

Structure from Motion Problem

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Topic: Structure from Motion, Module: Reconstruction II

First Principles of Computer Vision

Feature Detection and Tracking

- Detect feature points: Corners, SIFT points, ...



Feature Detection and Tracking

- Detect feature points: Corners, SIFT points, ...



Feature Detection and Tracking

- Detect feature points: Corners, SIFT points, ...
- Track feature points: Template Matching, Optical Flow...

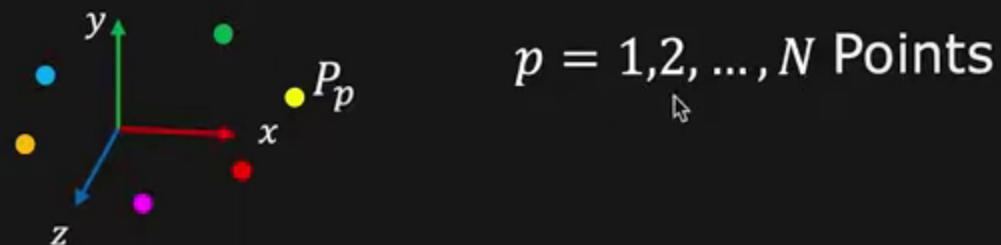


Feature Detection and Tracking

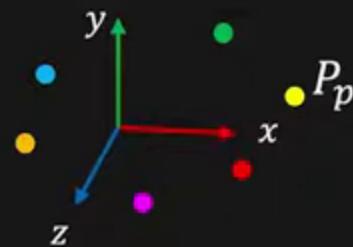
- Detect feature points: Corners, SIFT points, ...
- Track feature points: Template Matching, Optical Flow...



