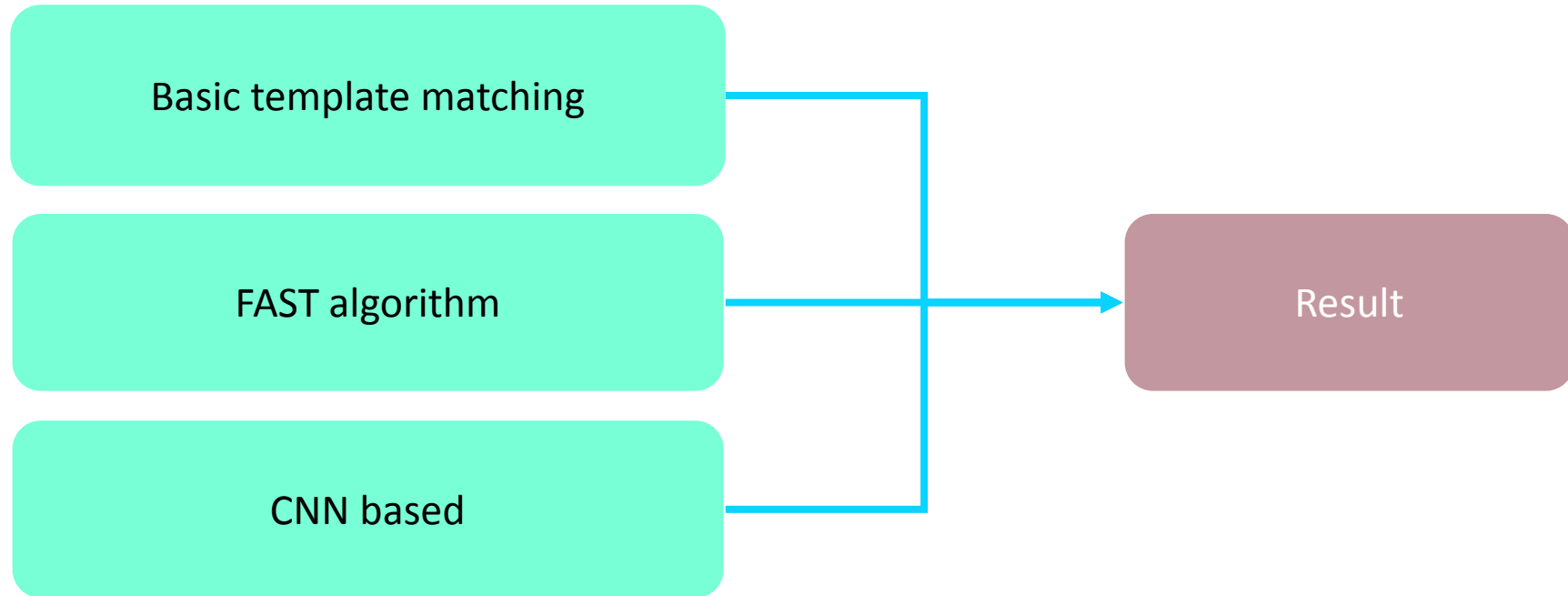


The Computer Vision Mid-term Demo

Template matching corner detection

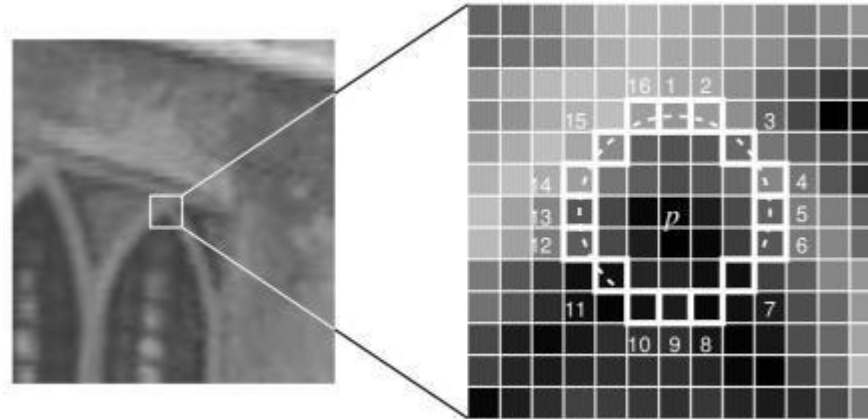
Outline



Template Matching Corner Detection

$$\begin{bmatrix} -4 & 5 & 5 \\ -4 & 5 & 5 \\ -4 & -4 & -4 \end{bmatrix} \quad \begin{bmatrix} 5 & 5 & -4 \\ 5 & 5 & -4 \\ -4 & -4 & -4 \end{bmatrix} \quad \begin{bmatrix} -4 & -4 & -4 \\ 5 & 5 & -4 \\ 5 & 5 & -4 \end{bmatrix} \quad \begin{bmatrix} -4 & -4 & -4 \\ -4 & 5 & 5 \\ -4 & 5 & 5 \end{bmatrix}$$
$$\begin{bmatrix} 5 & 5 & 5 \\ -4 & 5 & -4 \\ -4 & -4 & -4 \end{bmatrix} \quad \begin{bmatrix} -4 & -4 & 5 \\ -4 & 5 & 5 \\ -4 & -4 & 5 \end{bmatrix} \quad \begin{bmatrix} -4 & -4 & -4 \\ -4 & 5 & -4 \\ 5 & 5 & 5 \end{bmatrix} \quad \begin{bmatrix} 5 & -4 & -4 \\ 5 & 5 & -4 \\ 5 & -4 & -4 \end{bmatrix}$$

