

MiniCV

Dash Project



keokim
hyopark
minjkim2

Bitmap, Image Processing

42
| SEOUL

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42Seoul 2022 Eduthon

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1. Overview



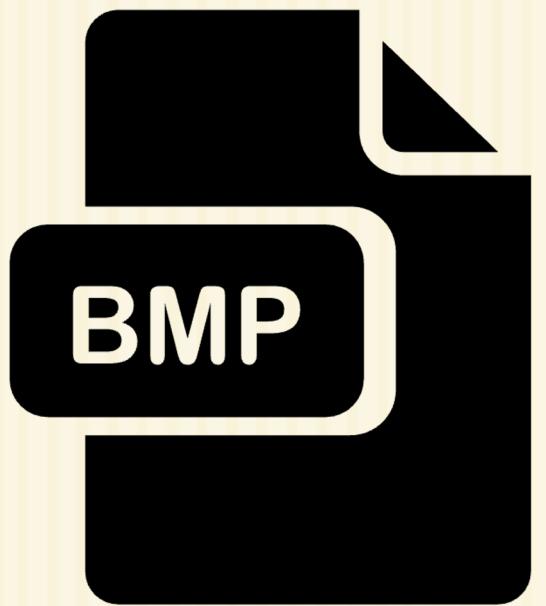
Dashes

The Dash is a short-time project

1. Overview



Based on C

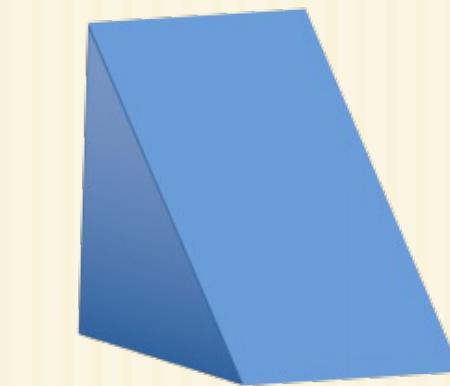


Bitmap Structure

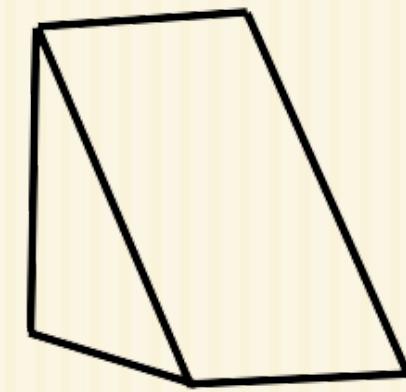


Basic of Image Processing

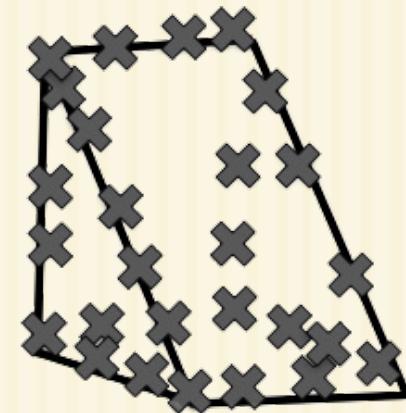
1. Overview



(a) Original picture



(b) Differentiated picture



(c) Feature points selected



1960s

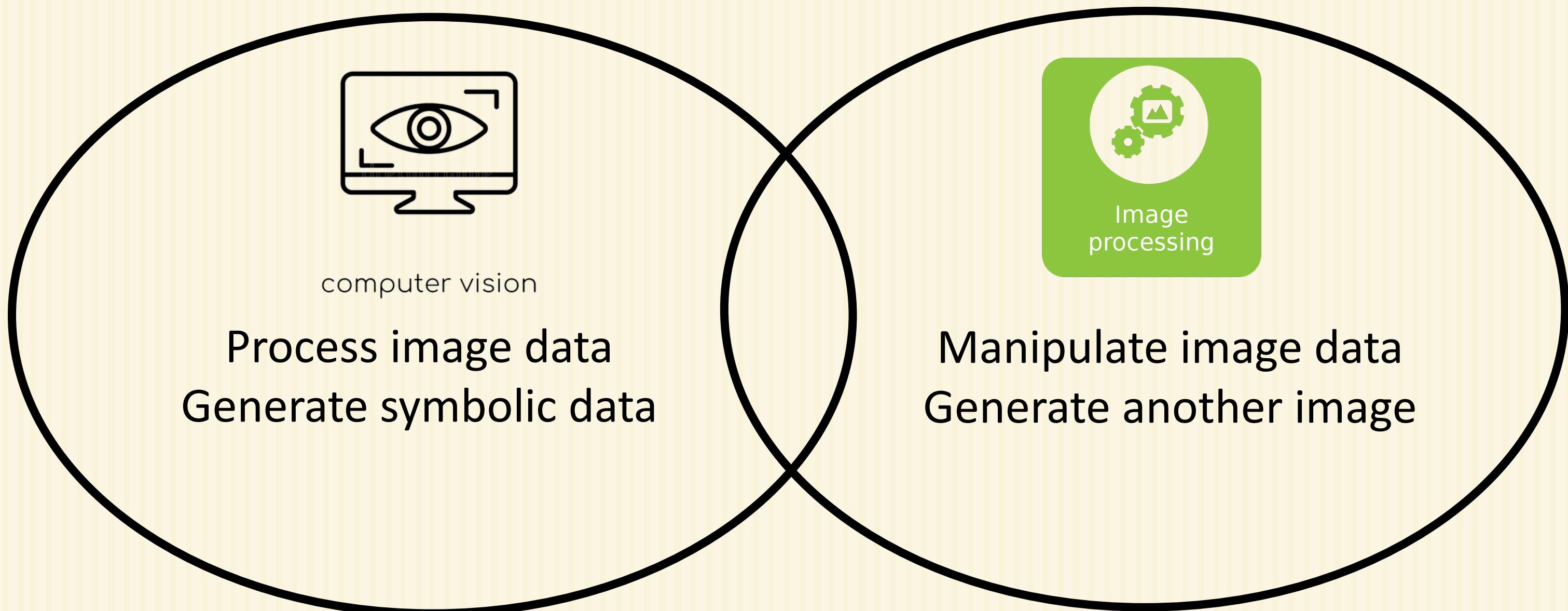
Larry Roberts' Black World



2020s

AI, Deep Learning, Automatic Drive

1. Overview



2. Project Description



Dash - MiniCV

MiniCV

Summary: bitmap, image processing

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2. Project Description



Chapter I

Introduction

Image processing is already used in many fields. Medical field, Transmission and encoding, Robot vision, Pattern recognition etc. Did you know that you can handle bitmap images in C without using OpenCV? This project offers you an opportunity to learn about bitmap structure and image processing basics. We will provide the bitmap image you will use for the project.

The beautiful palace in the picture is Gyeongbokgung Palace in South Korea. Gyeongbokgung Palace was built in 1395, burned down by the war in 1592, and re-built in 1868. Although most of the buildings in the palace have disappeared, the main buildings remain, and it is an important historical site where you can check the appearance of the royal palace in South Korea. However, the image of this beautiful Gyeongbokgung Palace is ruined. You need to restore this image.



