

# 101年大學部國際交流甄選專題成果展



## Development of image technique to intelligent energy-saving air conditioner

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### ABSTRACT

This research use micro controller to develop a tracking system which can Automatically trace moving object. The tracking system has three parts: Image Capture, Image processing, Gravity finding. In order to plan a complicated project the research import a methodology for embedded system design concept to reduce the difficulty. This technology can use in air conditioner and lamp, which make them intelligent and energy-saving.

### IMAGE PROCESSING

First, Data receive from CMOS, and arrange the data become a image. Because the image is consisted of primary colors is difficult to do identification of person, then change the image pixels into grayscale which carries only intensity information.

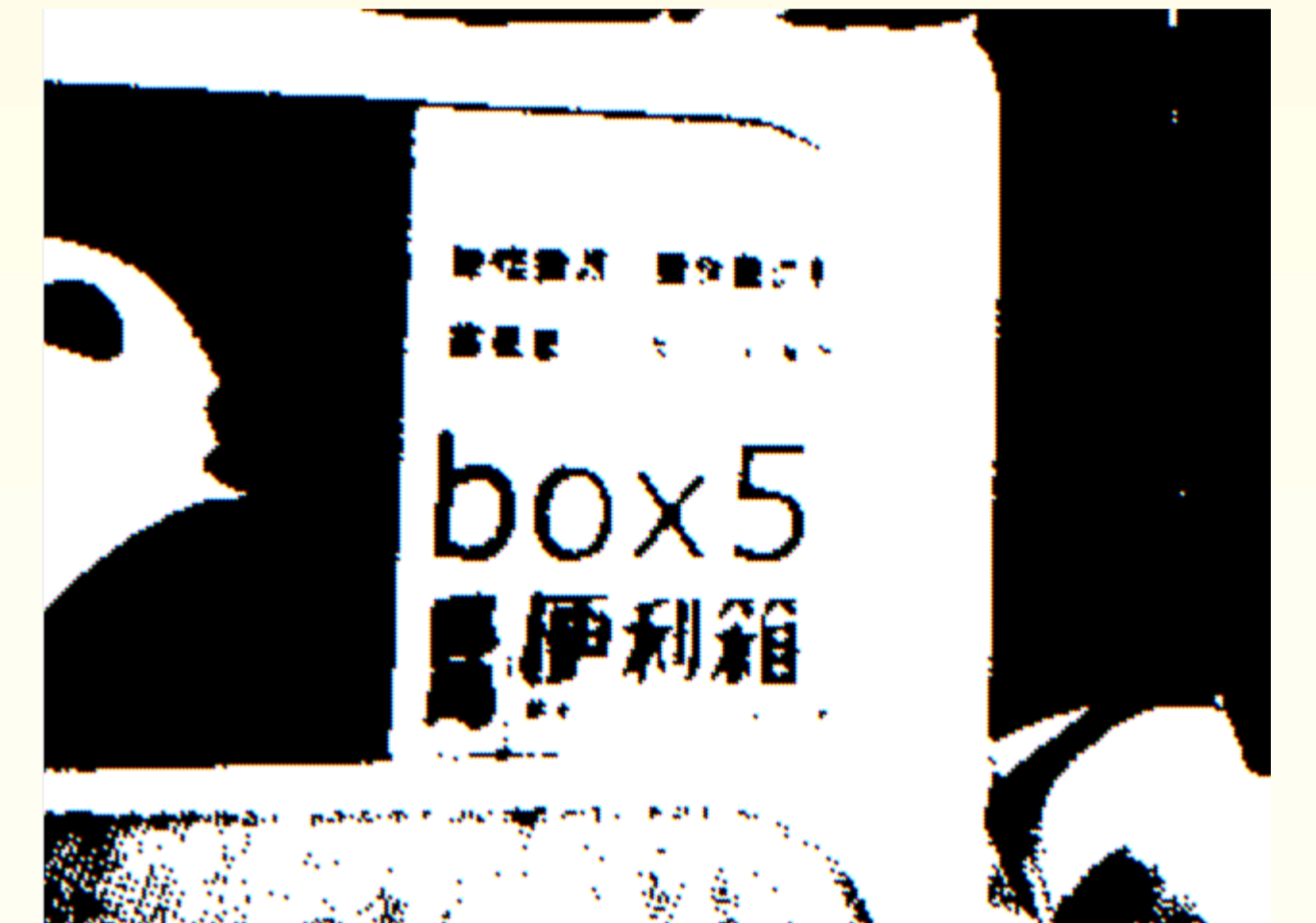
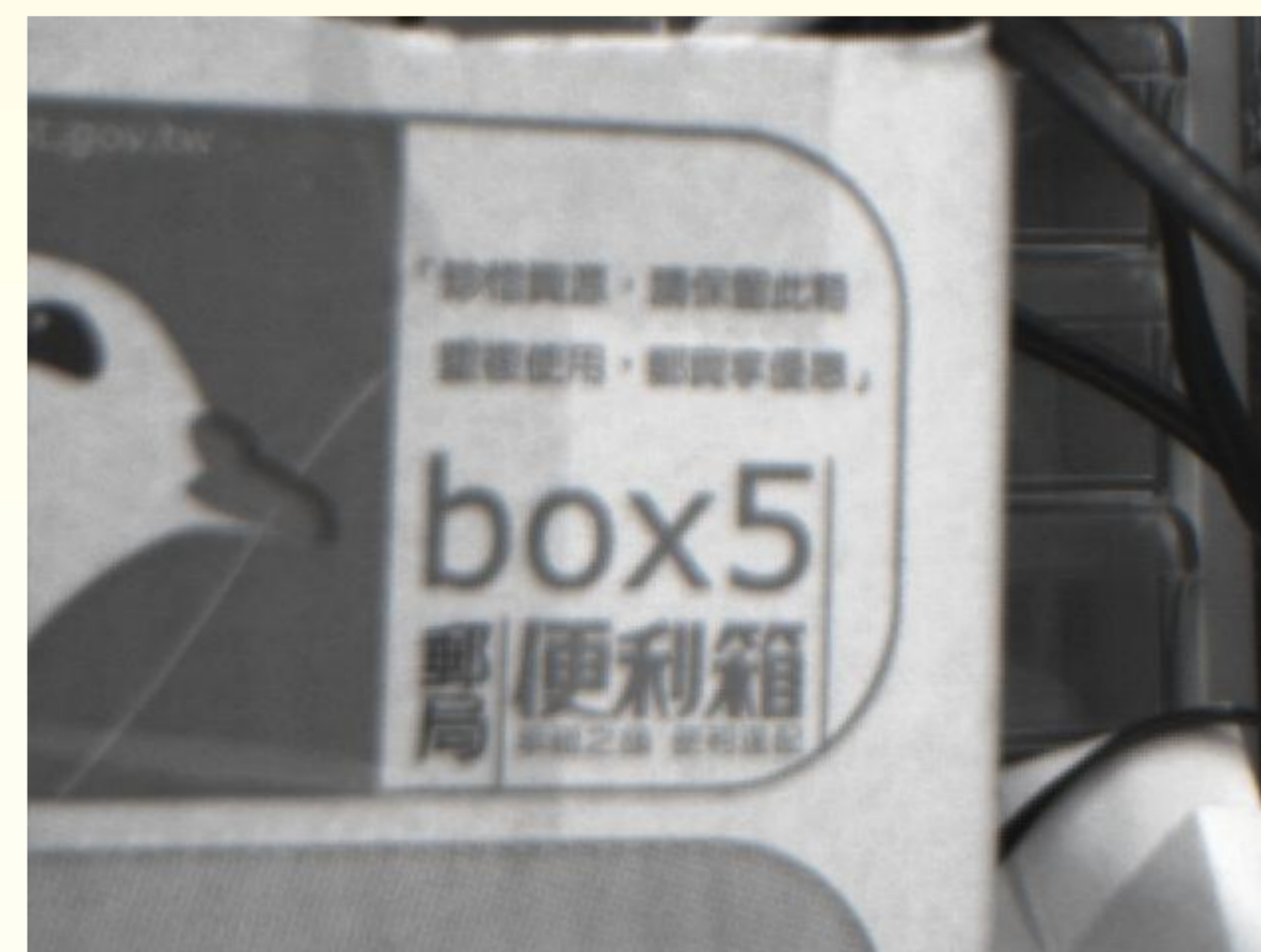


Fig.6 grayscale

Fig.7 Binary Image

For obviously to distinguish differences between images, then transfer the image to binary image. Thresholding can easily distinguish differences between two images.

