3D Data Processing

RGBD 3D Reconstruction Multi-Views

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Today

- RGBD-based 3D Reconstruction using multiple RGBD dataset

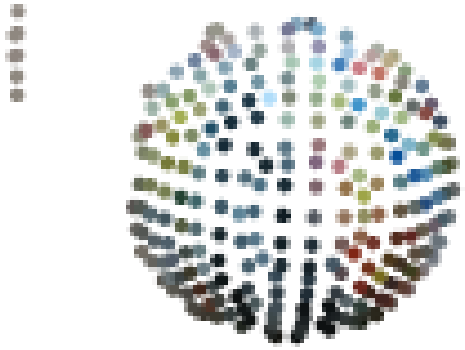
- TODO
  - Make function that produces pose of two rgbd dataset
  - Iteratively get pose from data1~data16
  - Merge all point clouds

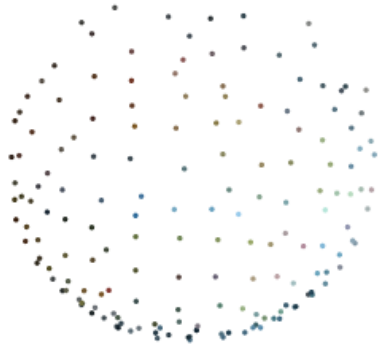
RGBD 3D Reconstruction

- Load RGBD images
  - Downsampling is allowed

RGBD 3D Reconstruction

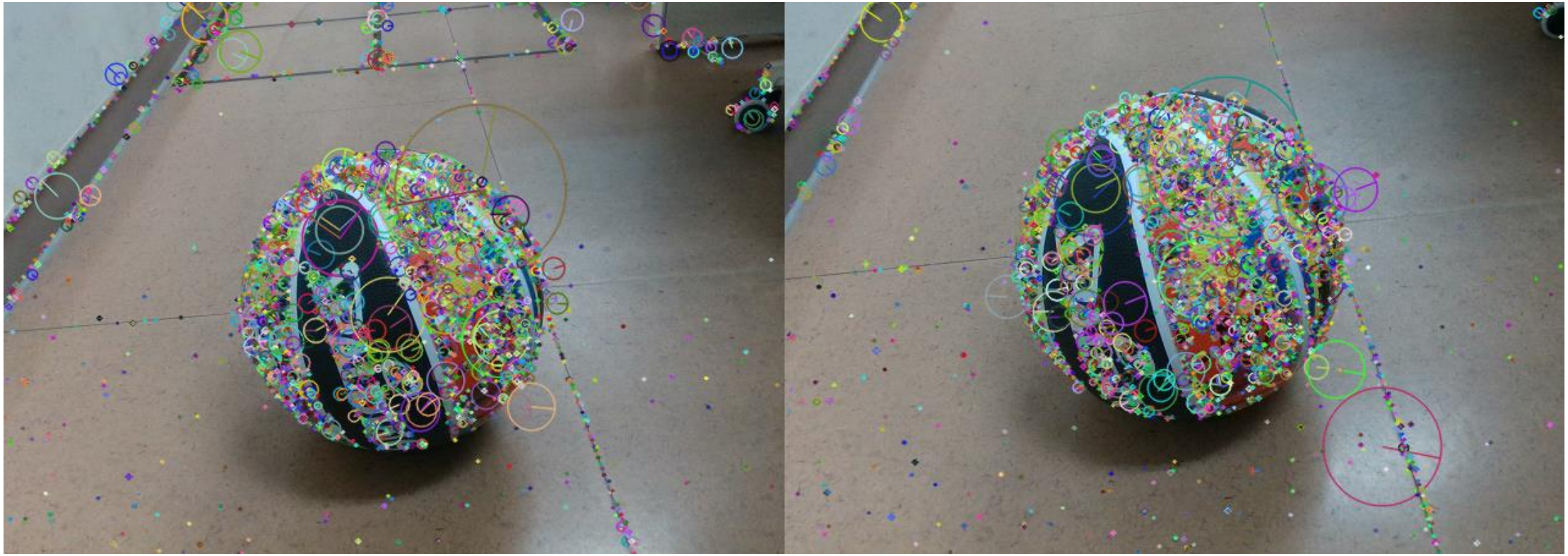
- Segmentation(floor) and Clustering





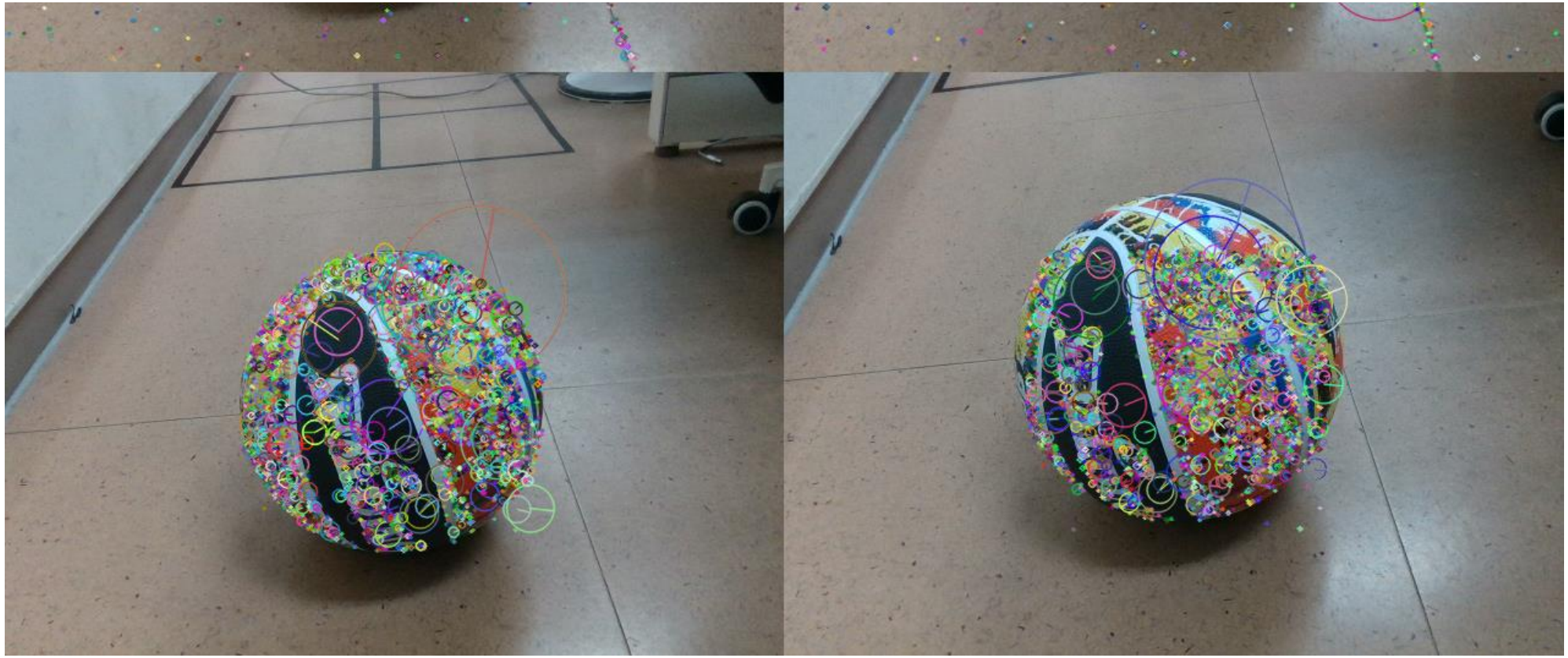
RGBD 3D Reconstruction

- Feature extraction



RGBD 3D Reconstruction