2. Project Description



Chapter II

General rules

- Your project must be written in accordance with the Norm. If you have bonus files/functions, they are included in the norm check and you will receive a 0 if there is a norm error inside.
- Your functions should not quit unexpectedly (segmentation fault, bus error, double free, etc) apart from undefined behaviors. If this happens, your project will be considered non functional and will receive a 0 during the evaluation.
- All heap allocated memory space must be properly freed when necessary. **No leaks will be tolerated.**
- If the subject requires it, you must submit a Makefile which will compile your source files to the required output with the flags -Wall -Wextra and -Werror, and your Makefile must not relink.
- Your Makefile must at least contain the rules \$(NAME), all, clean, fclean, and re.
- We encourage you to create test programs for your project even though this work won't have to be submitted and won't be graded. It will give you a chance to easily test your work and your peers' work. You will find those tests especially useful during your defence. Indeed, during defence, you are free to use your tests and/or the tests of the peer you are evaluating.

2. Project Description

ex00



Chapter III

Mandatory part

Exercise 00: RGB to BGR



Exercise : 00

Program name : RGB2BGR

Turn-in directory : *ex00/*

File to turn in : Makefile, *.c */*.c, *.h, */*.h

Allowed functions : fopen, fread, fwrite, fclose, fprintf, fseek, malloc, free, exit

Description : Restore the given bmp file to the original image



The color of the picture has changed.

Write a program that restores the original picture.

Your program must save the **original.bmp** file.