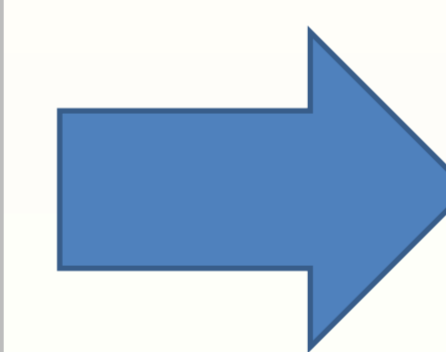
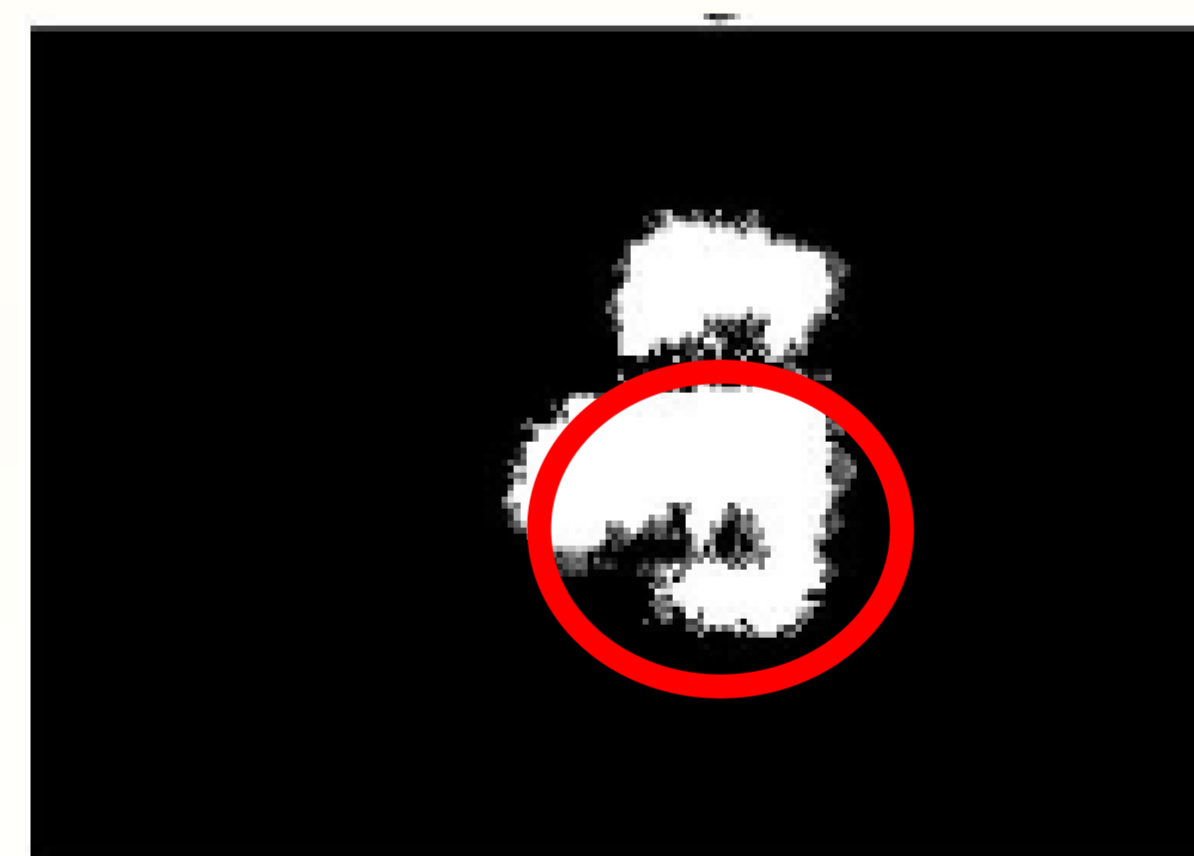


Fig.6 original image

Fig.6 object moving

Calculate image bright gravity center and mark the point, then compare two images each other. If the gravity center changes means object moving under the system, then then bright area is the target to trace.

