15EEE337 Digital Image Processing

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Last Lecture

- Segmentation

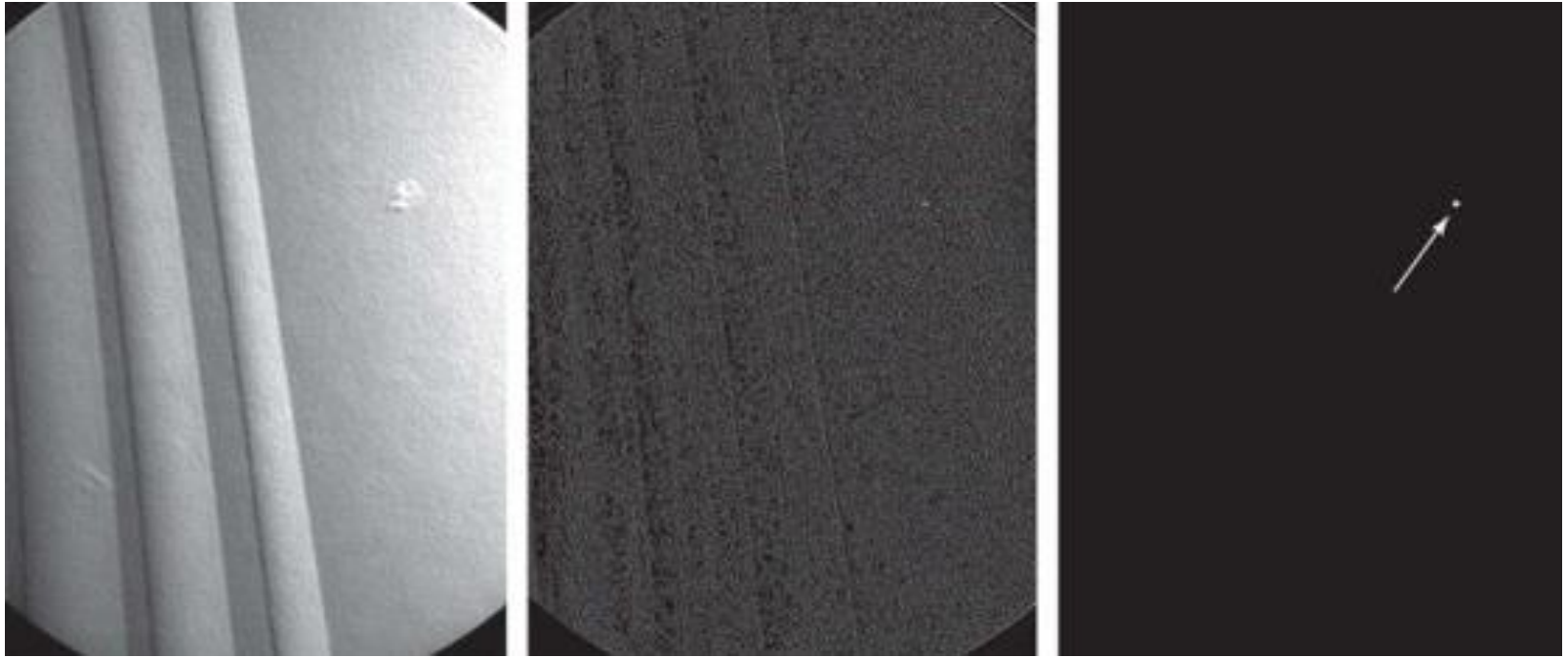
Detection of Isolated points

- Second order derivatives.
- Isolated point –different from its surroundings
- Intensity wise its different from surroundings
- Use kernel -->
- If the absolute value of the response of the filter at that