The evaluation is conducted by comparing the original bitmap file with the recovered bitmap file.

Apply the same rule to all subsequent exercises.

We will provide you bitmap structure.



Do you know the **-fpack-struct** compiler flag?

2. Project Description

ex00



```
typedef struct s_file_header
{
    unsigned short      bf_type;
    unsigned int        bf_size;
    unsigned short      bf_reserved1;
    unsigned short      bf_reserved2;
    unsigned int        bf_off_bits;
} t_file_header;

typedef struct s_info_header
{
    unsigned int        bi_size;
    int                bi_width;
    int                bi_height;
    unsigned short      bi_planes;
    unsigned short      bi_bit_count;
    unsigned int        bi_compression;
    unsigned int        bi_size_image;
    int                bi_x_pels_per_meter;
    int                bi_y_pels_per_meter;
    unsigned int        bi_clr_used;
    unsigned int        bi_clr_important;
} t_info_header;
```



The color of the picture has changed.

Write a program that restores the original picture.

Your program must save the **original.bmp** file.

The evaluation is conducted by comparing the original bitmap file with the recovered bitmap file.

Apply the same rule to all subsequent exercises.

We will provide you bitmap structure.



Do you know the **-fpack-struct** compiler flag?

2. Project Description

ex00



```
typedef struct s_file_header
{
    unsigned short      bf_type;
    unsigned int        bf_size;
    unsigned short      bf_reser
    unsigned short      bf_reser
    unsigned int        bf_off_b
} t_file_header;

typedef struct s_info_header
{
    unsigned int        bi_size;
    int                bi_width
    int                bi_heigh
    unsigned short      bi_plane
    unsigned short      bi_bit_c
    unsigned int        bi_compr
    unsigned int        bi_size_
    int                bi_x_pel
    int                bi_y_pel
    unsigned int        bi_clr_u
    unsigned int        bi_clr_i
} t_info_header;
```