Structure From Motion



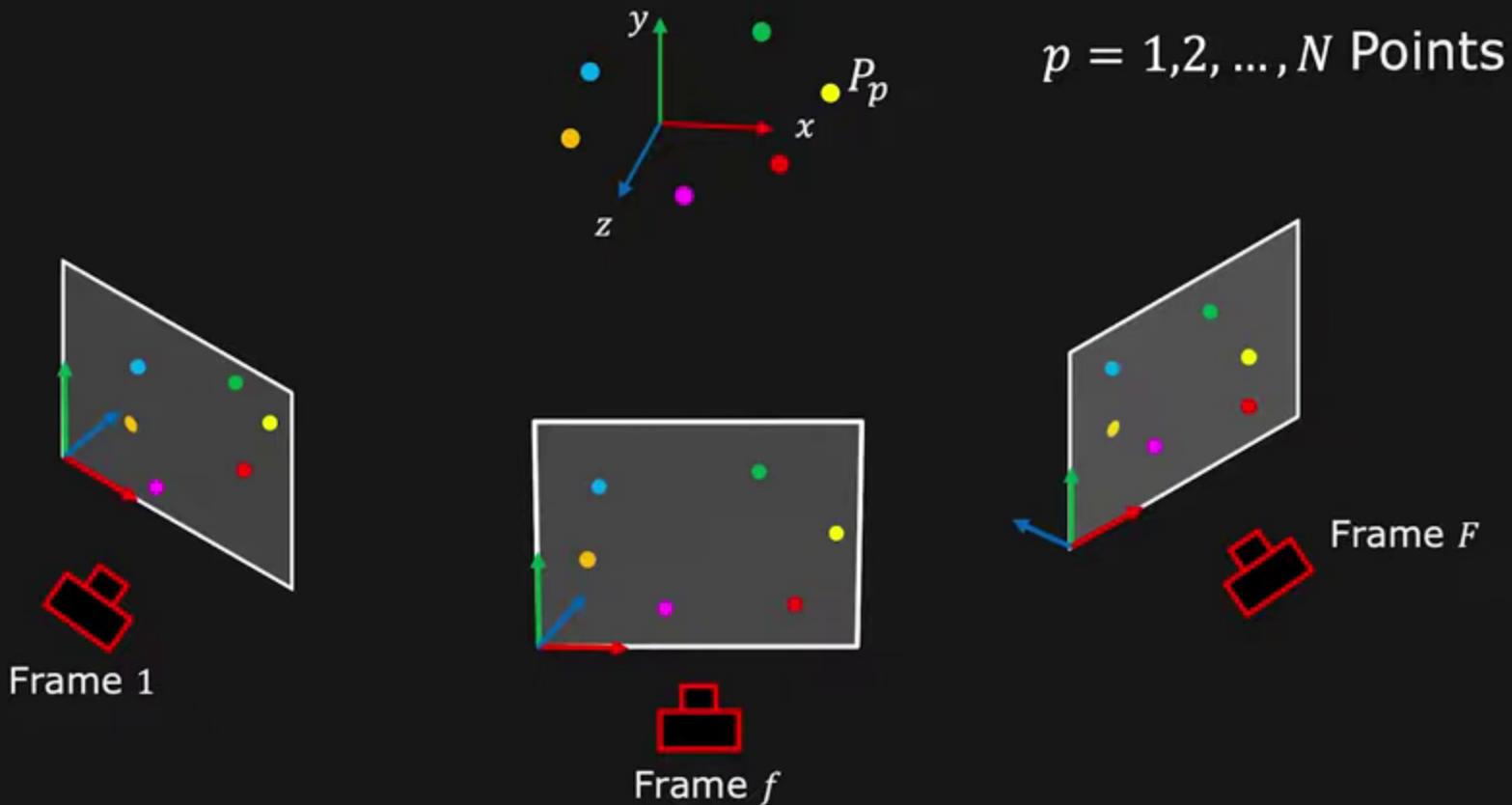
Structure From Motion



$p = 1, 2, \dots, N$ Points

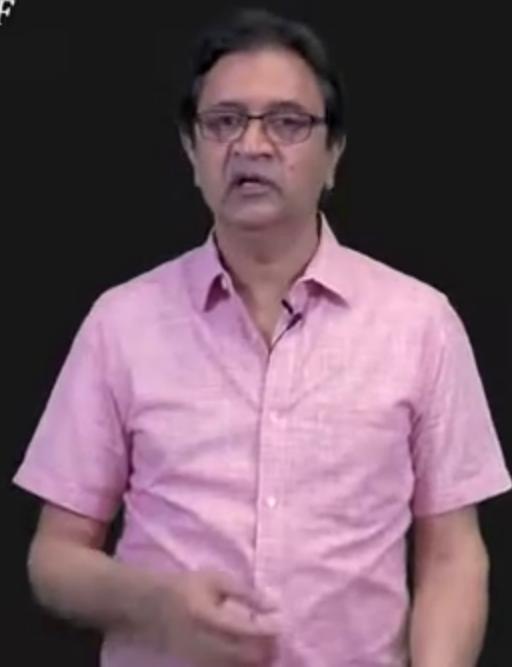


Structure From Motion

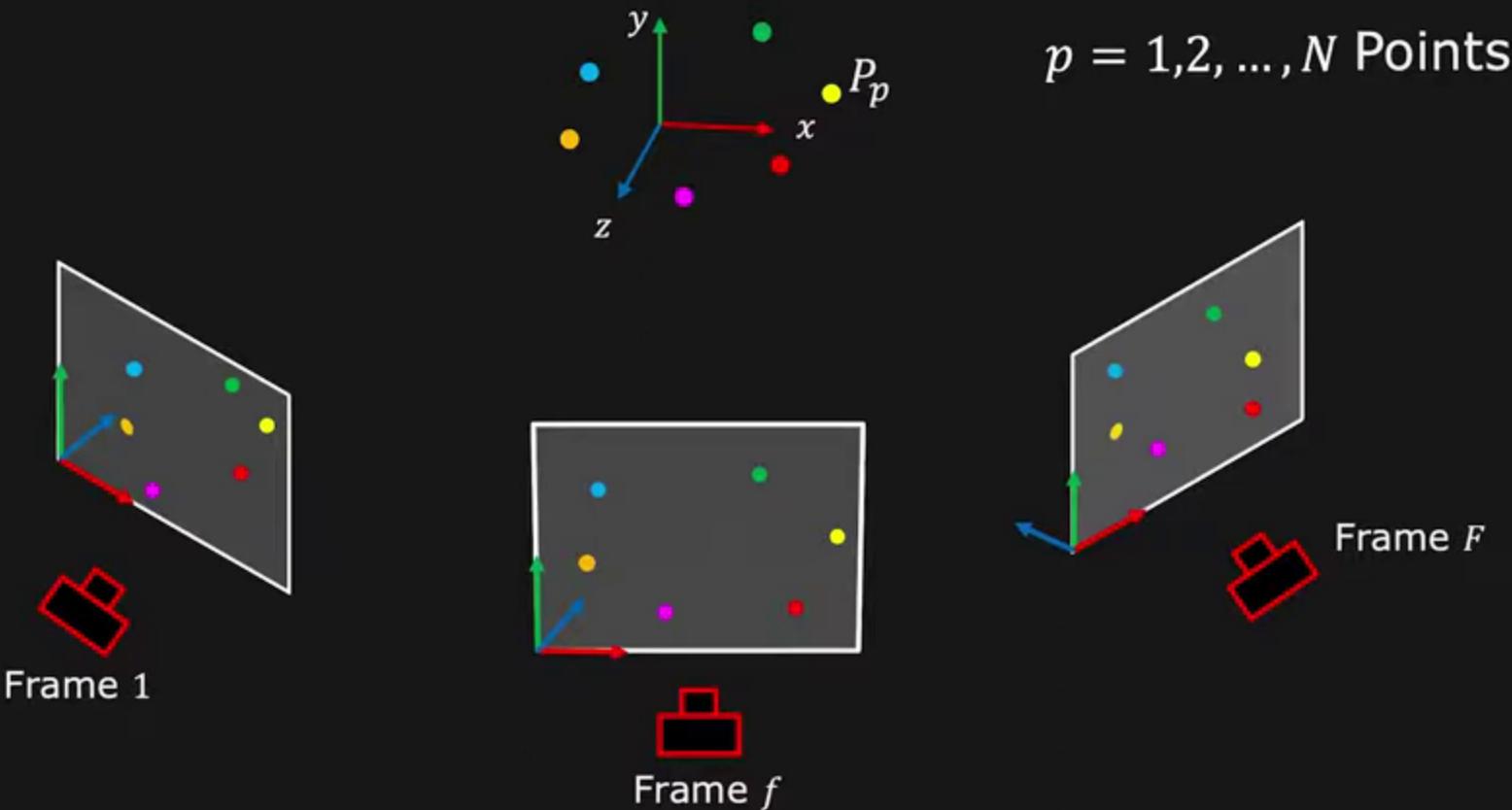


