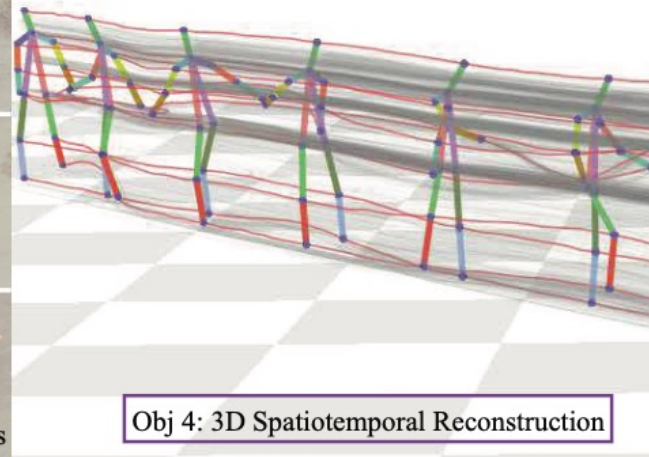
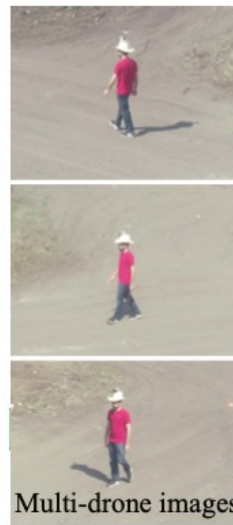
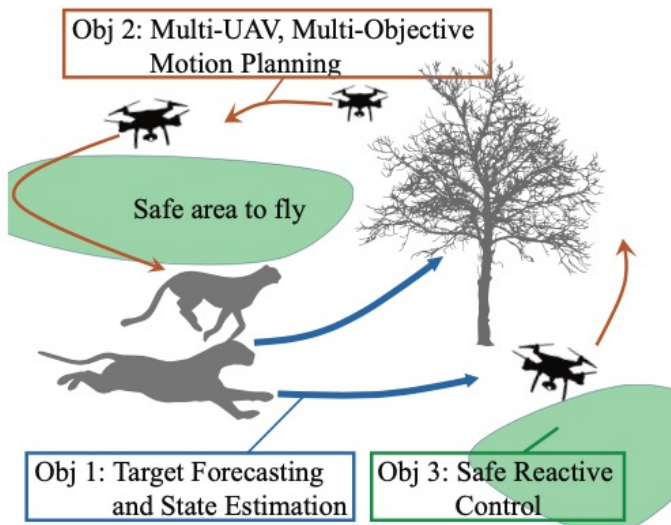
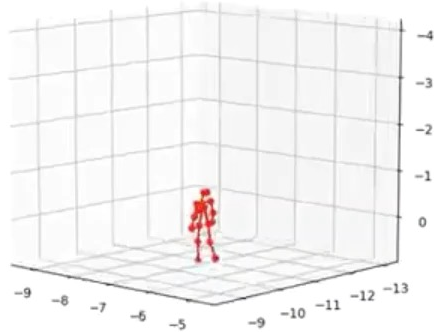


MultiFlyCam - Dense 3D Reconstruction of Dynamic Actors in Natural Environments using Multiple Flying Cameras

Key idea: Use team of flying cameras to rapidly reconstruct dense 3D models and motion



Collaborative Multi-Robot Formation Planning for 3D Human Pose Reconstruction



Collaborative Multi-Robot Formation Planning for 3D Human Pose Reconstruction

The screenshot displays a ROS-based simulation environment. The main window shows a 3D point cloud of a field, with a camera view of a person in a green suit. The simulation includes a multi-robot formation and a 2D navigation goal. The interface includes a menu bar (File, Panels, Help) and a toolbar with buttons for Interact, Move Camera, Select, Focus Camera, Measure, 2D Pose Estimate, 2D Nav Goal, and Publish Point. A panel on the left shows two camera views (M1 and M2) of the person in the green suit. The bottom status bar displays ROS Time: 1611763797.93, ROS Elapsed: 5.71, Wall Time: 1613429562.21, and Wall Elapsed: 28.53. A legend at the bottom indicates: Reset | Left-Click: Rotate, Middle-Click: Move X/Y, Right-Click: Move Z, Shift: More options.