with the

2. Project Description

ex01



Exercise 01: Upside down / Right to left



Exercise : 01

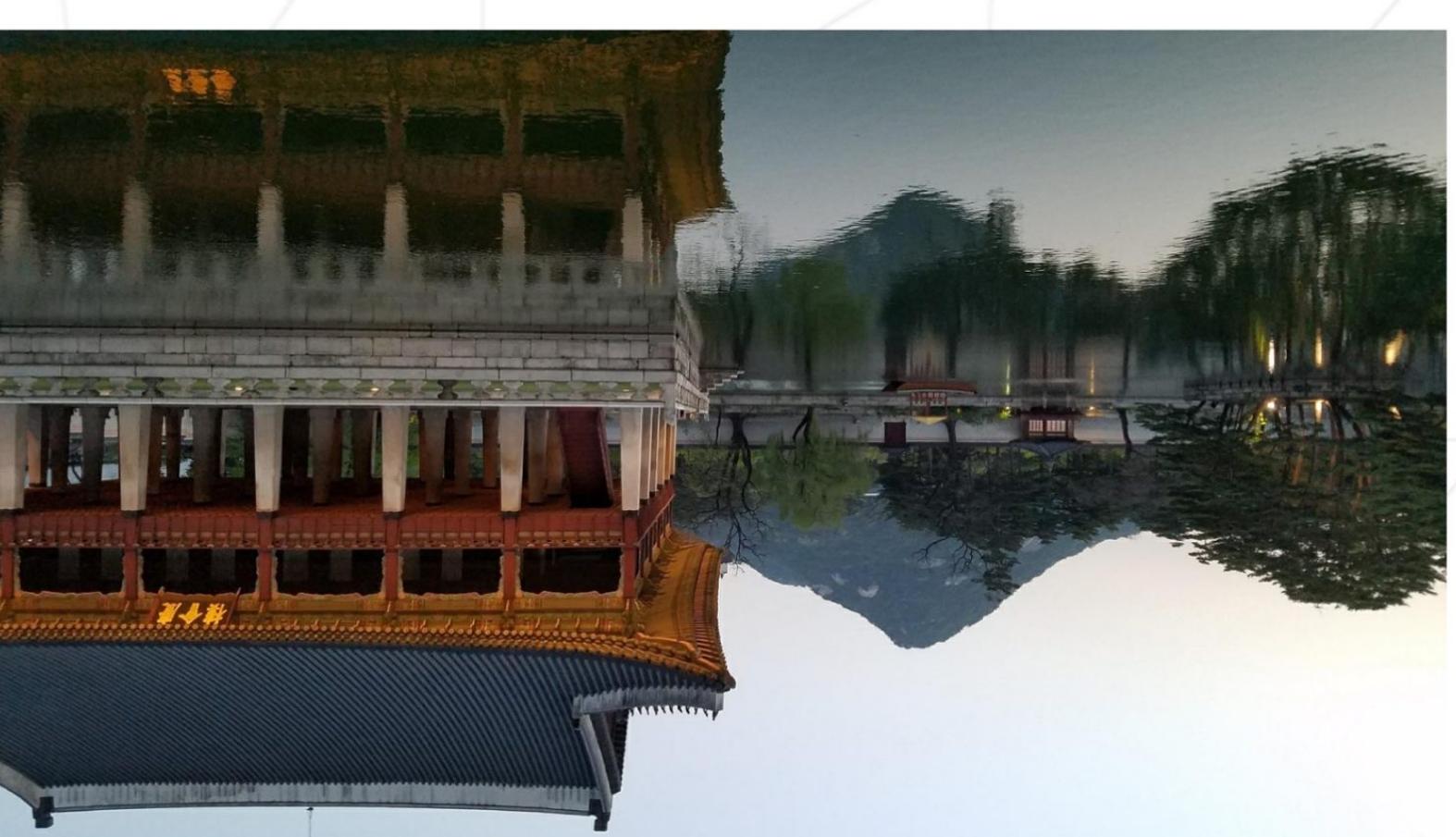
Program name : reverse

Turn-in directory : *ex01/*

File to turn in : Makefile, *.c */*.c, *.h, */*.h

Allowed functions : fopen, fread, fwrite, fclose, fprintf, fseek, malloc, free, exit

Description : Restore the given bmp file to the original image



2. Project Description ex02



Chapter IV

Bonus part

Exercise 02: Zoom in

	Exercise : 02
Program name : zoom	
Turn-in directory : <i>ex02/</i>	
File to turn in : Makefile, *.c */*.c, *.h, */*.h	
Allowed functions : fopen, fread, fwrite, fclose, fprintf, fseek, malloc, free, exit	
Description : Write a program that magnifies a original bitmap file	

You can pass this dash-project without doing exercise 02.

Don't spend too much time on bonus.

There are many ways to zoom in, but the choice is freedom.

Write a program that stores a given bitmap file to double magnification.

2. Project Description

eval



Automatic Evaluation (Mandatory)



Peer Evaluation (Bonus)

2. Project Description

tester



```
Minjun ▶ 42_Eduthon/MiniCV ▶ main ± ./tester.sh
=====Norm Test=====
Norm pass
=====Ex00=====
RGB2BGR : ./objects/ deleted
RGB2BGR : RGB2BGR deleted
RGB2BGR : ./objects/ created
.....
RGB2BGR : object files created
RGB2BGR : RGB2BGR created
Ex00 compile pass
Ex00 diff pass
=====Ex01=====
reverse : ./objects/ deleted
reverse : reverse deleted
reverse : ./objects/ created
.....
reverse : object files created
reverse : reverse created
Ex01 compile pass
Ex01 diff pass
=====Ex02=====
zoom : ./objects/ deleted
zoom : zoom deleted
zoom : ./objects/ created
.....
zoom : object files created
zoom : zoom created
Ex02 compile pass

Test all passed :)
```

```
Minjun ▶ 42Seoul/42_Eduthon ▶ main ± ./tester.sh
=====Norm Test=====
Norm pass
=====Ex00=====
./tester.sh: line 24: cd: ex00: No such file or directory
Ex00 compile fail
Test failed :(
```

- Check Norminette
- Check compile error
- Compare with original via diff command
- Check if it's normal execution
(check exit code)

2. Project Description

tester



```
Minjun 42_Eduthon/MiniCV ✘ main ± ./tester.sh
=====Norm Test=====
Norm pass
=====Ex00=====
RGB2BGR : ./objects/ deleted
RGB2BGR : RGB2BGR deleted
RGB2BGR : ./objects/ created
.....
RGB2BGR : object files created
RGB2BGR : RGB2BGR created
Ex00 compile pass
Ex00 diff pass
=====Ex01=====
reverse : ./objects/ deleted
reverse : reverse deleted
reverse : ./objects/ created
.....
reverse : object files created
reverse : reverse created
Ex01 compile pass
Ex01 diff pass
=====Ex02=====
zoom : ./objects/ deleted
zoom : zoom deleted
zoom : ./objects/ created
.....
zoom : object files created
zoom : zoom created
Ex02 compile pass

Test all passed :)
```

