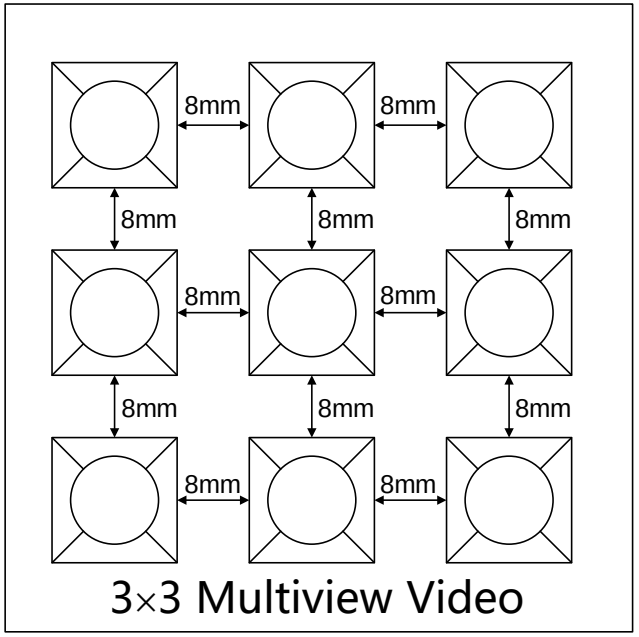
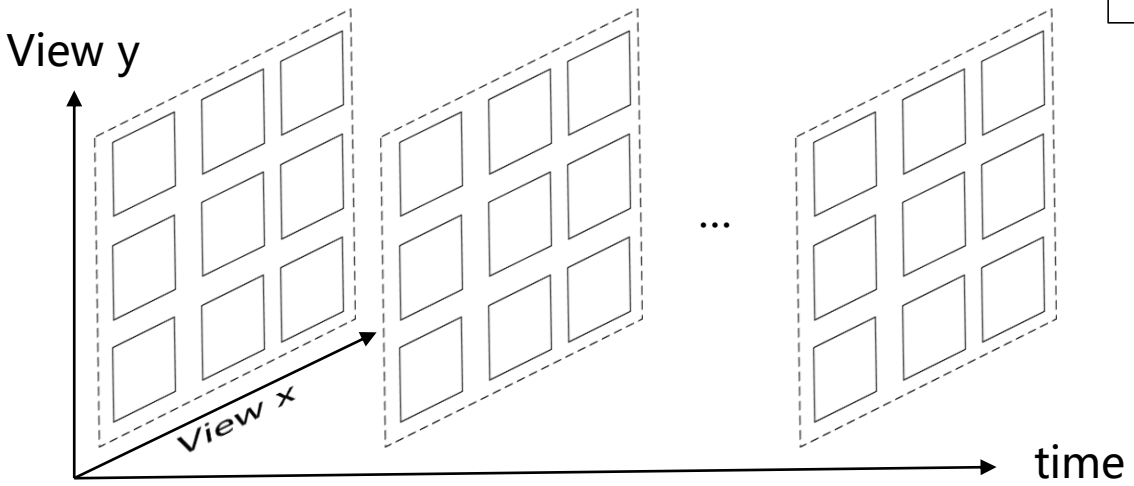
Difficulty 1-Problem 2: inter-prediction for Multiview video coding

Extracting

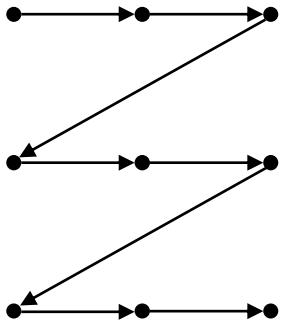




The Multiview video is a big volume of data, which is required to be compressed.