Given sets of corresponding image points (2D): $(u_{f,p}, v_{f,p})$

Find scene points (3D): P_p



Structure From Motion

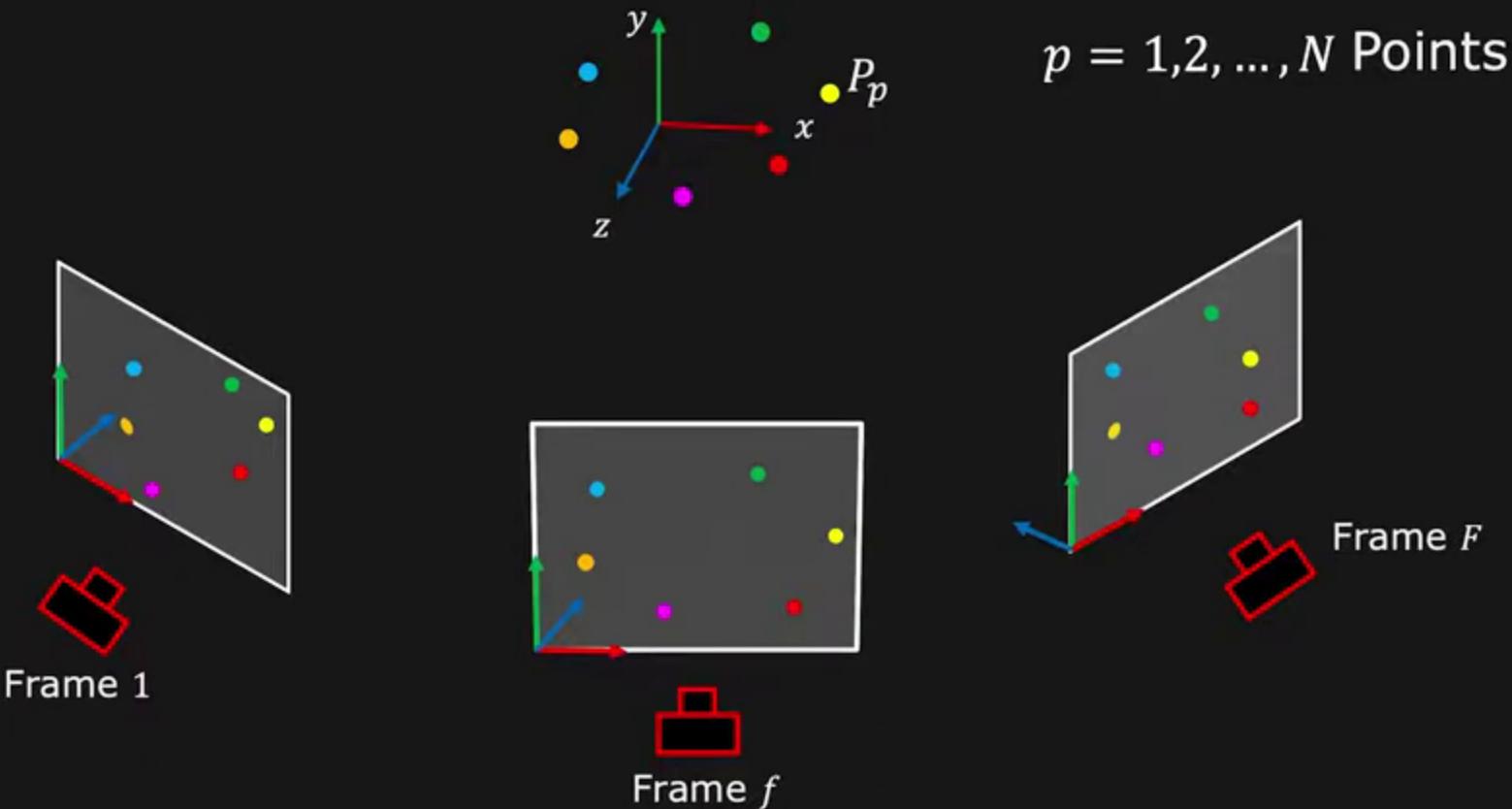


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Structure From Motion