- Feature filtering using bounding box



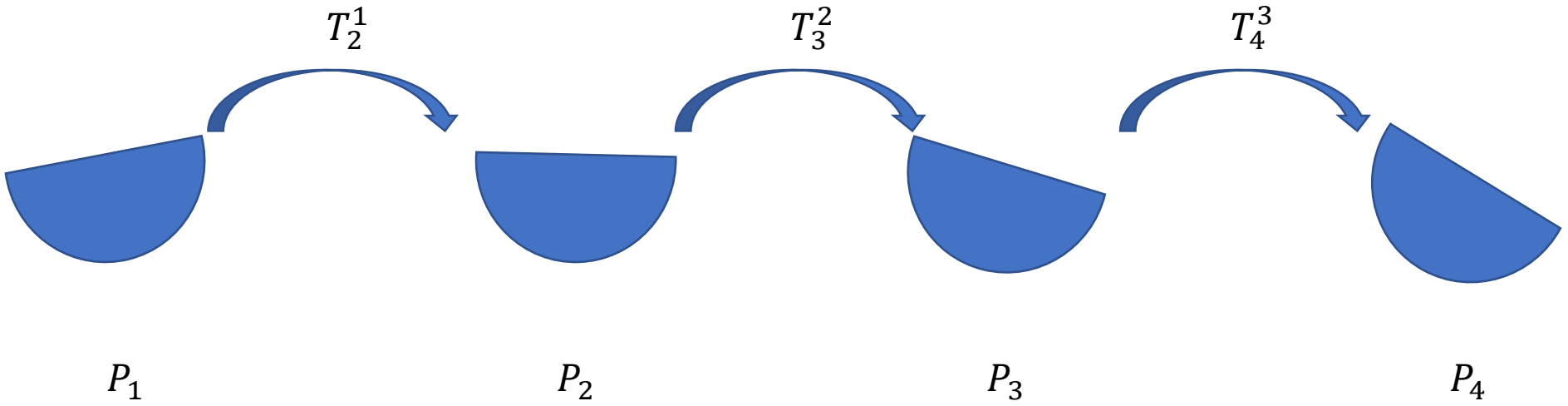
RGBD 3D Reconstruction

- Feature matching

RGBD 3D Reconstruction

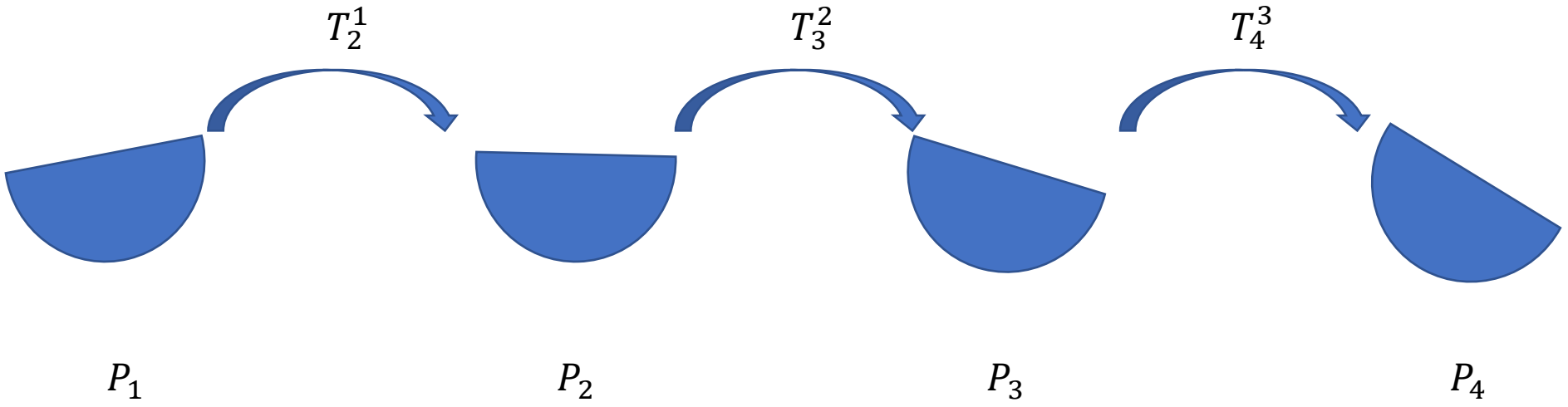
- Multiple transform

$$T_1^2 = (T_2^1)^{-1}$$



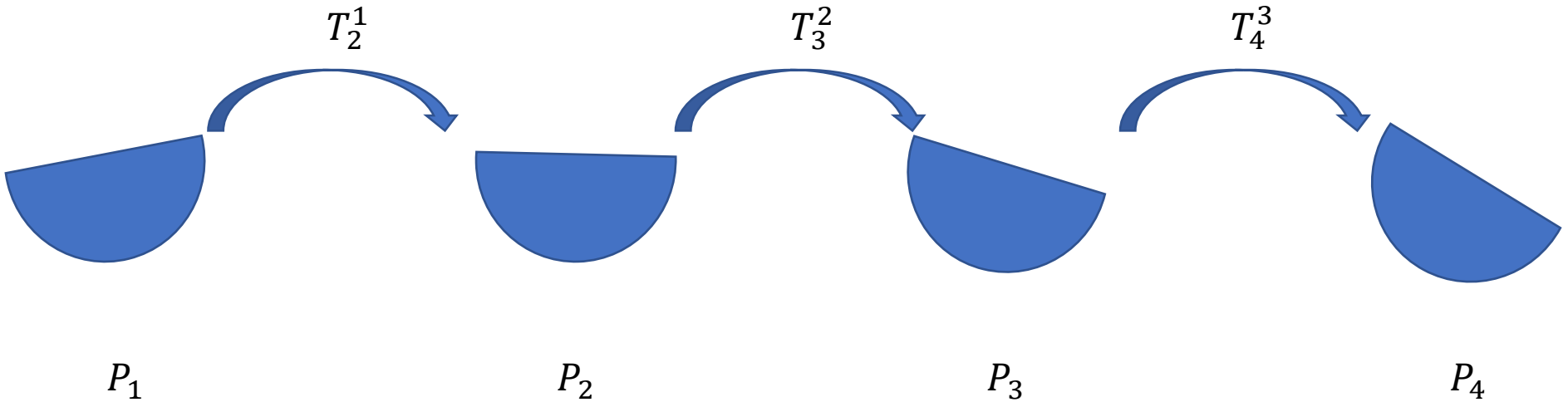
RGBD 3D Reconstruction

- Multiple transform