Difficulty 1-Problem 2: inter-prediction for Multiview video coding

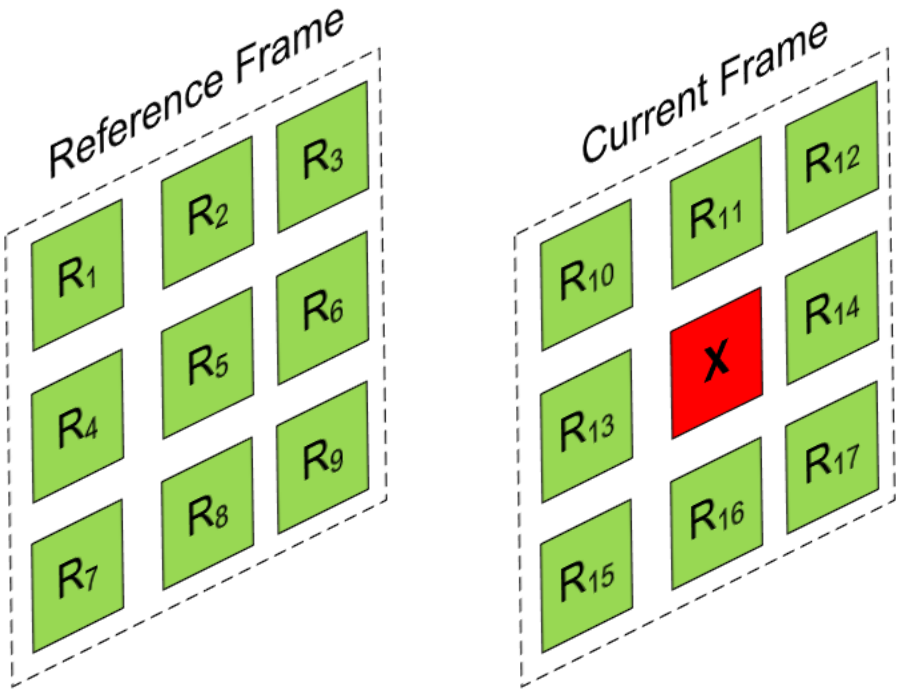
Sweep order



Difficulty 1-Problem 2: inter-prediction for Multiview video coding

- **Problem:**

Generate a predicted image based on the reference images. The predicted image should be as similar as possible with the original image.



For example:

Generating a prediction for image *X* by:

$$X' = f(R_1, R_2, \dots, R_{17})$$

Wish:

$$Min.Diff(X', X)$$

Difficulty 1-Problem 2: inter-prediction for Multiview video coding

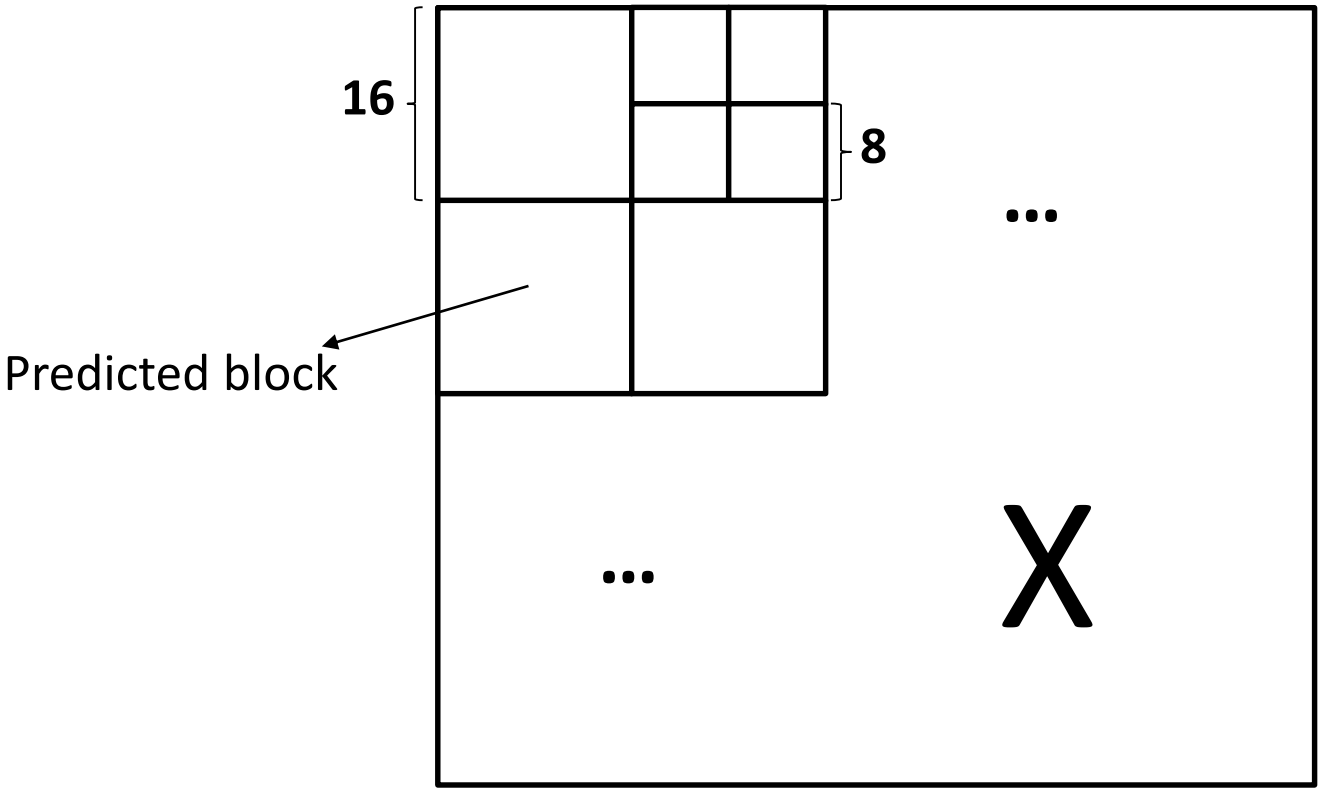
- **Input**
  - Dataset: NagoyaDataLeading, NagoyaFujita, NagoyaOrigami.
  - Data format is RGB.
  - Original video: intensity varies in [0,255].
  - Each component of each pixel is 8 bits.
  - Parameter: The resolution of each view is 880x912.