Features from Accelerated Segment Test



CNN Structure



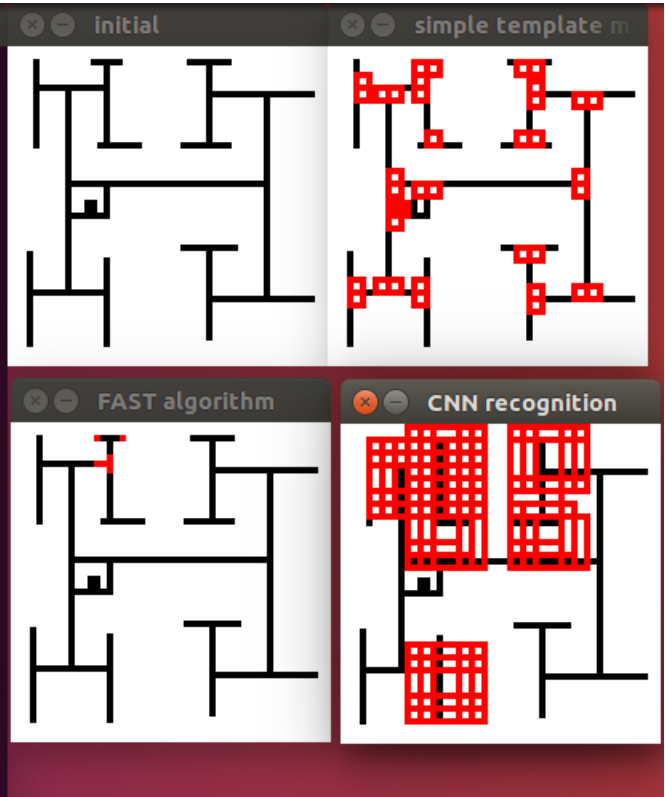
Result



Image with single width and rigid corner

```
sunner@sunner-PC: ~/Save/computer_vision/final
sunner@sunner-PC:~/Save/computer_vision/final$ python main.py
(50, 50)
Finish 1 template matching...
Finish 2 template matching...
Finish 3 template matching...
Finish 4 template matching...
Finish 5 template matching...
Finish 6 template matching...
Finish 7 template matching...
Finish 8 template matching...
(50, 50, 3)
(50, 50, 3)
please wait for a while to form the tensor...
Finish forming!
Tensor size: (484, 8, 8, 1)

-----
Time (sec)
-----
template matching: 0.132229089737
FAST               : 0.399680137634
CNN                : 0.672029018402
(50, 50, 3)
█
```



The image displays four windows illustrating different image processing techniques applied to a handwritten digit '4' on a white background. The windows are arranged in a 2x2 grid:

- initial**: Shows the original image of the digit '4'.
- simple template m**: Shows the result of simple template matching, with red boxes indicating detected features or matches.
- FAST algorithm**: Shows the result of the FAST (Feature from Accelerated Structure Thresholding) algorithm, with red dots indicating detected corner points.
- CNN recognition**: Shows the result of CNN (Convolutional Neural Network) recognition, with red boxes indicating detected features or regions of interest.

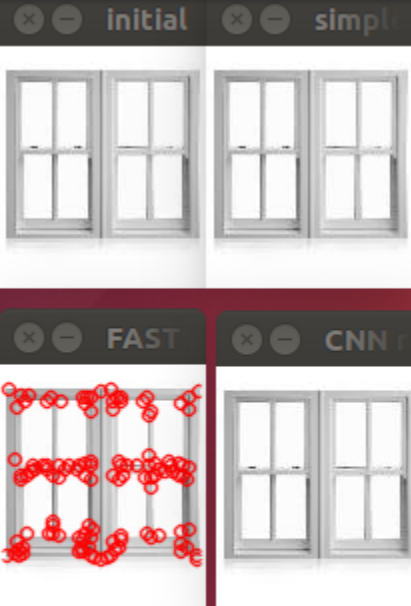
Image with single width and various corner



Natural Image

```
sunner@sunner-PC: ~/Save/computer_vision/final
sunner@sunner-PC:~/Save/computer_vision/final$ python main.py -n window.jpg
Finish 1 template matching...
Finish 2 template matching...
Finish 3 template matching...
Finish 4 template matching...
Finish 5 template matching...
Finish 6 template matching...
Finish 7 template matching...
Finish 8 template matching...
please wait for a while to form the tensor...
Finish forming!
Tensor size: (2793, 8, 8, 1)

-----
Time (sec)
-----
template matching: 0.752769947052
FAST              : 0.679129838943
CNN               : 11.9693760872
█
```



Demo