  - Set your world coordinate
  - Ex) I will depict all points based on the coordinate of P_1



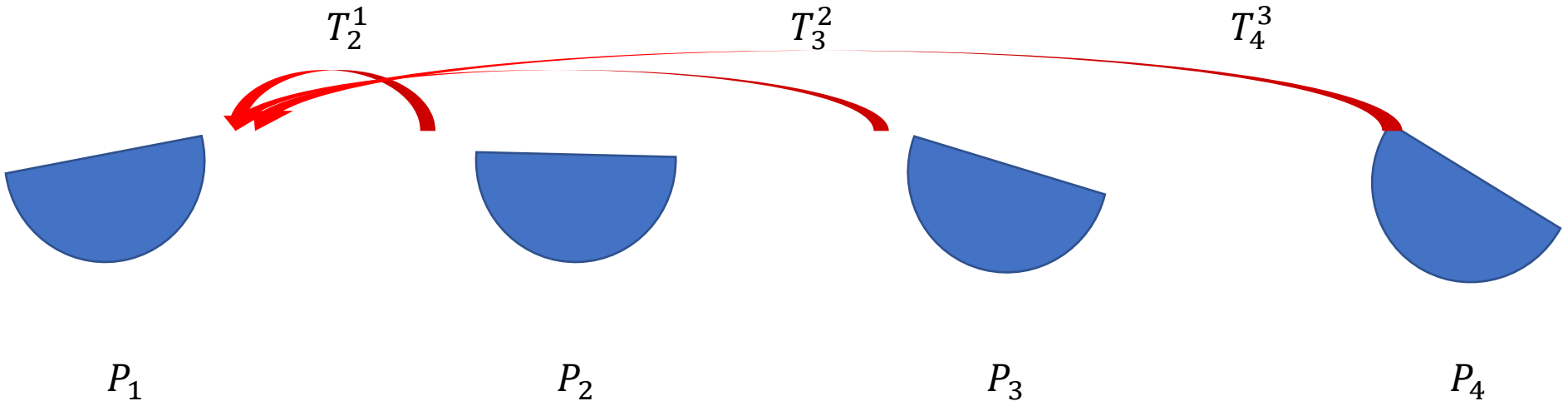
RGBD 3D Reconstruction

- Multiple transform
  - Set your world coordinate
  - Ex) I will depict all points based on the coordinate of P_1
  - Then all points clouds should be transformed to C_1