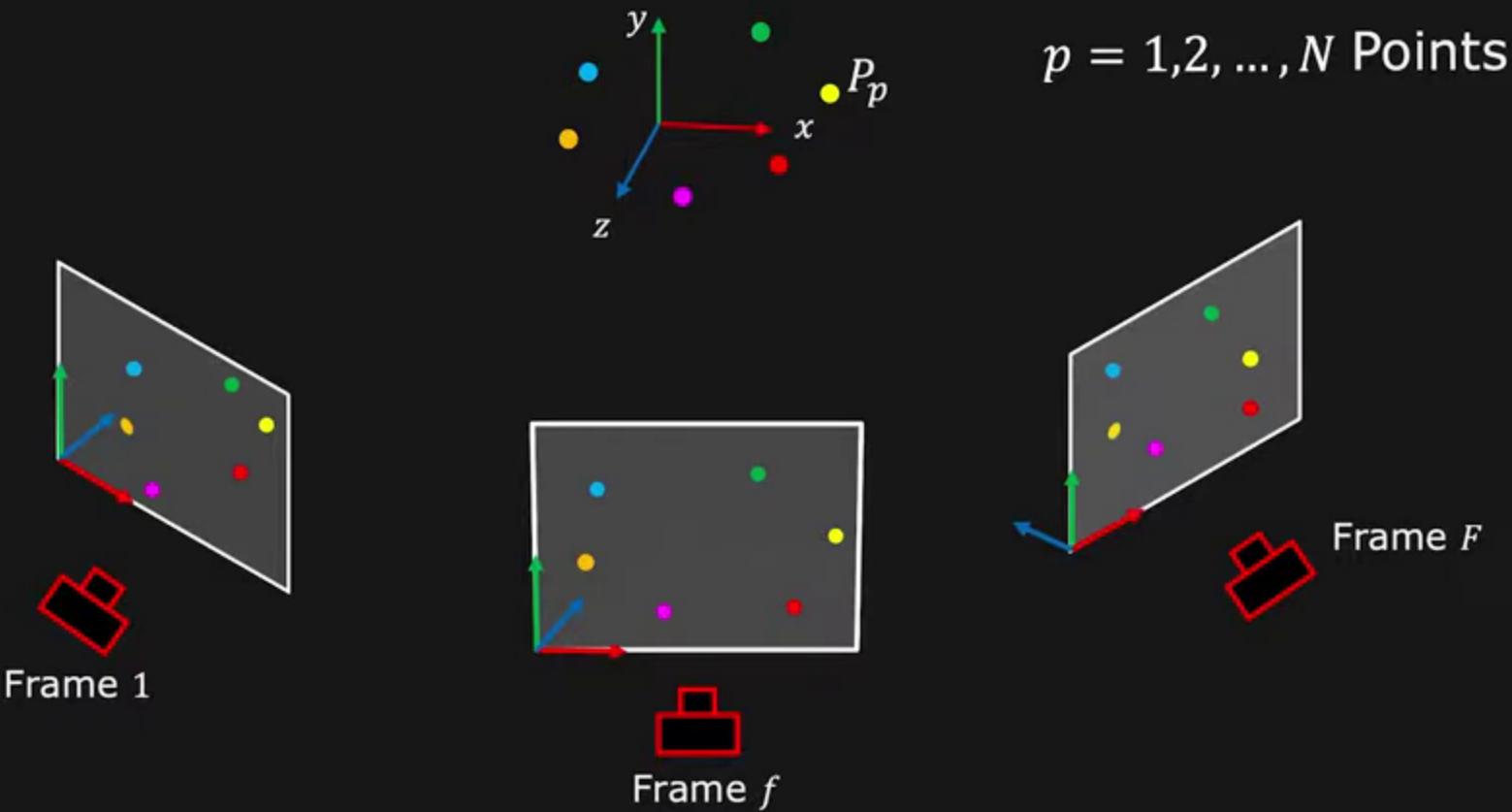


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Structure From Motion

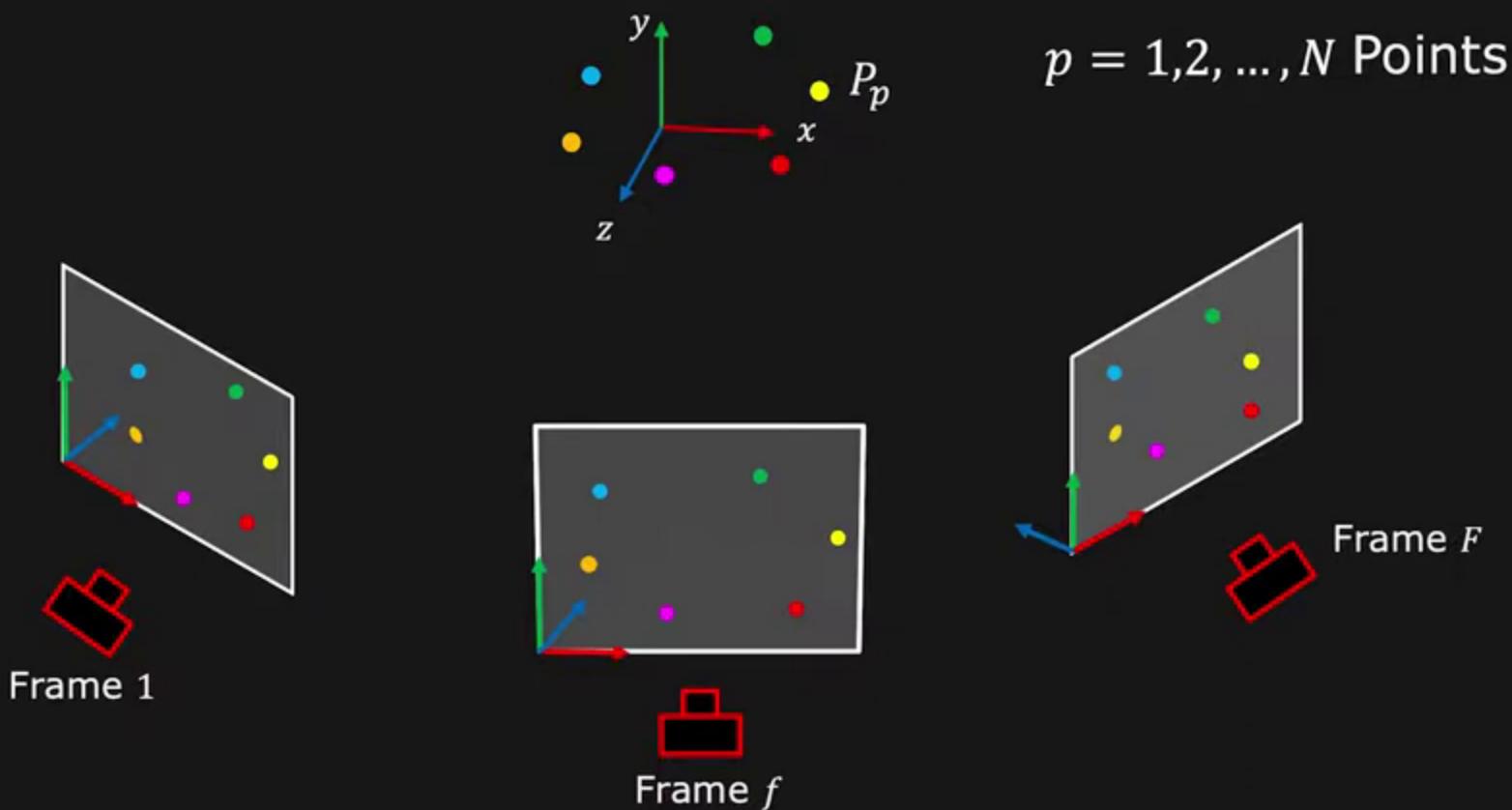


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Orthographic Structure from Motion