Point exceed a specific threshold

1	**1**	**1**
1	-8	**1**
1	**1**	**1**

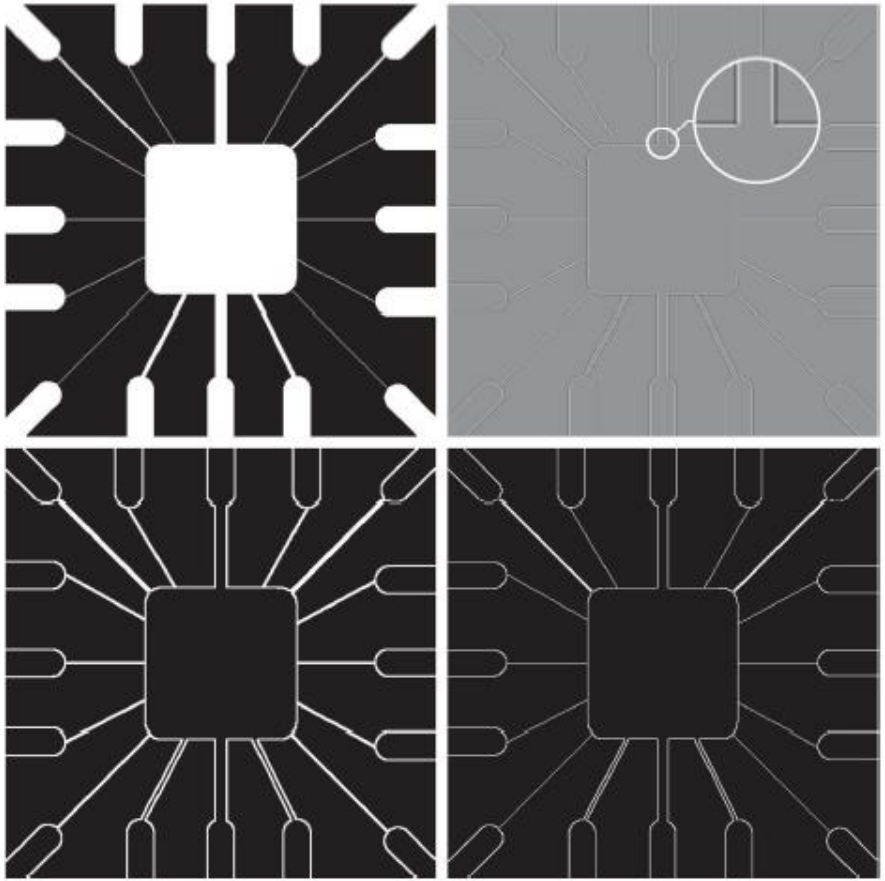
$$g(x,y) = \begin{cases} 1 & \text{if} |Z(x,y)| > T \\ 0 & \text{otherwise} \end{cases}$$



- Threshold 90% of the highest absolute pixel value of image

Line detection

- Second derivatives results in stronger filter response , thinner lines than first derivatives.
- Double line effect
- Absolute value of filtered image
- Positive values of filtered image