RGBD 3D Reconstruction

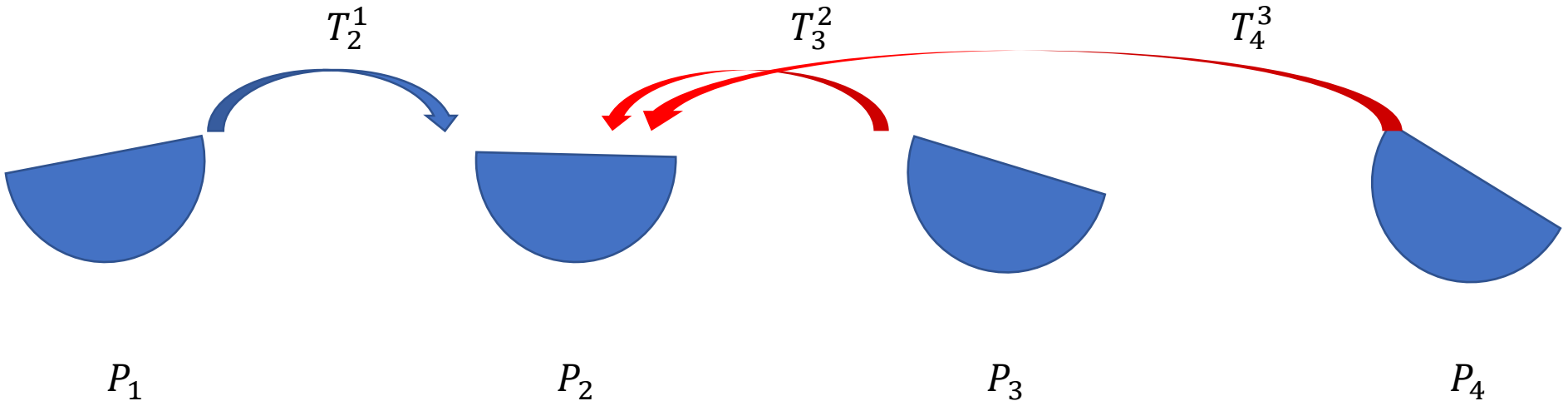
- Multiple transform
  - Set your world coordinate
  - Ex) I will depict all points based on the coordinate of P_1
  - Then all points clouds should be transformed to C_1



$P'_2 = T_2^1 P_2$ $P'_3 = T_3^1 P_3 = T_2^1 T_3^2 P_3$ $P'_4 = T_4^1 P_3 = T_2^1 T_3^2 T_4^3 P_4$

RGBD 3D Reconstruction

- Multiple transform
  - Ex) I will depict all points based on the coordinate of P_2
  - Then all points clouds should be transformed to C_2



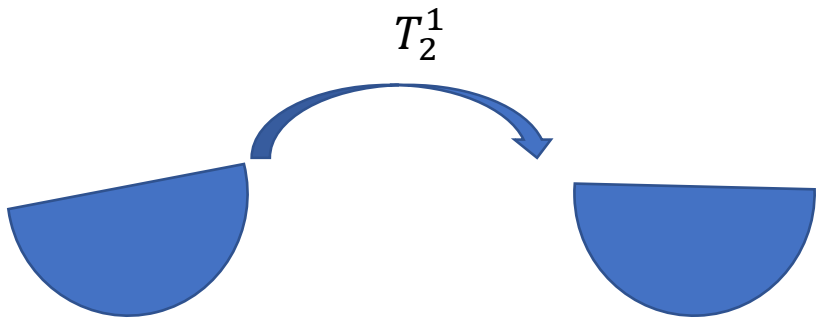
$$P'_1 = T_1^2 P_1 = (T_2^1)^{-1} P_1$$

$$P'_3 = T_3^2 P_3$$

$$P'_4 = T_4^2 P_3 = T_3^2 T_4^3 P_4$$

RGBD 3D Reconstruction

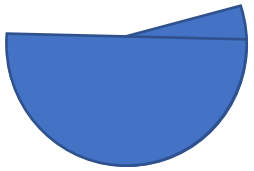
- Multiple transform
  - Ex) I will depict all points based on the new coordinate



$$P'_1 = T_1^2 P_1 = (T_2^1)^{-1} P_1$$

RGBD 3D Reconstruction

- Multiple transform
  - Ex) I will depict all points based on the new coordinate