2. Project Description

Demonstration



A screenshot of a terminal window titled "Demonstration". The window has a dark theme with white text. At the top left is a file browser sidebar showing a folder named "DEMONS..." containing "img", "MiniCV", and "tester.sh". The main area of the terminal shows a large, dark blue "X" logo centered on the screen. Below the logo, there is a navigation bar with tabs: "문제", "출력", "터미널" (Terminal), and "디버그 콘솔" (Debug Console). The "터미널" tab is currently selected. Below the tabs, the word "Demonstration" is followed by a small yellow square icon. At the bottom of the terminal window, there are several small icons and status indicators, including "zsh", a "+" sign, a downward arrow, an upward arrow, and an "X".

2. Project Description

feedback



Focused on

- Appropriate level
- Completeness
- Light and fun process
- Fully understanding bitmap structure

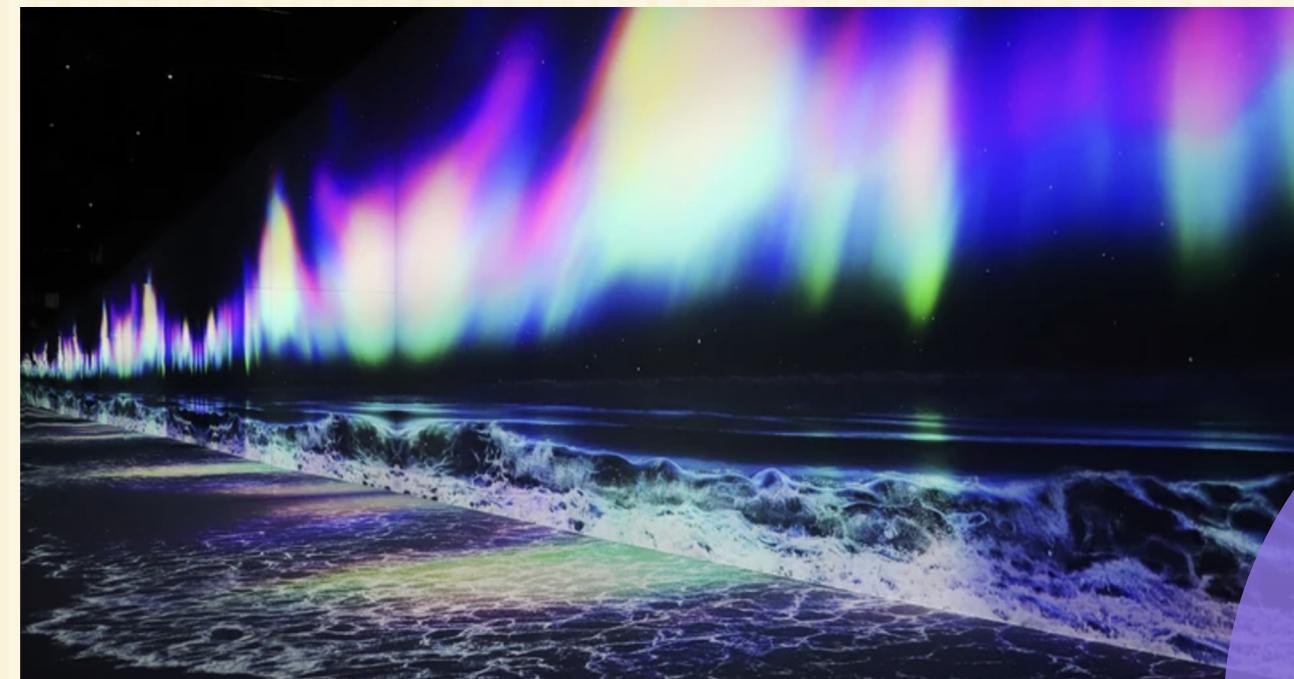
Reflect feedback

- Limit allowed functions
- Input/output using FILE stream only
- Provide bitmap structure