Difficulty 1-Problem 2: inter-prediction for Multiview video coding

- **Constraints**
  - The original to-be-predicted image (X) cannot be used in the optimization model.
  - More than one temporal reference image (R_1-R_9) should be applied into the optimization model.
  - More than one spatial reference image (R_{10}-R_{17}) should be applied into the optimization model.

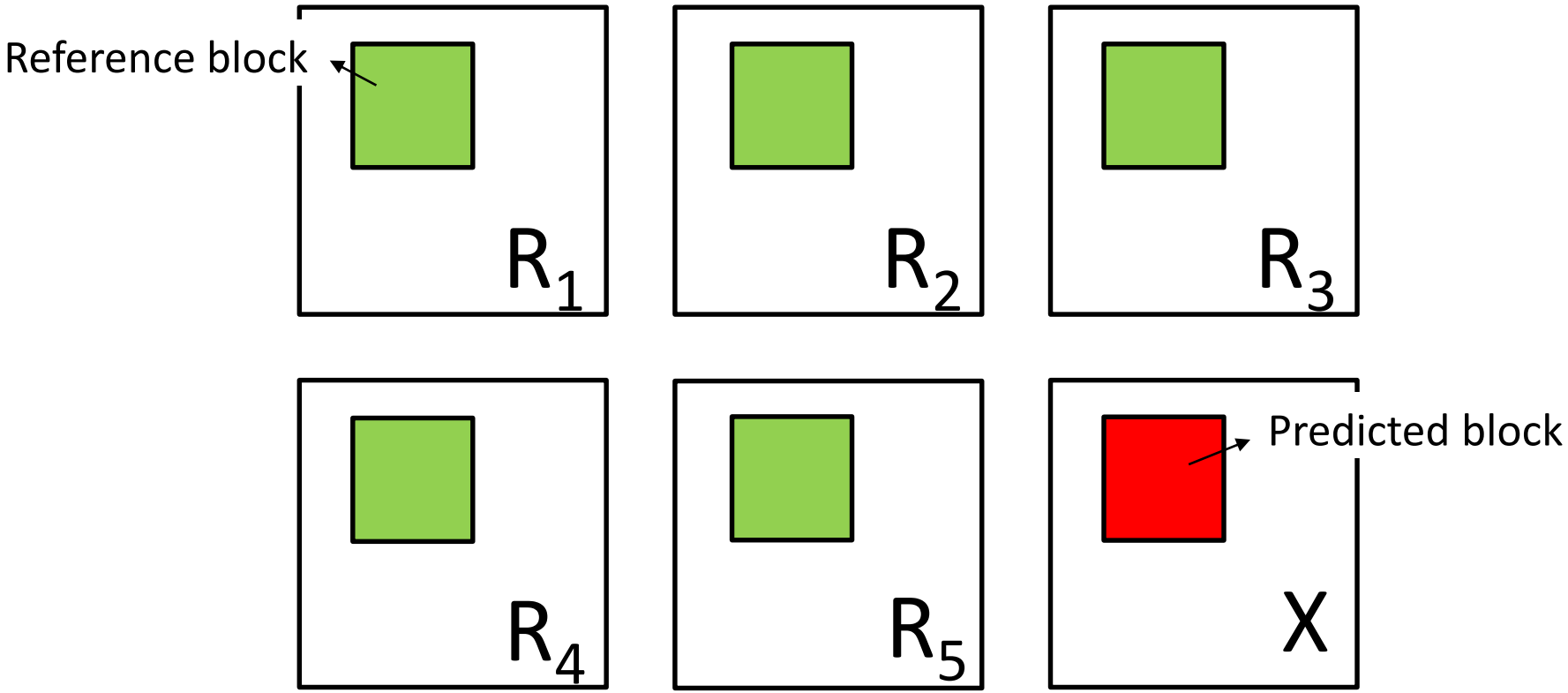
Difficulty 1-Problem 2: inter-prediction for Multiview video coding