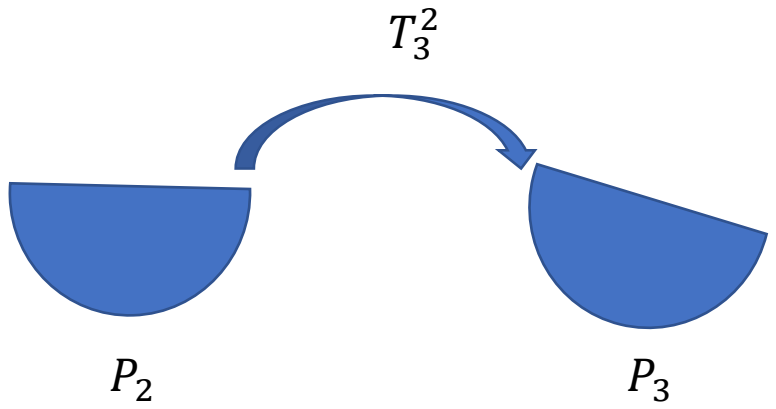
$$P_2$$

$$P_{global} = P'_1 + P_2$$

$$base: C_2$$

RGBD 3D Reconstruction

- Multiple transform
  - Ex) I will depict all points based on the new coordinate

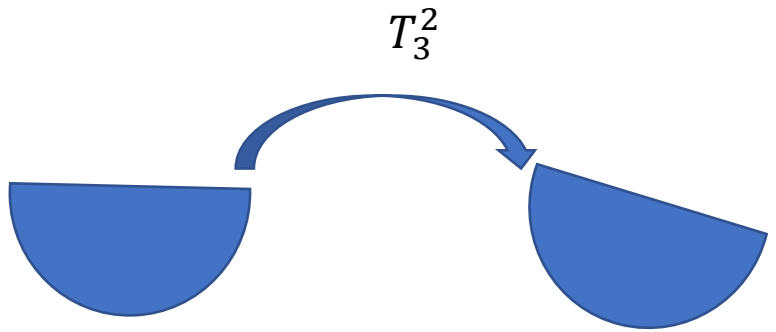


$$P_{global} = P'_1 + P_2$$

$$base: C_2$$

RGBD 3D Reconstruction

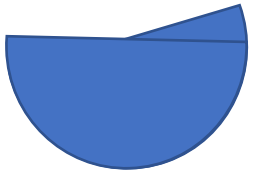
- Multiple transform
  - Ex) I will depict all points based on the new coordinate



P_2

P_3

$P'_2 = T_2^3 P_2 = (T_3^2)^{-1} P_2$



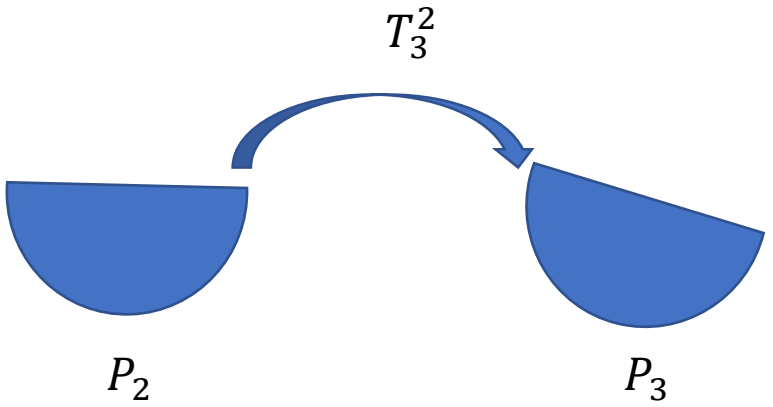
$P_{global} = P'_1 \oplus P_2$

$base: C_2$

$\oplus: Merge$

RGBD 3D Reconstruction

- Multiple transform
  - Ex) I will depict all points based on the new coordinate