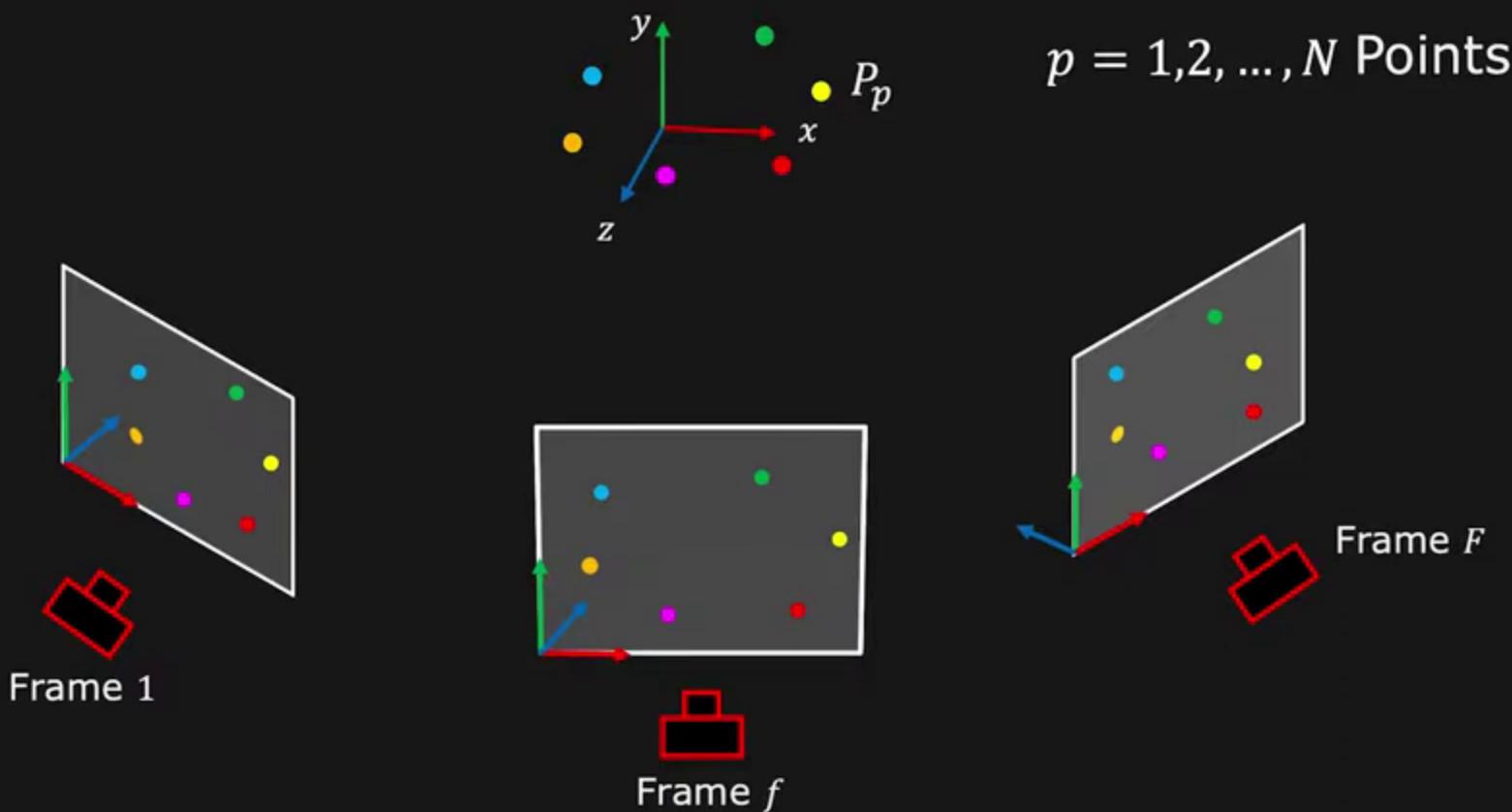


Given sets of corresponding image points (2D): $(u_{f,p}, v_{f,p})$

Find scene points (3D) P_p , assuming orthographic camera.

