New GPU-FPGA ideas for 1ms:
Object Pose Prediction on GPU
& End-to-End Network on FPGA

Weekly Seminar

2025/4/1

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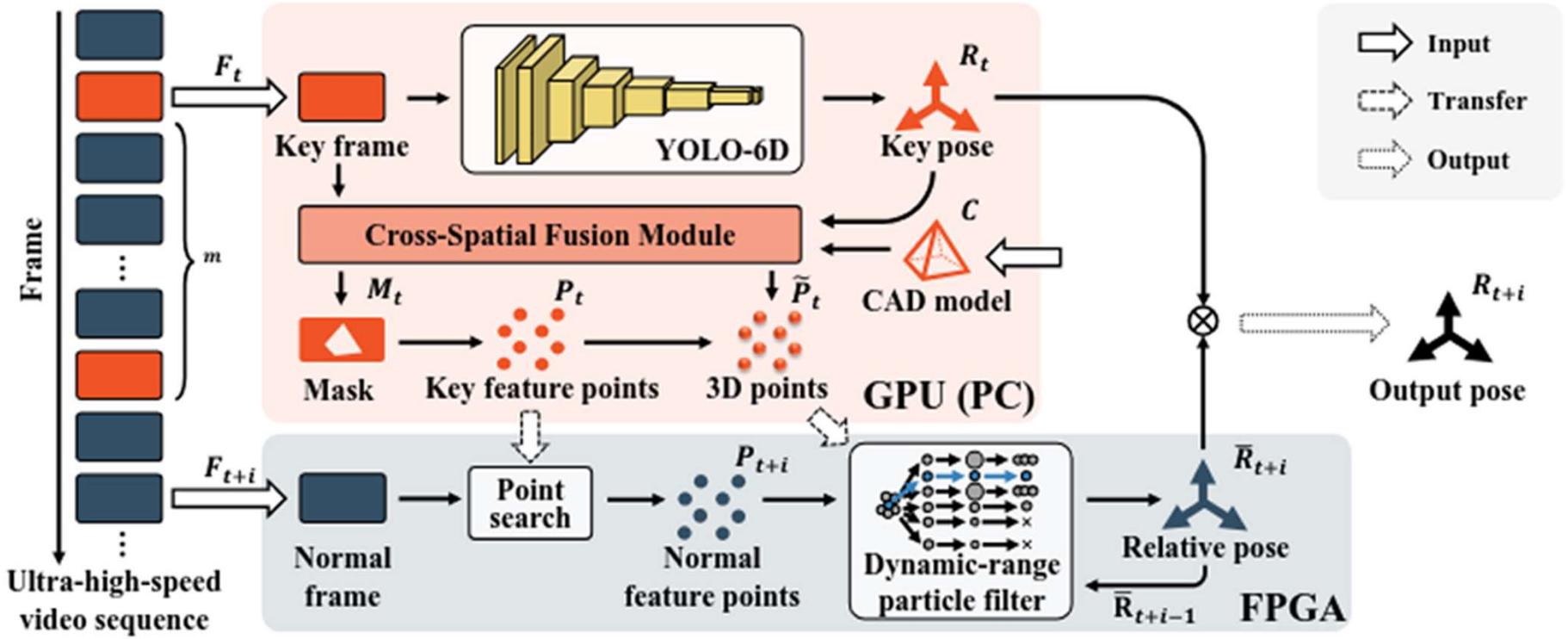
Inspiration from Wangwei's Work

- FPGA-GPU hetero structure:



Inspiration from Dr.Du's Work

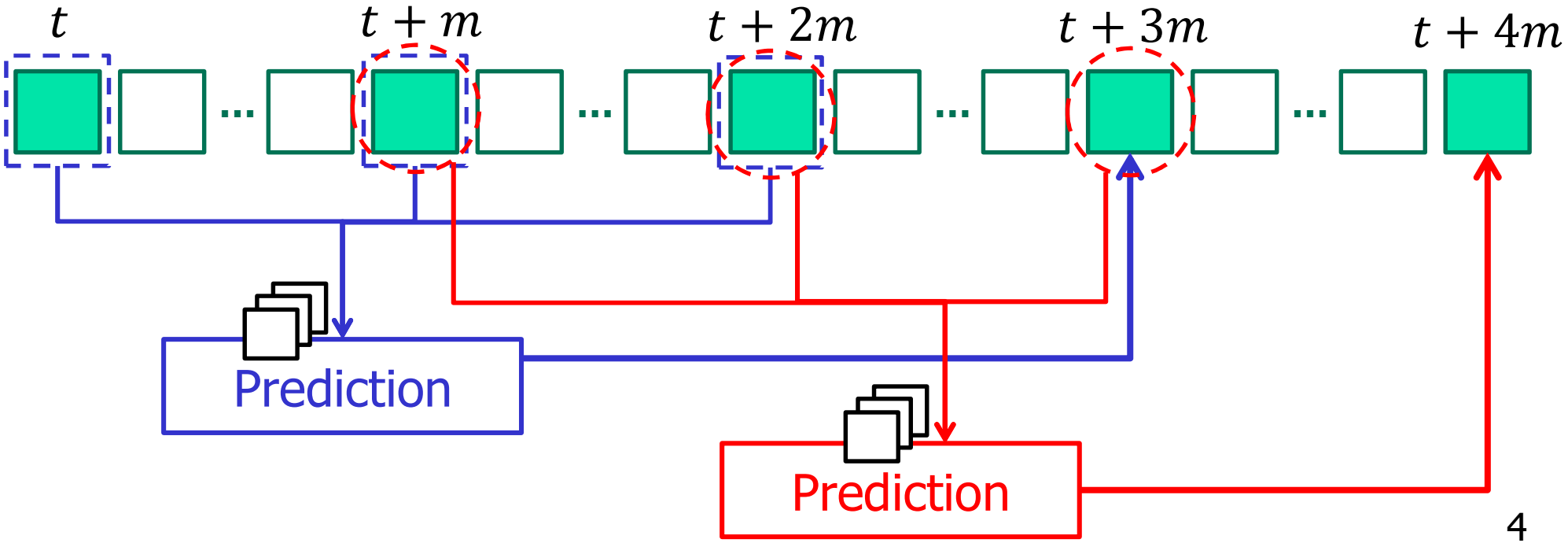
- In terms of pose prediction:

Regardless of human pose or object pose, we all need to extract spatial and temporal information, which relatively accords to intra-frame and inter-frame information we can obtain. Learning from previous frames, then we can do prediction of future frames.

My proposed GPU-FPGA structure

- Pose Prediction on GPU:

Select certain number of consecutive KeyFrames, extract temporal information using NN and then do the prediction of absolute pose when the next KeyFrame comes.

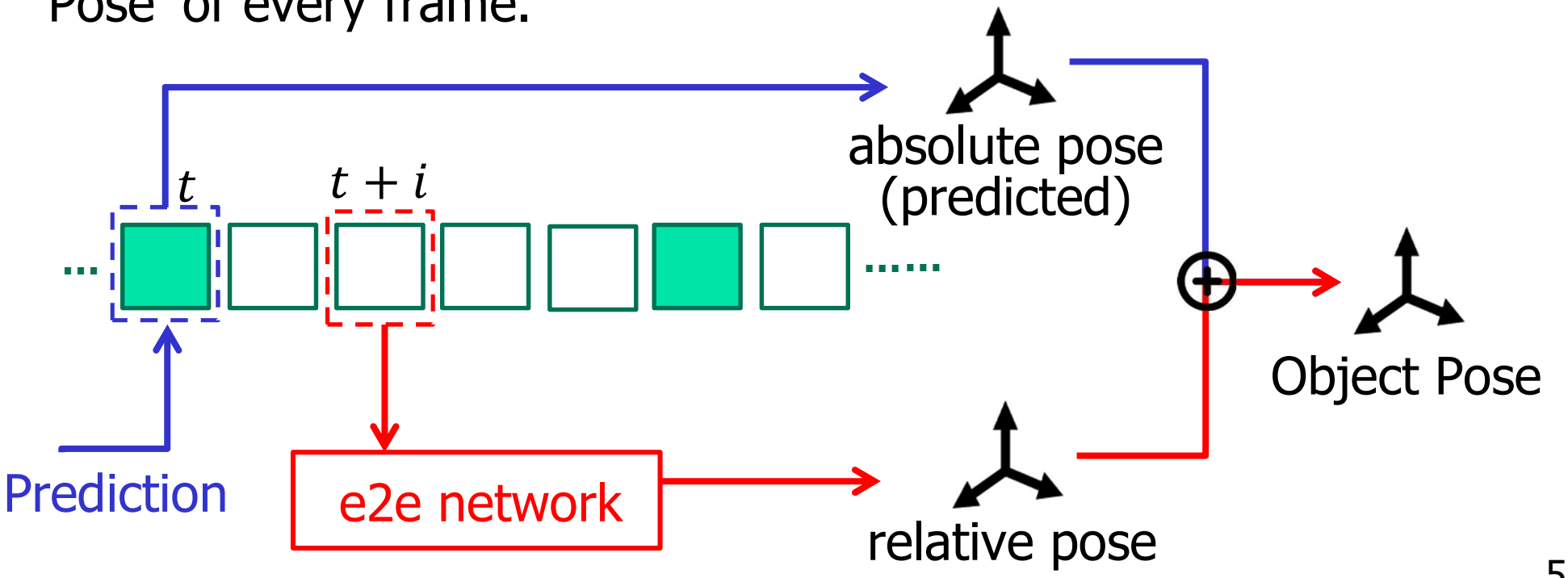


My proposed GPU-FPGA structure

- End-to-End Network on FPGA:

We only use end-to-end neural network rather than rule-based algorithms, to get relative pose of every NormalFrame.

Combining with predicted absolute pose, we can finally get 'Object Pose' of every frame.



Feature Research Plan

- Learn more and understand deeply about 1ms group's works, especially details, by looking through papers which senior students posted.
- Inspired by Dr.Du, I want to learn deeply in terms of how to do pose prediction in advantage of networks, extract and utilize inter & intra frame information.
- Talk more with Dr.Li, get more inspiration and then start my own research.