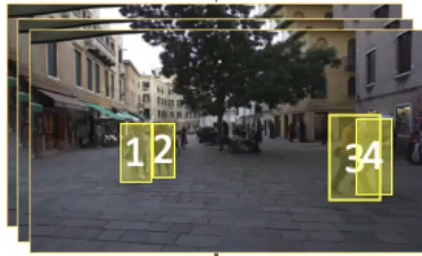


Multi-actor localization and tracking pipeline

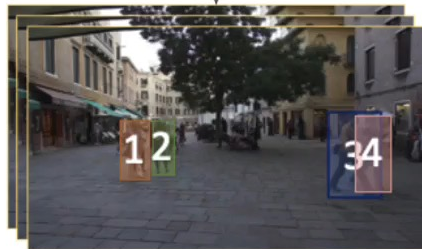
Multi-actor localization by multiple flying cameras.



Input images

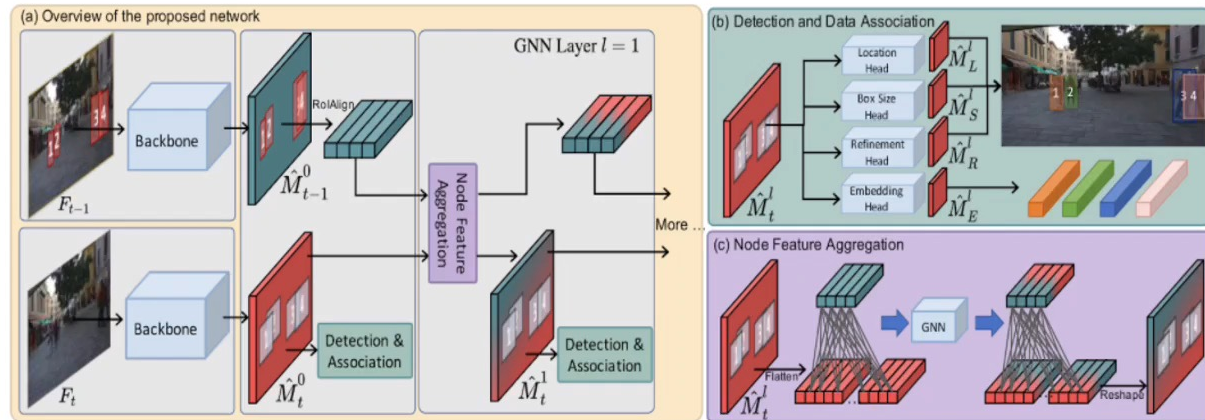


Actor detection



Actor tracking

Pipeline



- Approach

- Feature extraction from two consecutive frames
- Relation modeling between past tracklets and hypothesized objects in the current frame
- Object detection via regression
- Matching between past tracklets



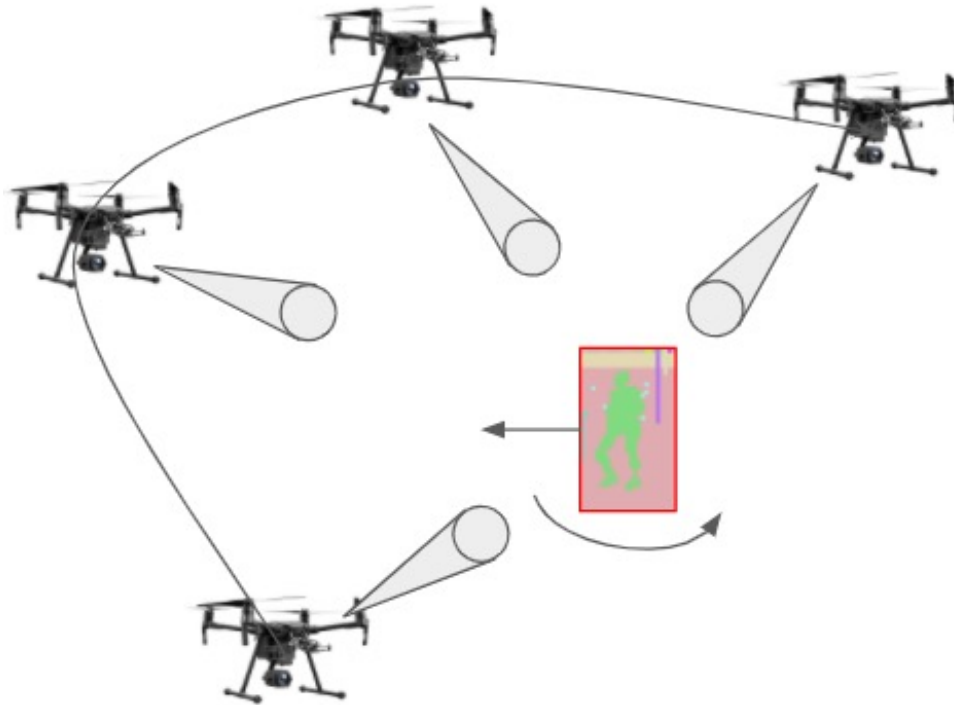
RSN Lab - View planning on directional objects

Use a single drone to maintain frontal or complete coverage of mobile actors.