### CONCLUSION

This research use micro controller instead of computer to do image processing and develop a tracking system. The system can use in intelligent air conditioner for the purpose of energy-saving.

In the future we could add function which could change thresholding by the luminance to make the system trace object precisely and faster.

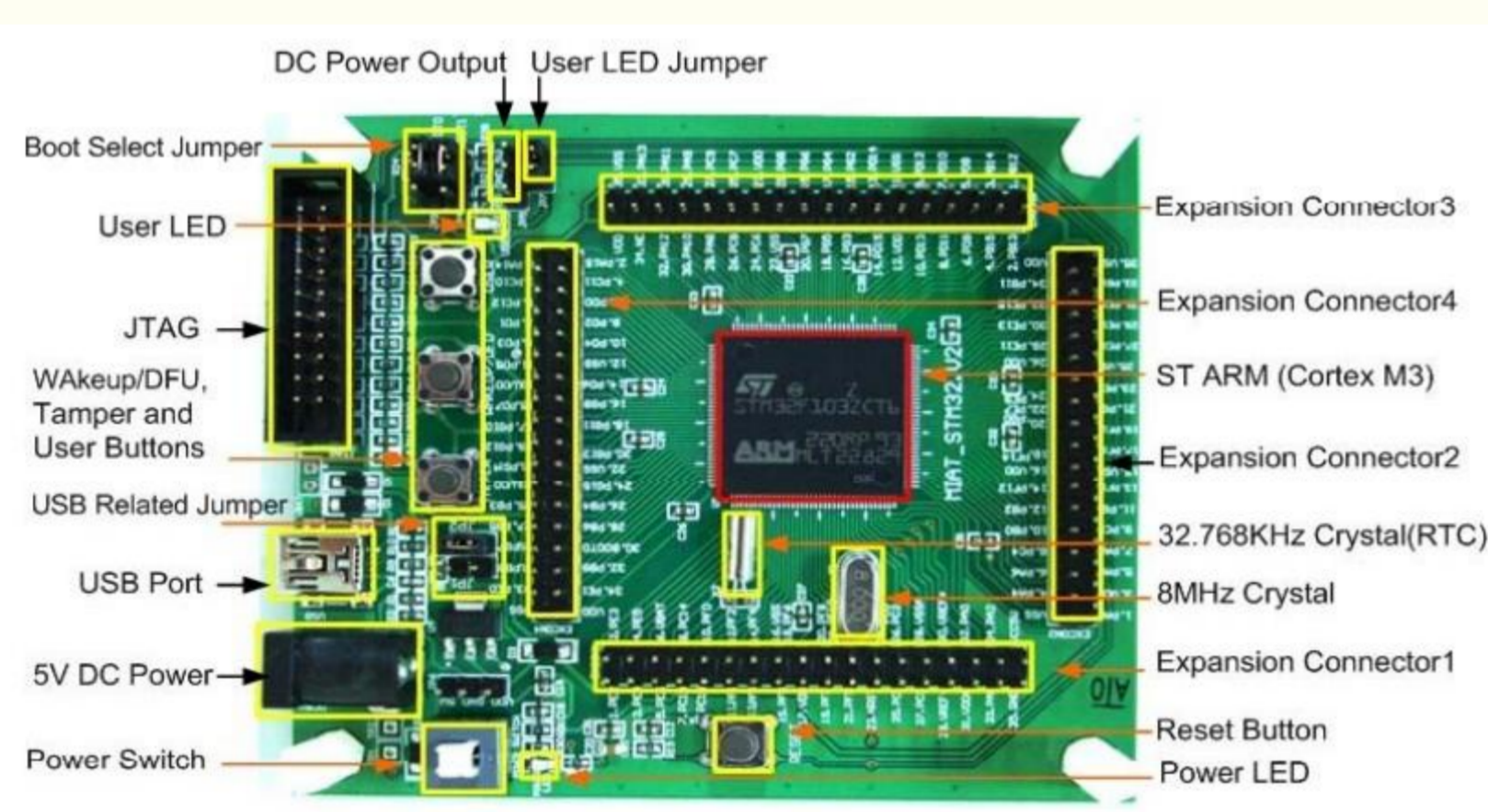


Fig.1 ARM Development kit



Fig.2 CMOS-MT9D111

### A METHODOLOGY OF EMBEDDED SYSTEM DESIGN

For developing a macro system, the methodology import IDEF0 as a tool to separate system Hierarchy and modules.