−1	−1	−1
2	2	2
−1	−1	−1

Horizontal

2	−1	−1
−1	2	−1
−1	−1	2

+45°

−1	2	−1
−1	2	−1
−1	2	−1

Vertical

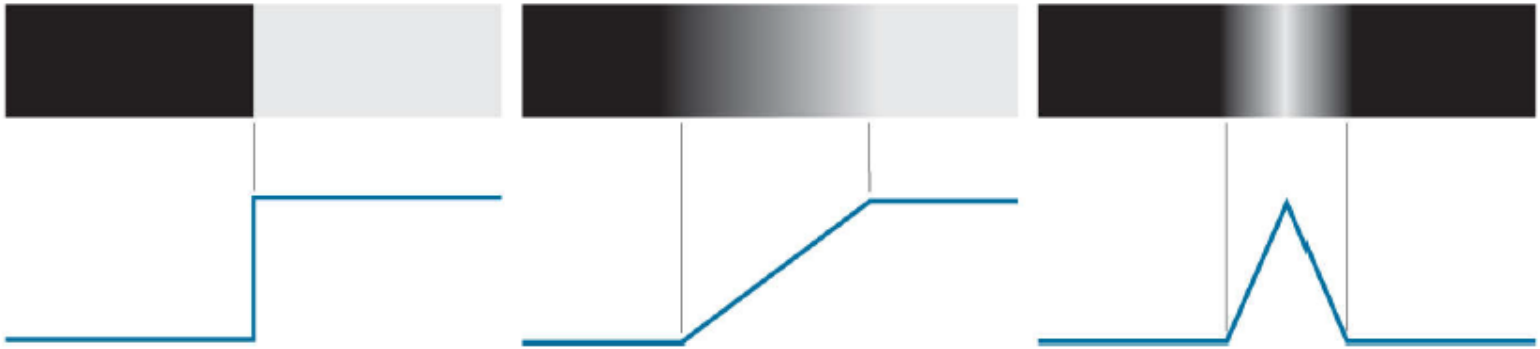
−1	−1	2
−1	2	−1
2	−1	−1

−45°

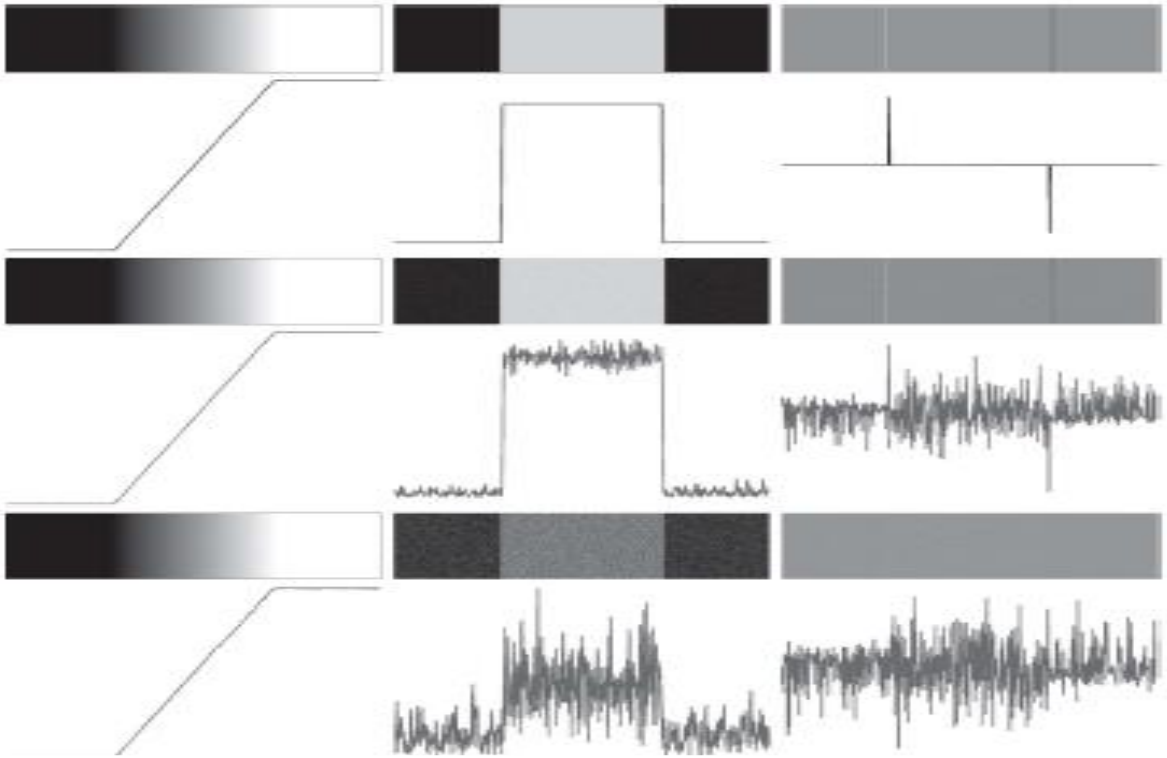
- Detecting lines in specified directions.

Edges

- Frequently used approach
- Abrupt changes in intensity.
- Edge models- intensity profiles.
- Step, ramp, roof edges



Impact of noise on first and second derivative



- The three steps performed typically for edge detection are
- **Image smoothing for noise reduction**
- **Detection of edge points**
- **Edge localization**

- Edge detection should yield set of pixels lying **only** on edges
- Edge detection followed by linking algorithms→ meaningful edges or boundaries.

Fitting approach

- Extraneous data
- Incomplete data
- Noise


THANK
YOU