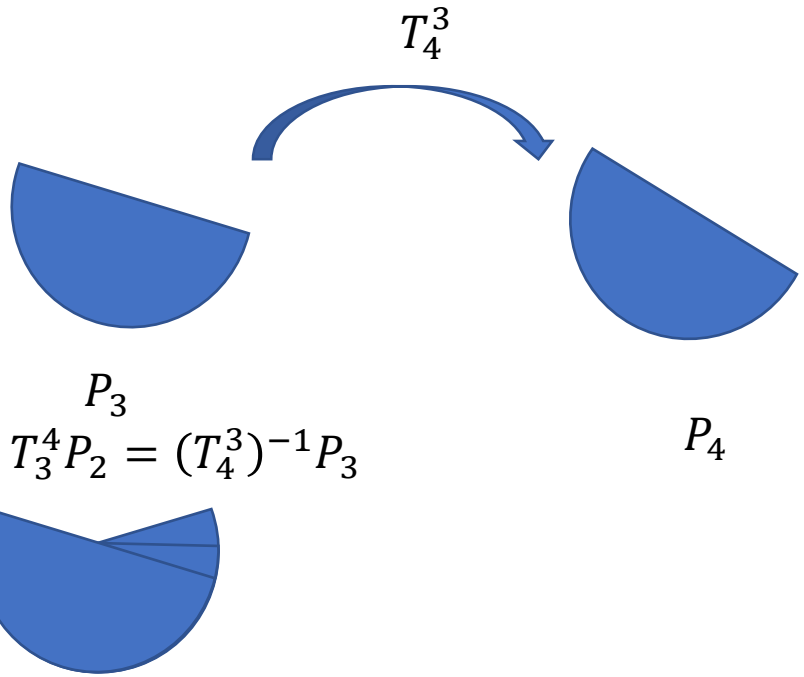
$$P'_2 = T_2^3 P_2 = (T_3^2)^{-1} P_2$$

$$P_{global} = T_2^3 P_{global} \oplus P_3$$

$$base: C_3$$

RGBD 3D Reconstruction

- Multiple transform
  - Ex) I will depict all points based on the new coordinate

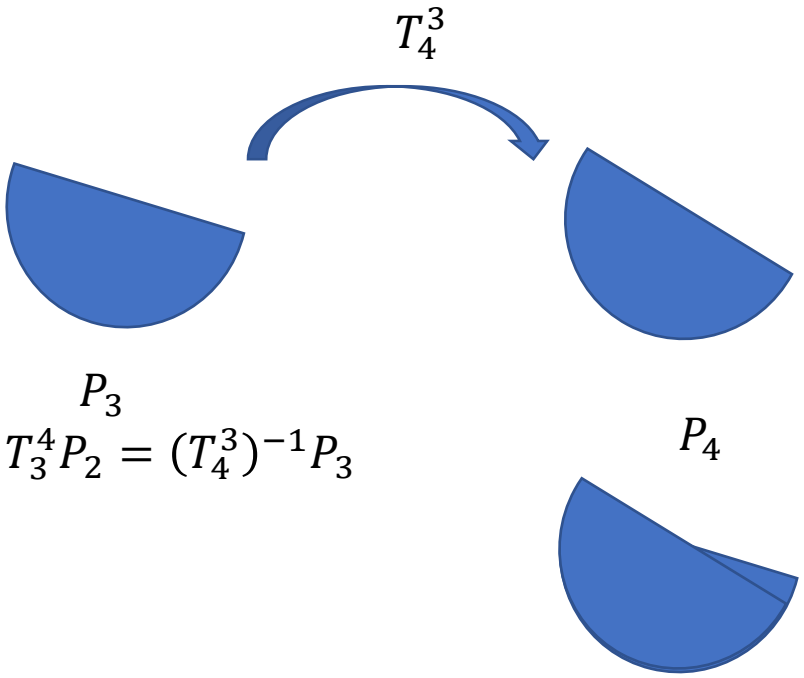


$$P_{global} = T_2^3 P_{global} \oplus P_3$$

$$base: C_3$$

RGBD 3D Reconstruction

- Multiple transform
  - Ex) I will depict all points based on the new coordinate



$$P_{global} = T_3^4 P_{global} \oplus P_4$$

$$base: C_4$$

Thank you