- **Constraints**
  - The predicted image should be segmented into small predicted blocks.
  - The size of each block must be 4×4, 8×8, 16×16, 32×32 or 64×64.



Difficulty 1-Problem 2: inter-prediction for Multiview video coding

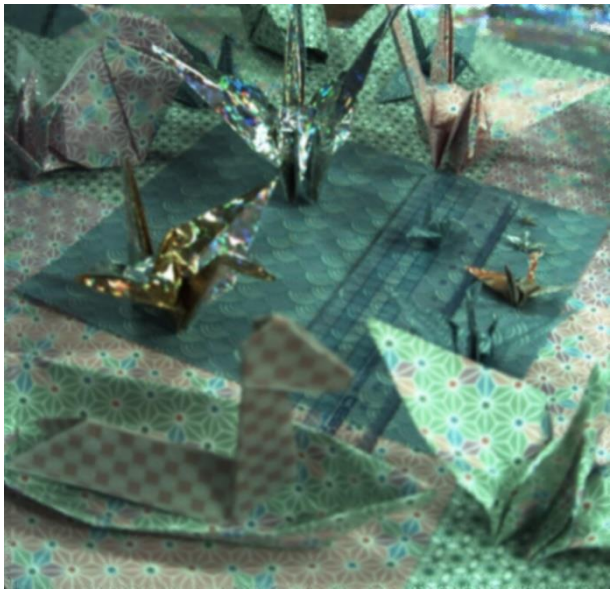
- **Constraints**
  - The reference blocks must have the same size with predicted block
  - The reference blocks may have different location with the predicted block



Difficulty 1-Problem 2: inter-prediction for Multiview video coding

- **Evaluation**

$$PSNR_{mean} = \frac{1}{3} \times \left(PSNR(X_R, X'_R) + PSNR(X_G, X'_G) + PSNR(X_B, X'_B) \right)$$



Difficulty 1-Problem 2: inter-prediction for Multiview video coding

- **Output**
  - A predicted image in RGB format, pixel value is an integer varying in [0,255]. Converting the pixel value to an integer can be processed after optimization.
  - PSNR of the original and predicted image of each dataset, and average PSNR of three dataset sets.
  - A partition image to show the partition result of the predicted image comprising predicted blocks.
  - Source code of the algorithm with Cost evaluation.
  - Project report including but not limited to:
    - Problem description
    - Details in the mathematical models and how it is solved by convex optimization
    - Processing results analysis
    - Improvement discussion
  - Presentation slides