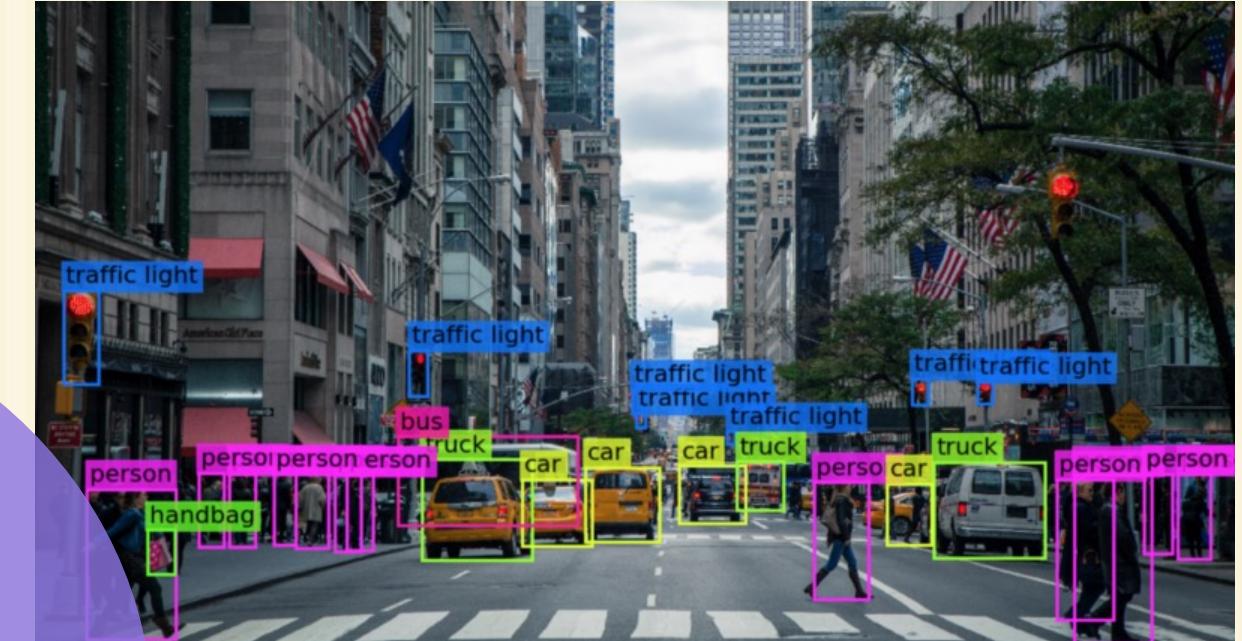
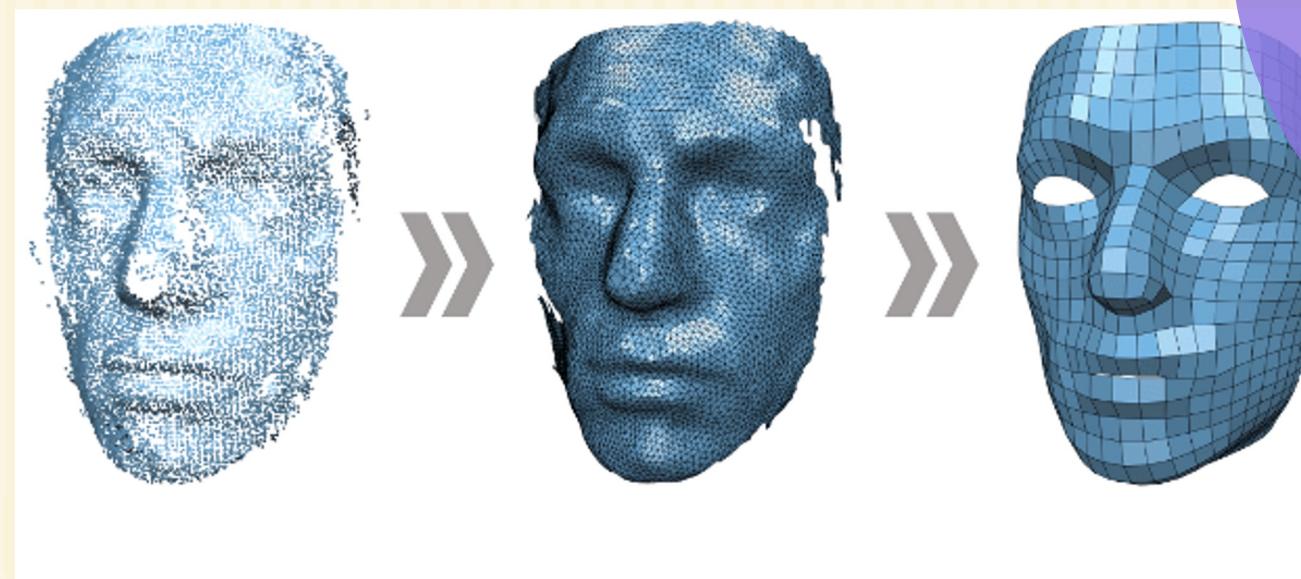
FEEDBACK