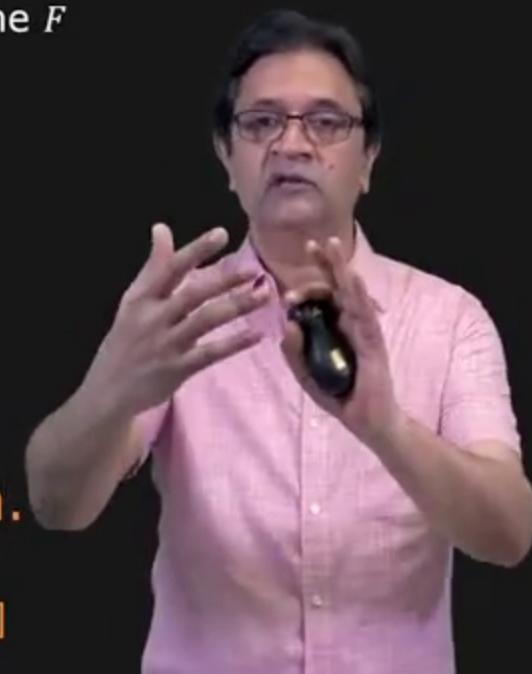


Orthographic Structure from Motion



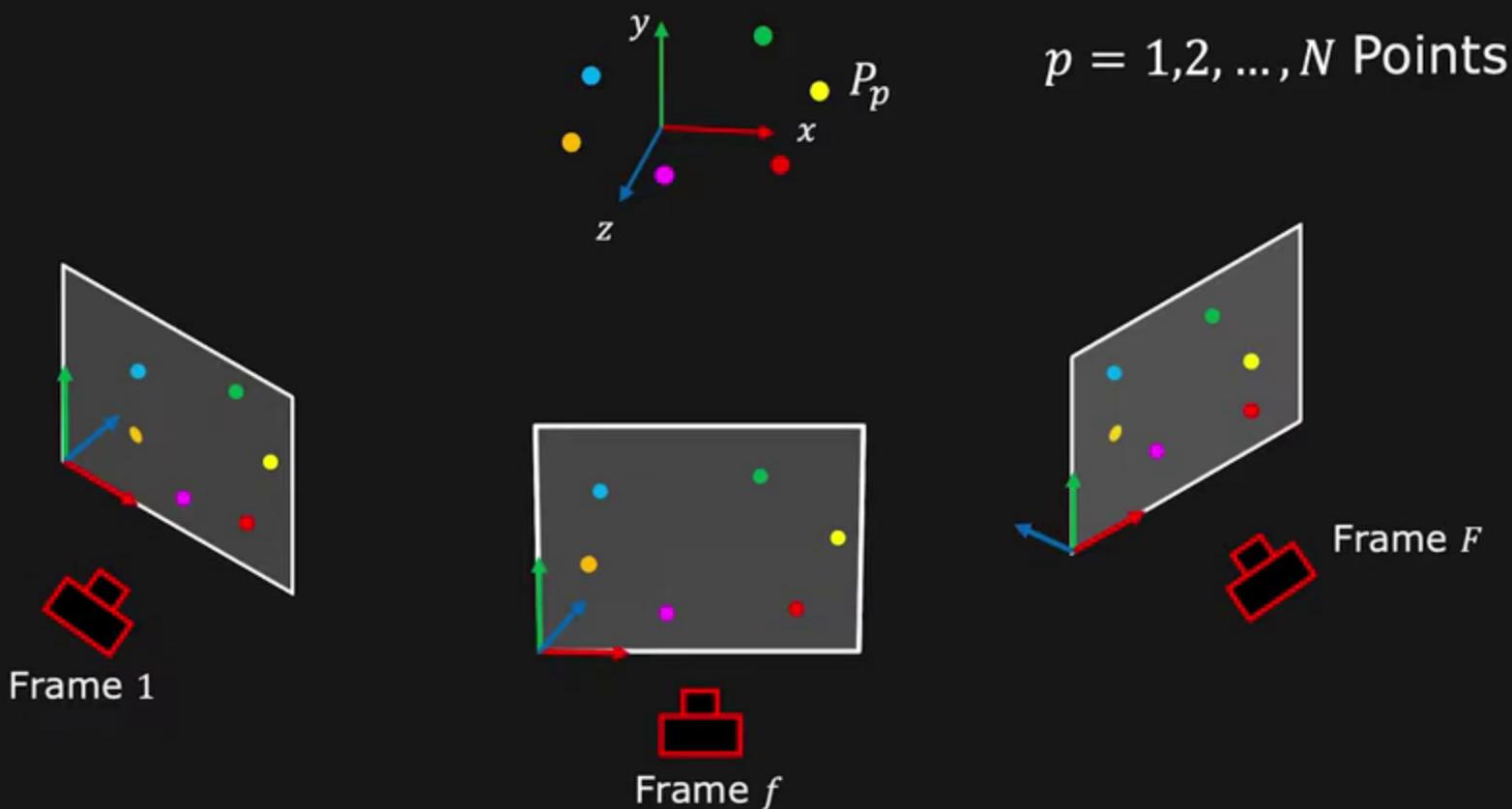
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[Tomasi 1992]

