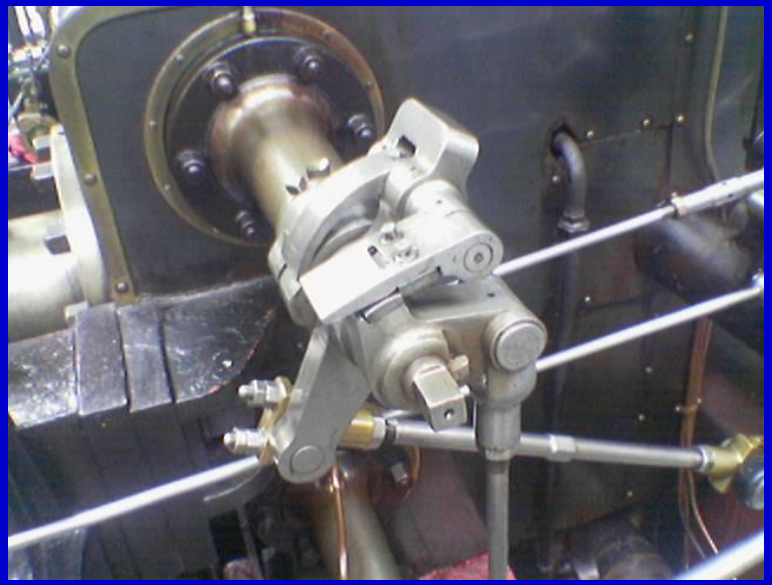
Edge detection

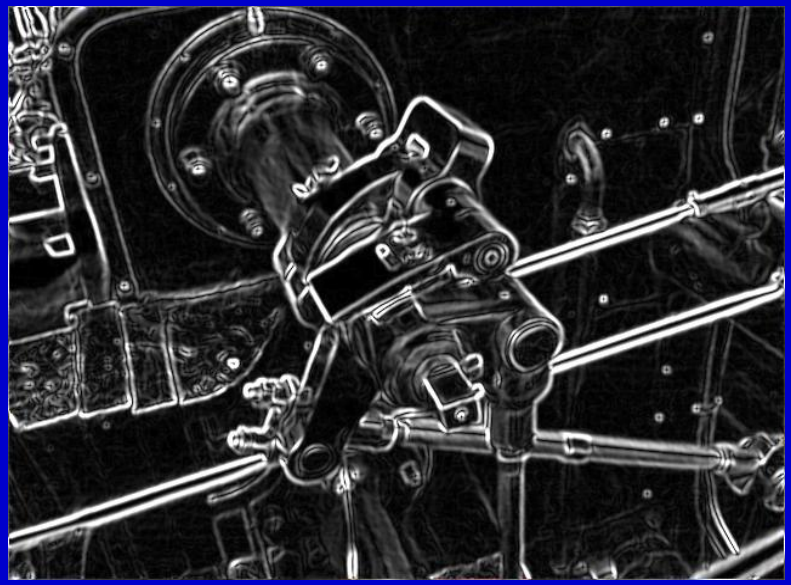
in digital images with Sobel operators

------Tongqing Bai

Main topics:

- approach
- Image data
- Use FPGA to get data





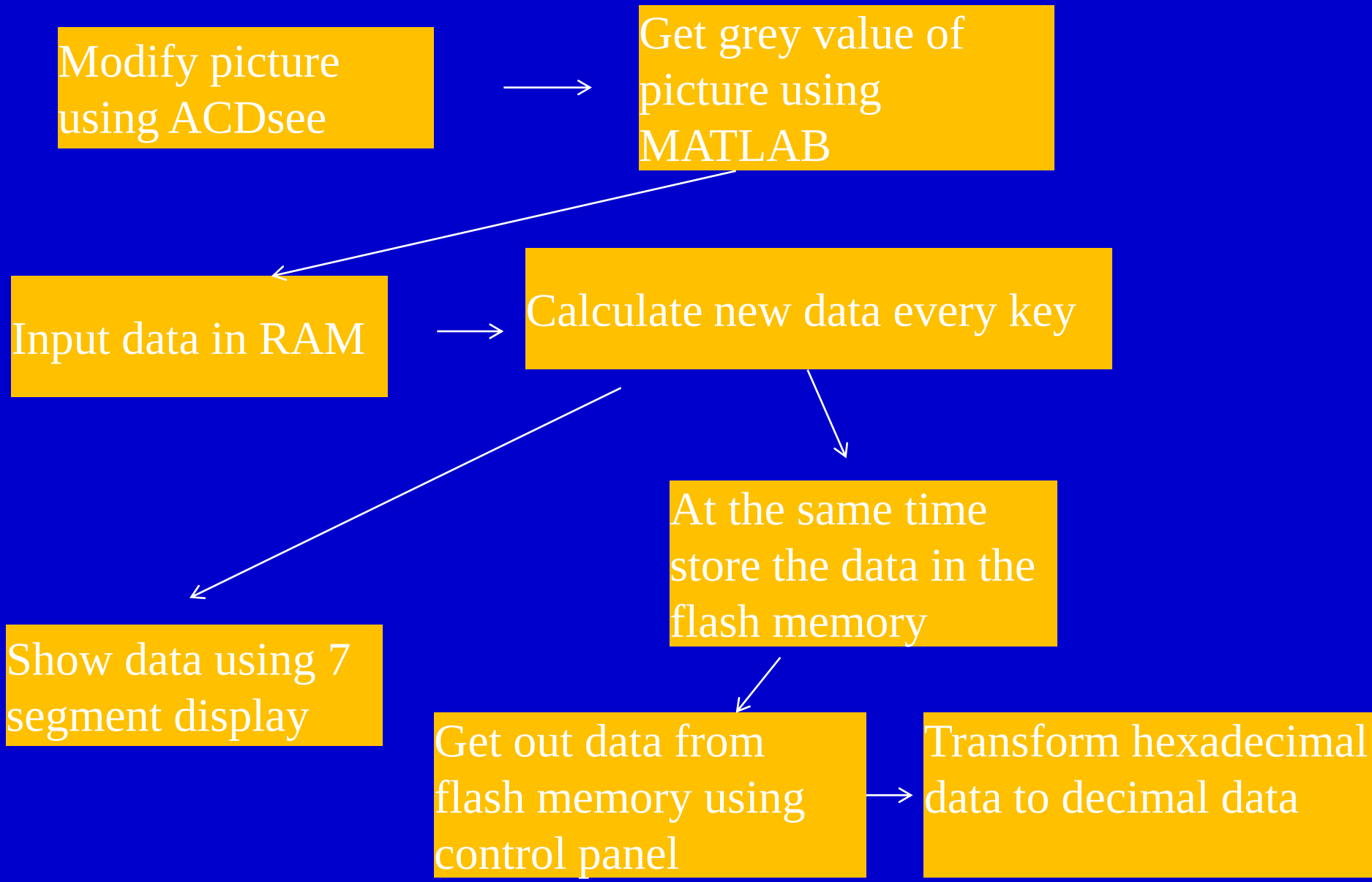
Origin

Edge detection

Sobel operator

$$\mathbf{G}_y = \begin{bmatrix} -1 & -2 & -1 \\ 0 & 0 & 0 \\ +1 & +2 & +1 \end{bmatrix} * \mathbf{A} \quad \text{and} \quad \mathbf{G}_x = \begin{bmatrix} -1 & 0 & +1 \\ -2 & 0 & +2 \\ -1 & 0 & +1 \end{bmatrix} * \mathbf{A}$$

$$\mathbf{G} = \sqrt{\mathbf{G}_x^{\,2} + \mathbf{G}_y^{\,2}}$$


Modify picture using ACDsee
Get grey value of picture using MATLAB
Input data in RAM
Calculate new data every key
At the same time store the data in the flash memory
Show data using 7 segment display
Get out data from flash memory using control panel
Transform hexadecimal data to decimal data

image



32bit * 32 bit , 8bpp

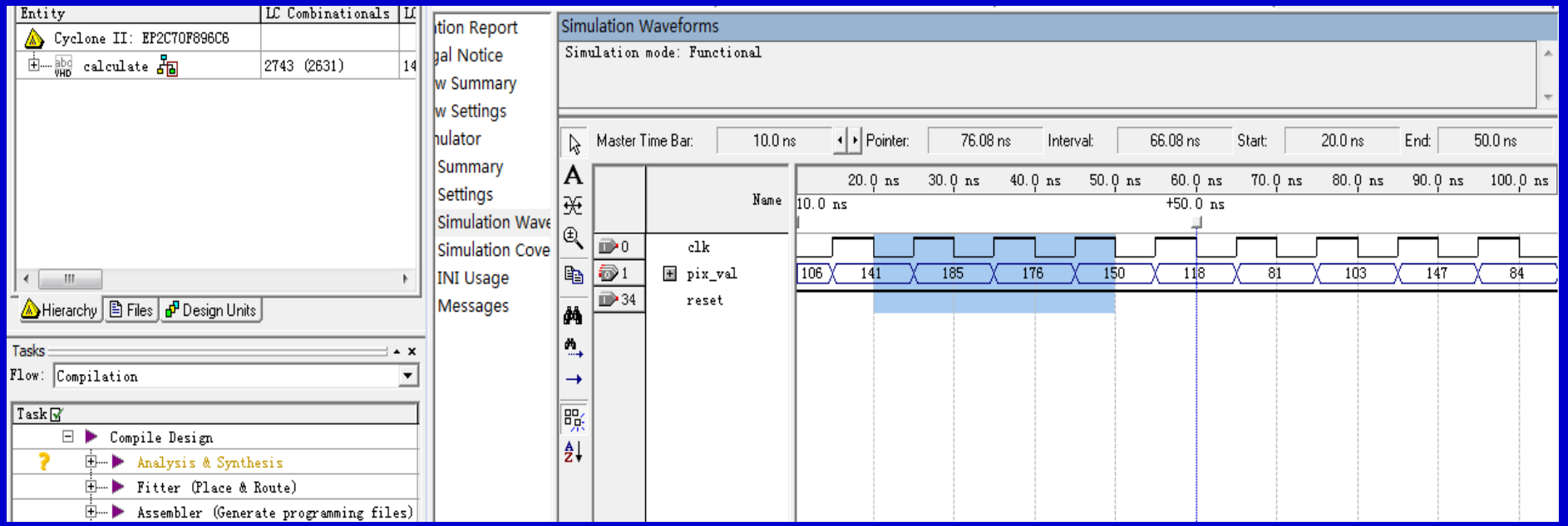
Put data into .mif and use RAM to process

Part of the image data

78	82	87	119	92	83	101	108
65	62	87	87	65	71	99	96
55	61	71	59	52	60	92	85
46	62	57	44	50	60	71	91
36	44	50	33	42	60	61	93
38	37	31	30	43	51	78	65
38	32	22	34	43	52	73	44
27	14	35	36	33	63	36	52

First 8 bit in row and first 8 bit in colomn

functional analysis



First four data(141,185,176,150) should be the same with 7-seg display and data from flash-memory

Learn

- Use ADCSee to do image processing
- Use MATLAB to get the data of image
- Use FPGA to do data processing and show these data through 7-seg display and flash-memory