Apply the idea, the exploitation of a system would be parted many module.

the modules are independent with each other.

Developer just take care of the individual module.

Apply the mode of top down, through the mechanism of Thought-Forming as the foundation of process analysis and planning.

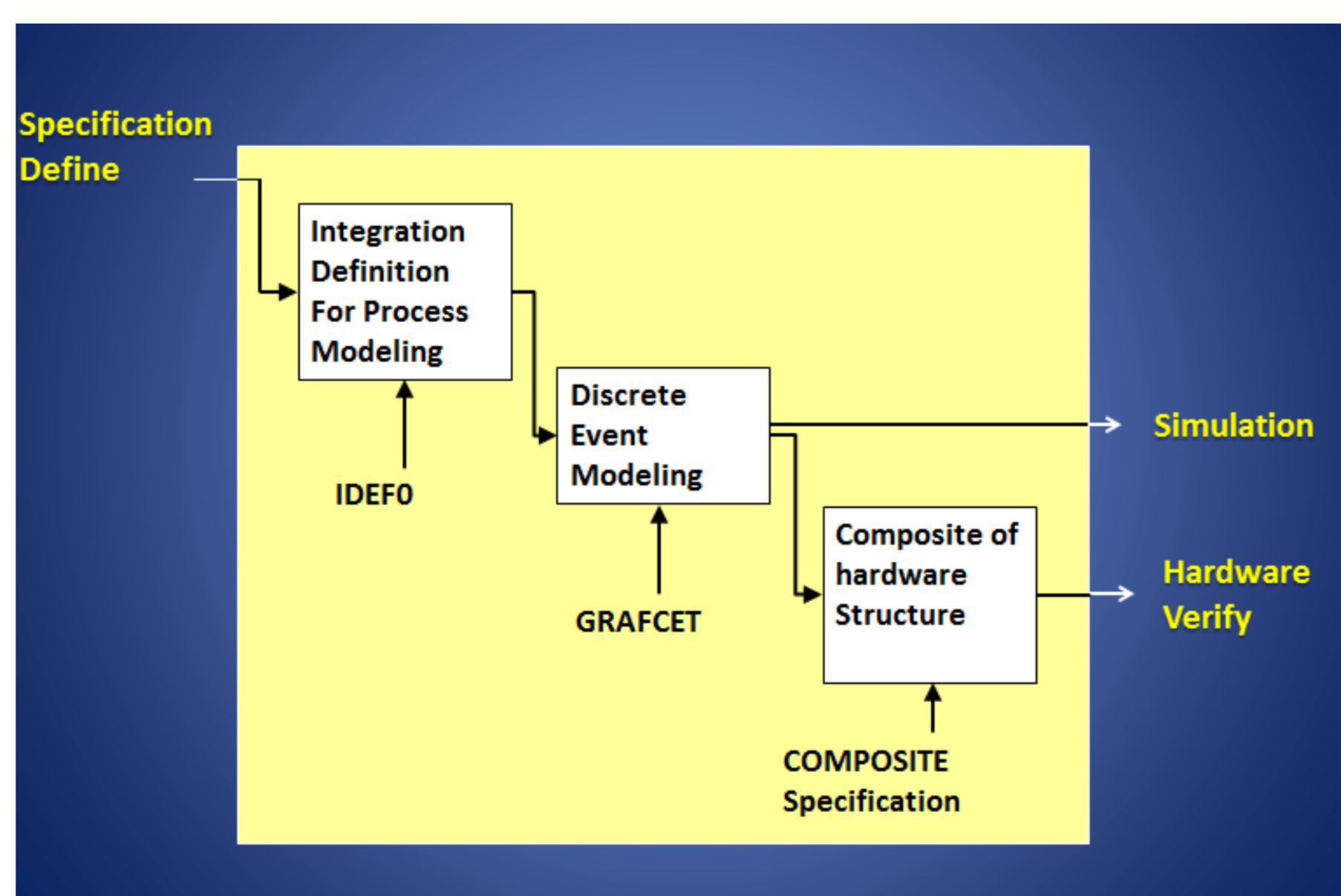


Fig.3 methodology of design

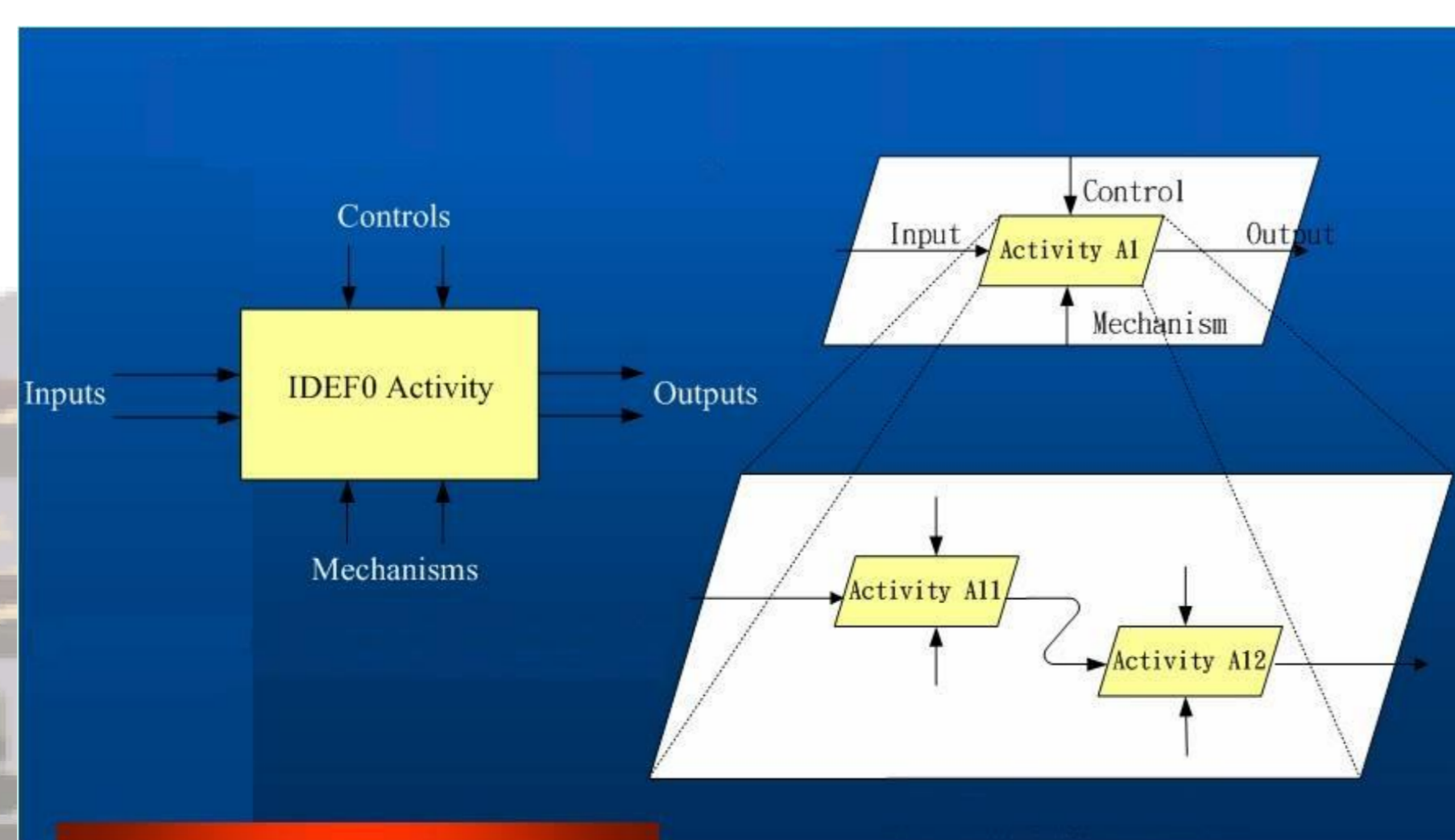


Fig.4 model of IDEF0