Orthographic Structure from Motion

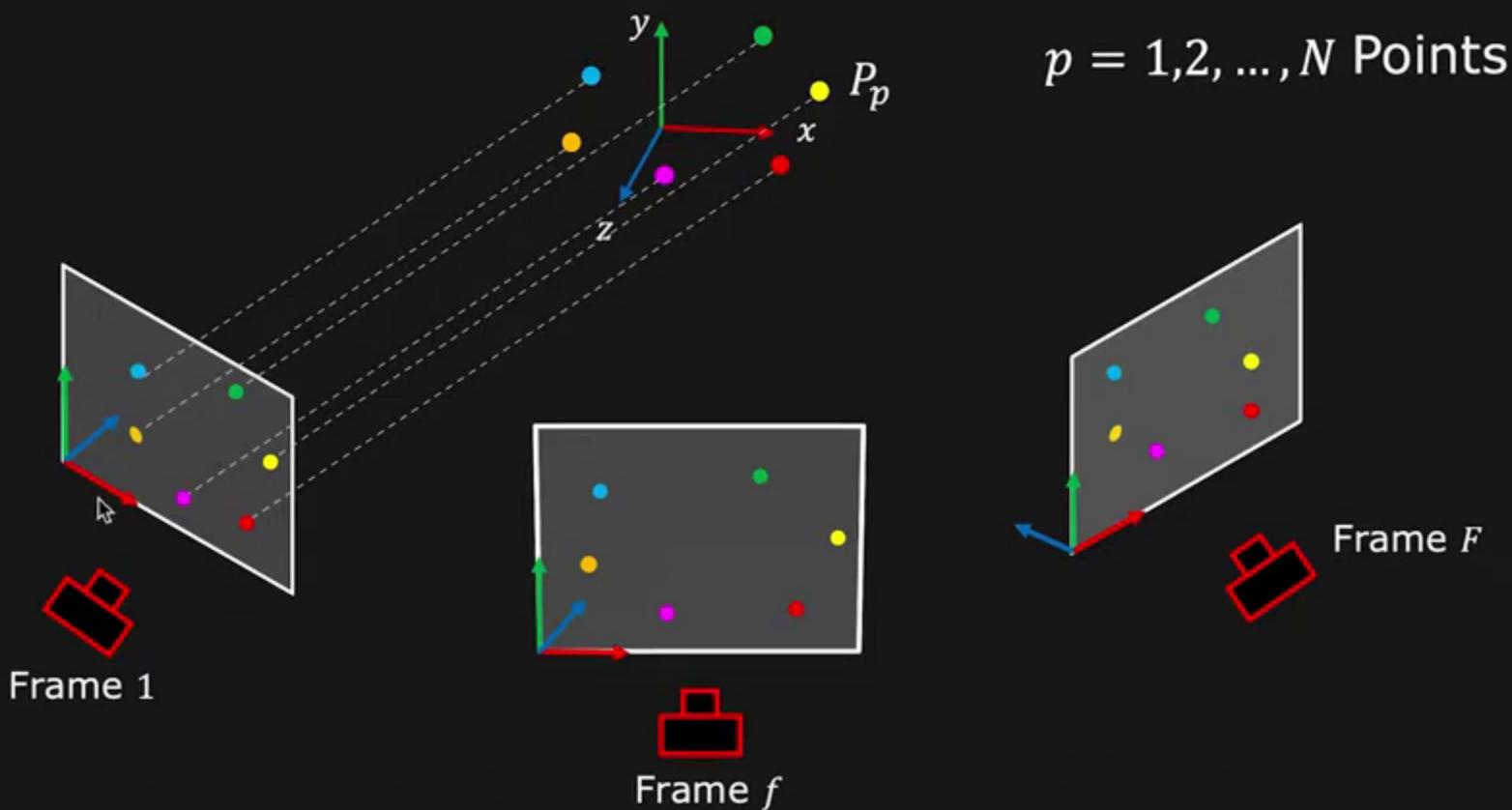


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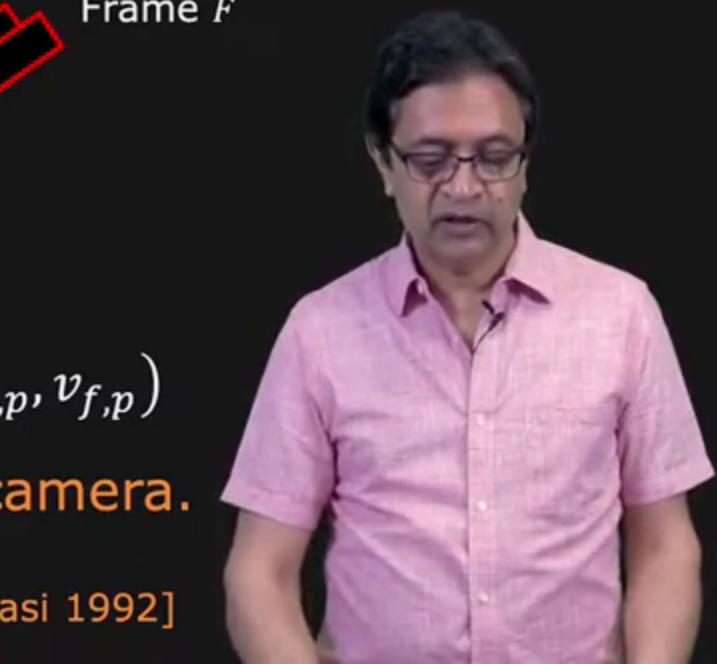


