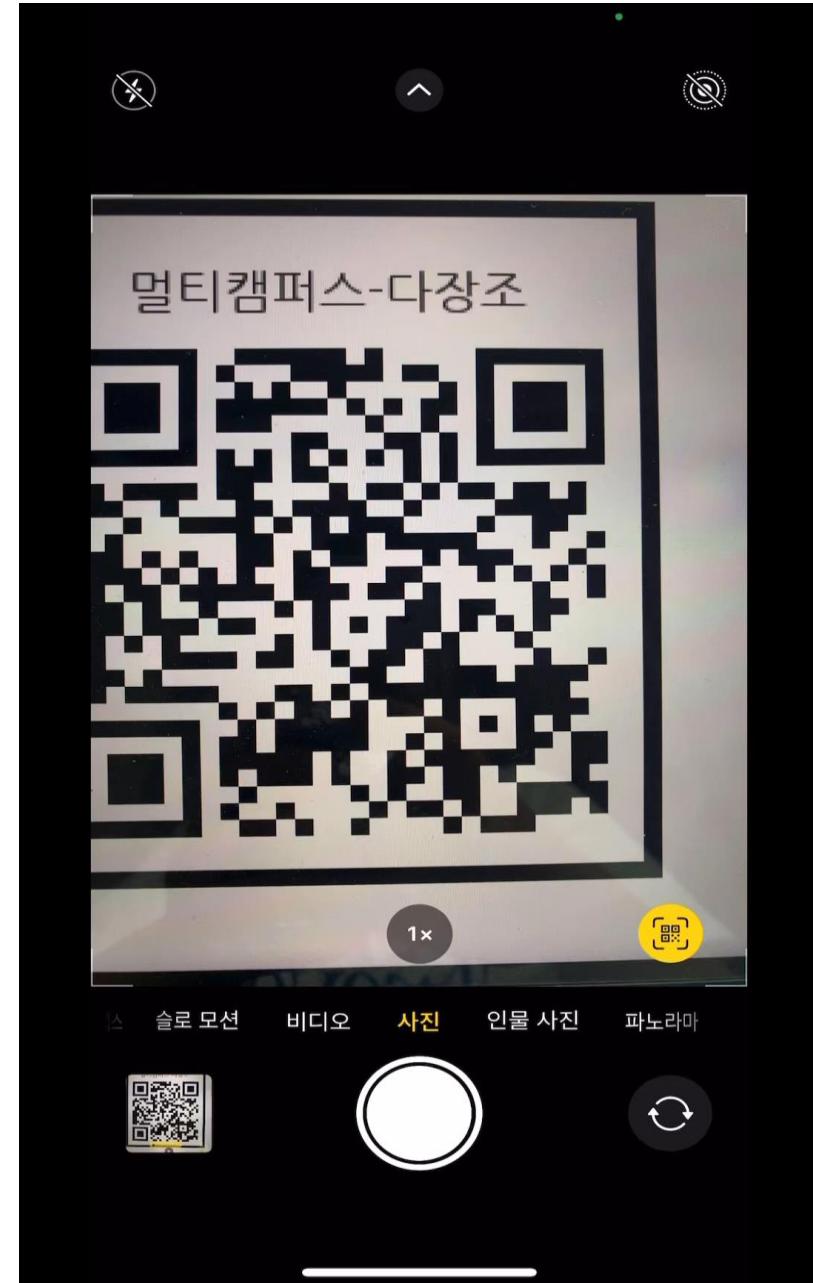
06 System Operator Guidelines

Web server

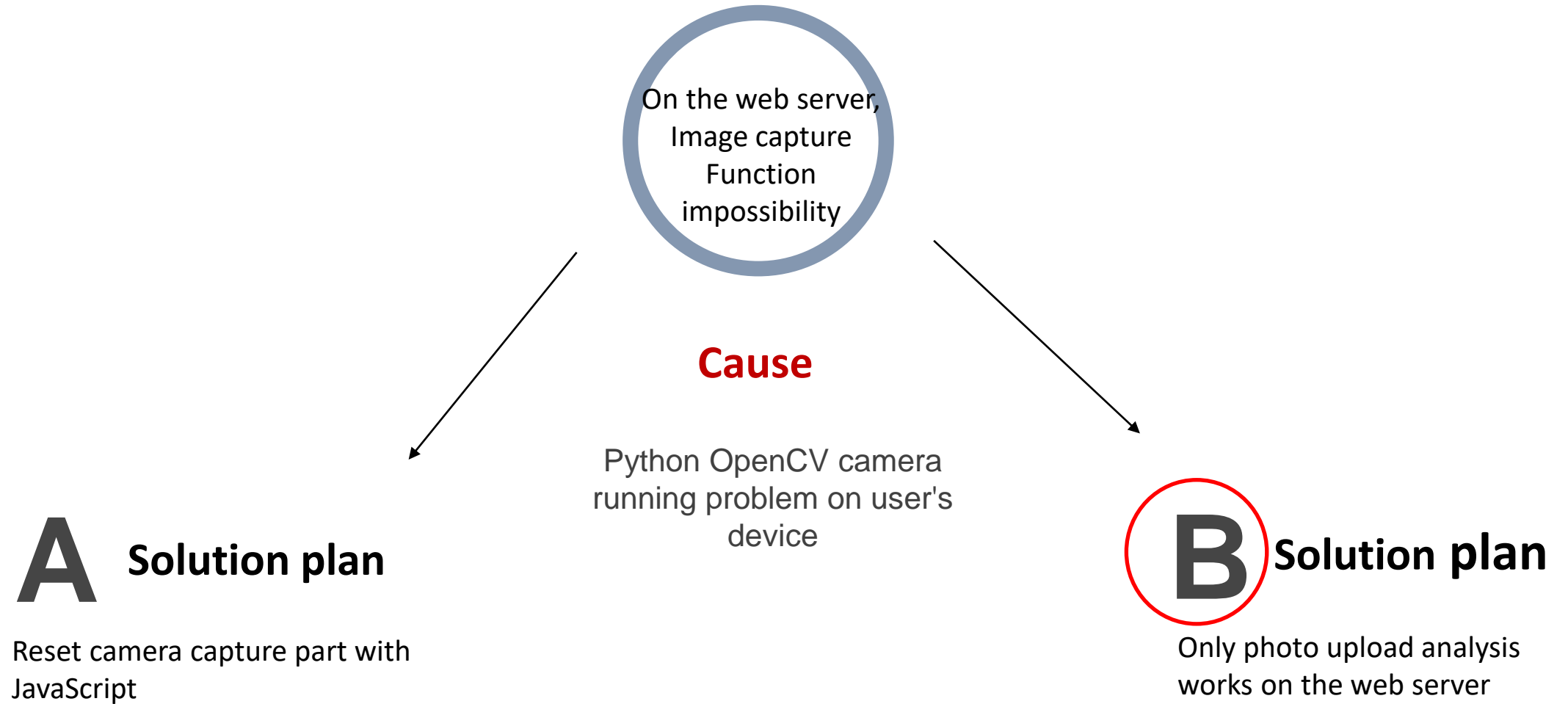


06 System Operator Guidelines

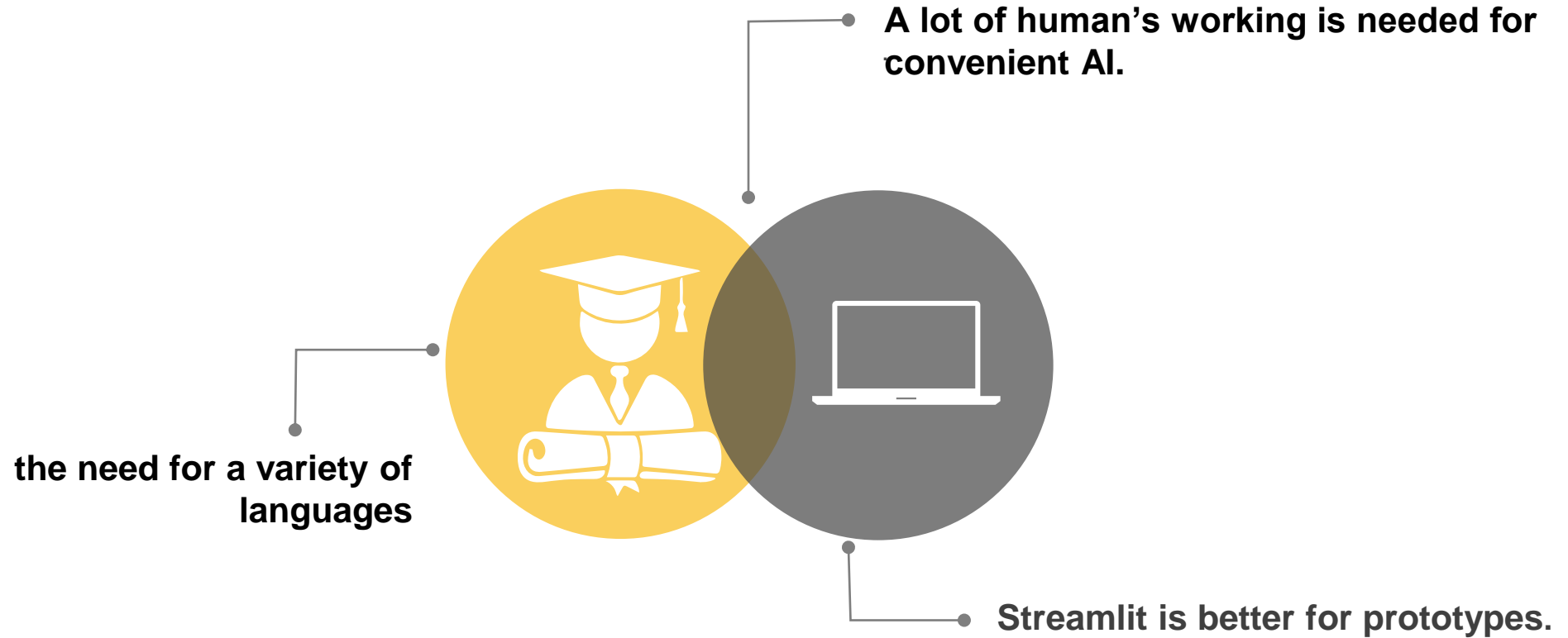
QR code



07 Problems and Solutions



08 Conclusion and Review



08 Conclusion and Review

Fewer people and less time

It is regrettable that various attempts could not be made due to the sudden decrease in the number of people. As the project deadline is approaching, it is very sorry that the cam drive could not be completed on the web.

Bad things

A lack of planning

It took a lot of time to solve problems because specific plans and accurate information of tools were not identified in advance.



Communication and cooperation among team members

It was a time to feel once again how important communication between team members is in a team project, and it was meaningful to be able to combine and produce good results

Good things

Acquire a variety of skills and knowledge

Through the project, I was able to study and learn knowledge that was not present in addition to each major. It was good to be able to understand deep learning and face recognition principles and to be able to access various technologies.



THANK YOU

Music Recommendation