3. Purpose & Expectations



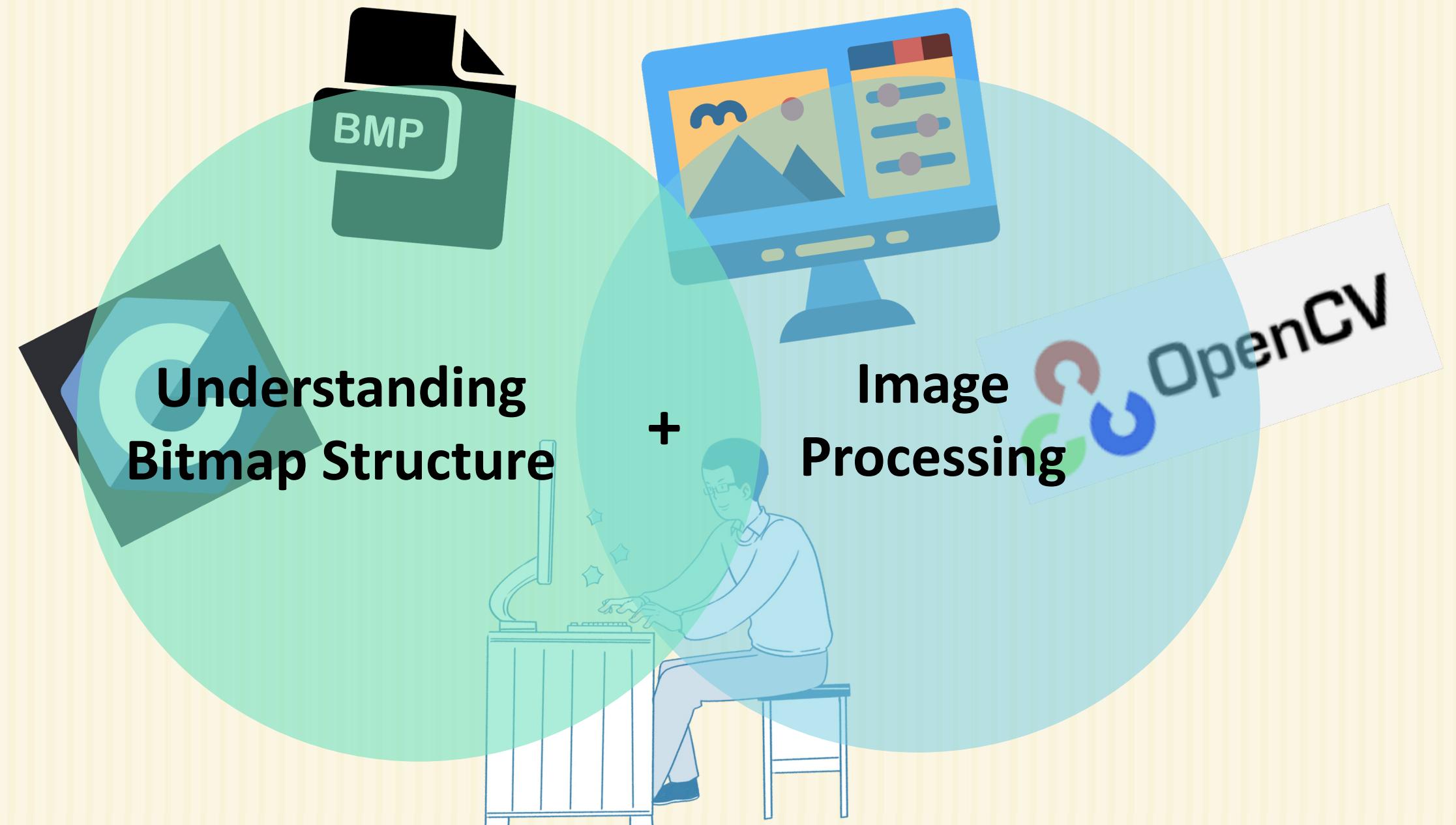
Increasing
interest
in image
processing



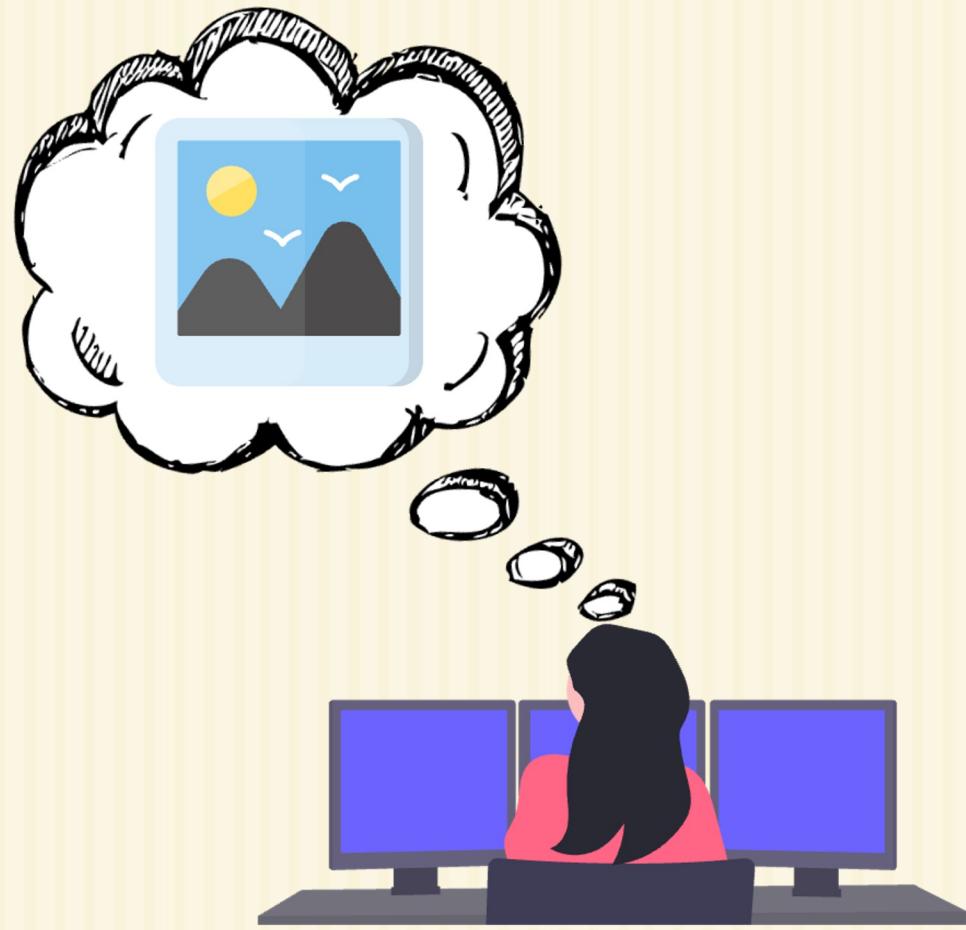
```
(cv3)malcolm:template-matching-ocr adrianrosebrock$ python ocr_a_reference.png
Credit Card Type: MasterCard
Credit Card #: 5476767898765432
```



3. Purpose & Expectations



3. Purpose & Expected effects



Provide visual elements
Raise interest in solving problems



The process of fixing broken
image is like playing game

4. Development Potential



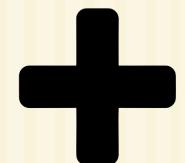
Intensive course

Nearest Neighbor Interpolation
(Zero Order Interpolation)

Bilinear Interpolation
(First Order Interpolation)

High Order Interpolation

Cubic Interpolation



42 Cursus

Graphic Projects

FdF

so long

fract-ol

minRT

cub3d



Don't worry about if you won't have enough time,
but worry about whether you'll be able to do your best with all your heart.

King Jeongjo, 22nd king of Joseon

모든 일에 있어서 시간이 부족하지 않을까를 걱정하지 말고
다만 내가 마음을 바쳐 최선을 다할 수 있을지 그것을 걱정하라

조선 22대왕 정조



MiniCV Github Link

https://github.com/keonwoo98/42_Eduthon

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