Orthographic Structure from Motion

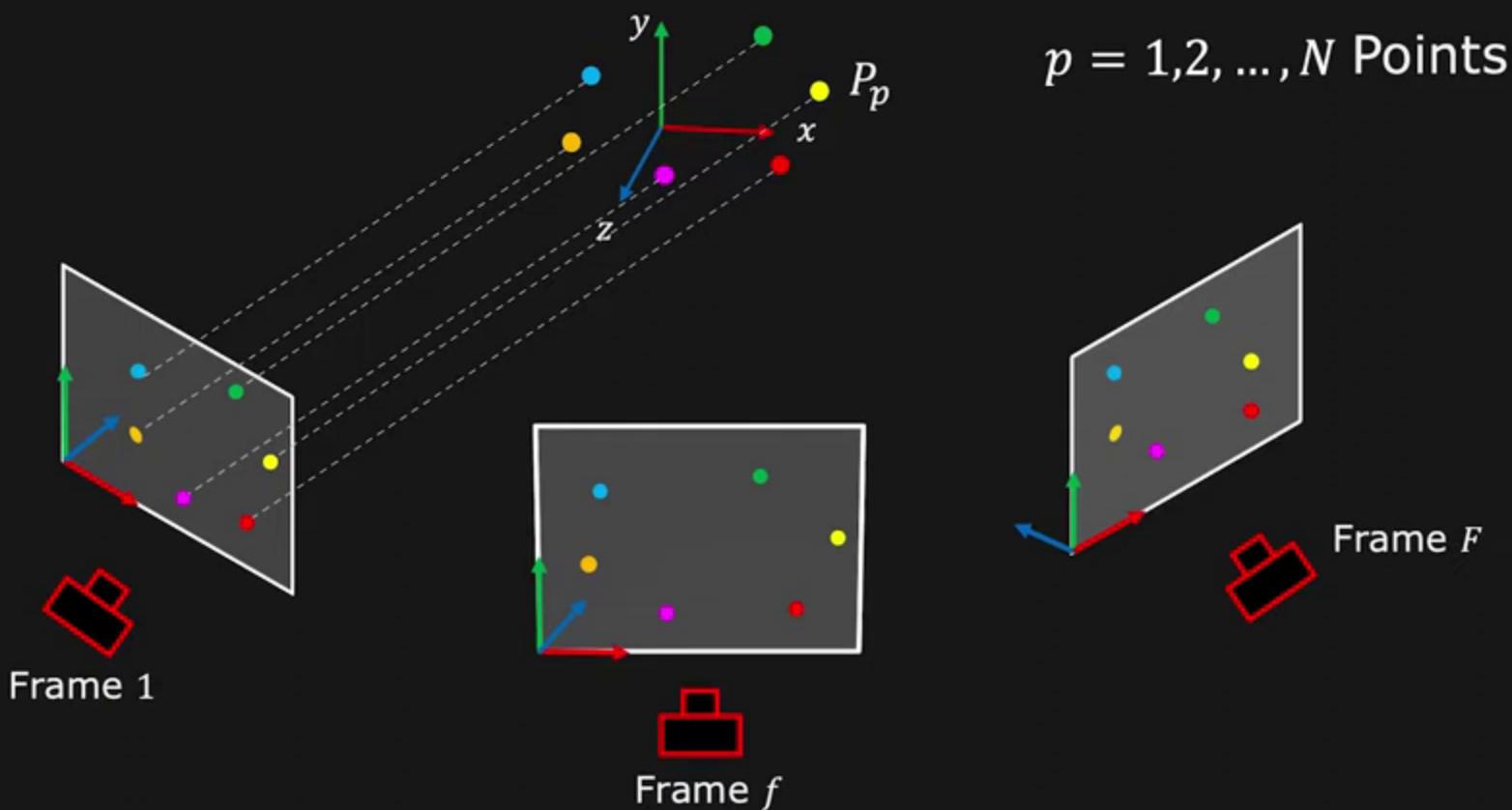


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Orthographic Structure from Motion



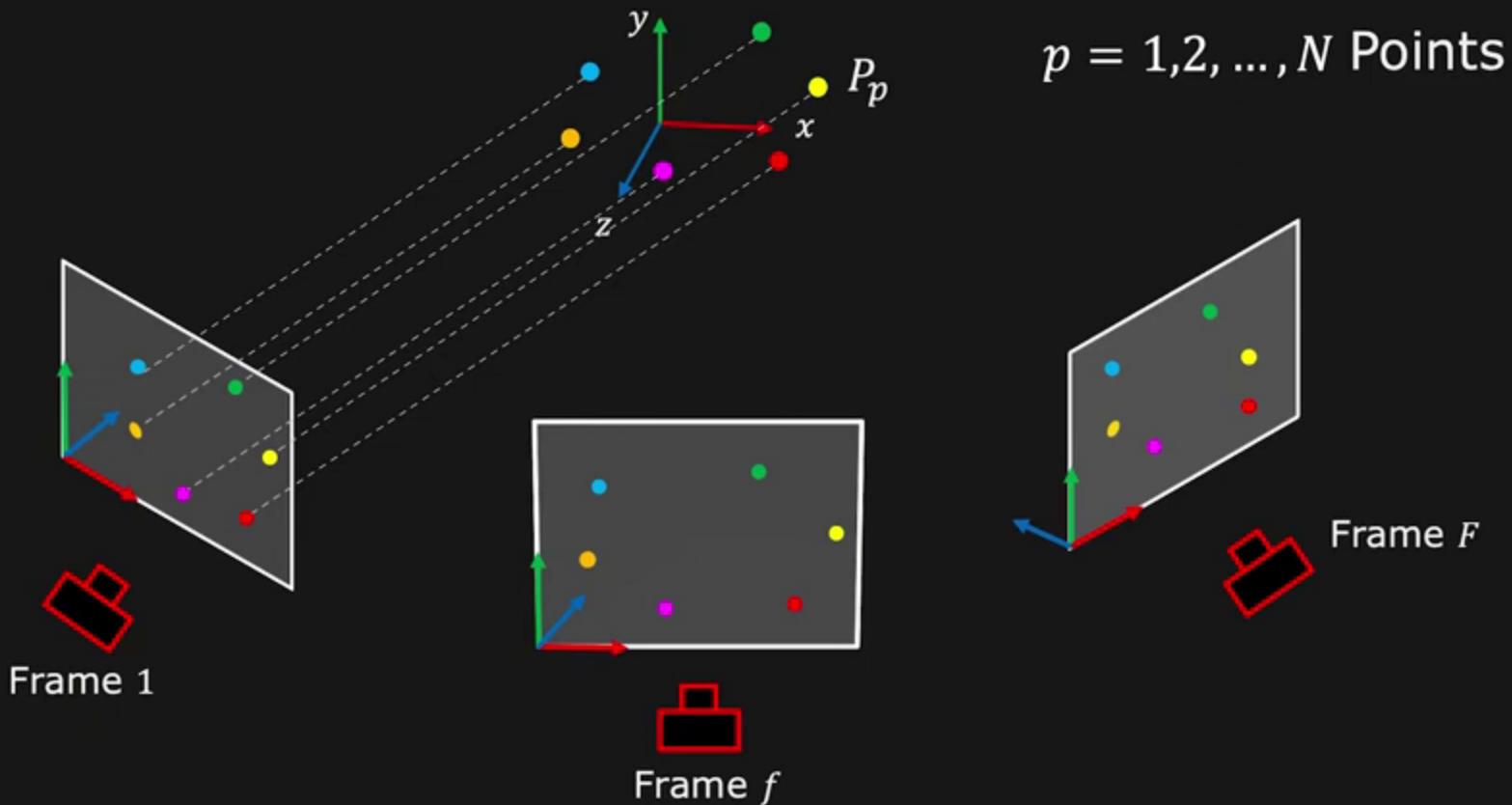
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