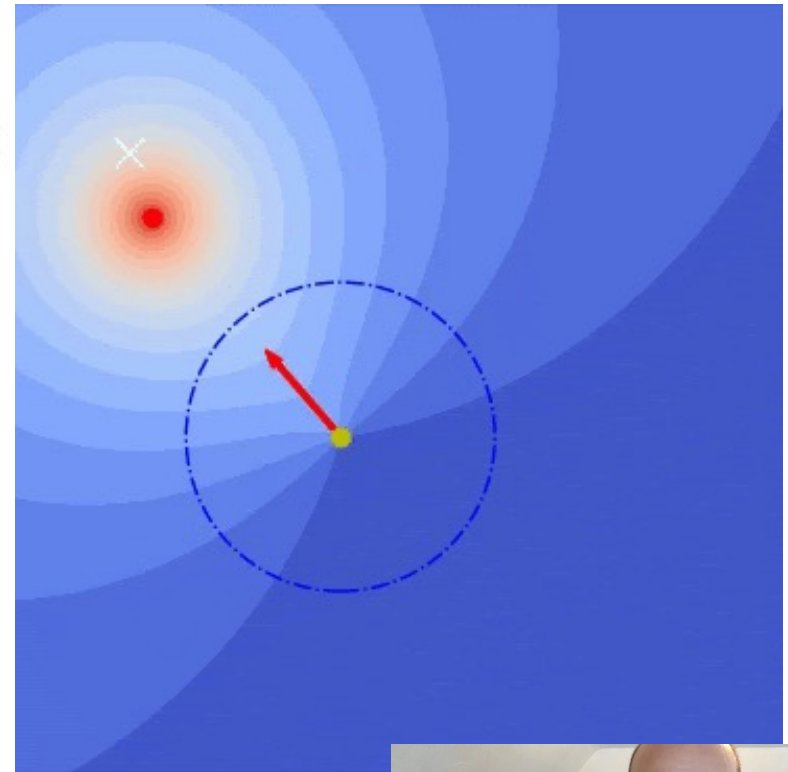


RSN Lab - View planning on directional objects

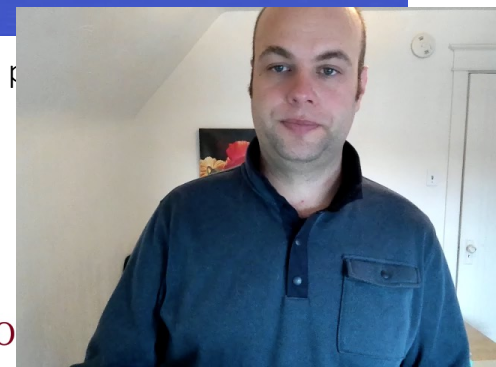
Current steps. Active tracking of an object with only yaw rotation in 2D space.



2D space planning given a single actor and view metric



2D planning p



3D Reconstruction of Actors



Input Image



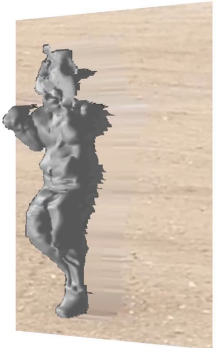
Output Depth



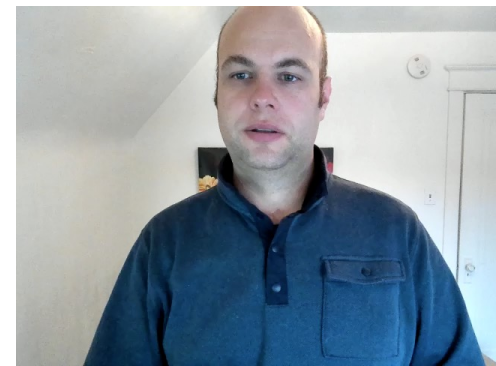
Output Normal



3D Surface



3D Surface
side-view



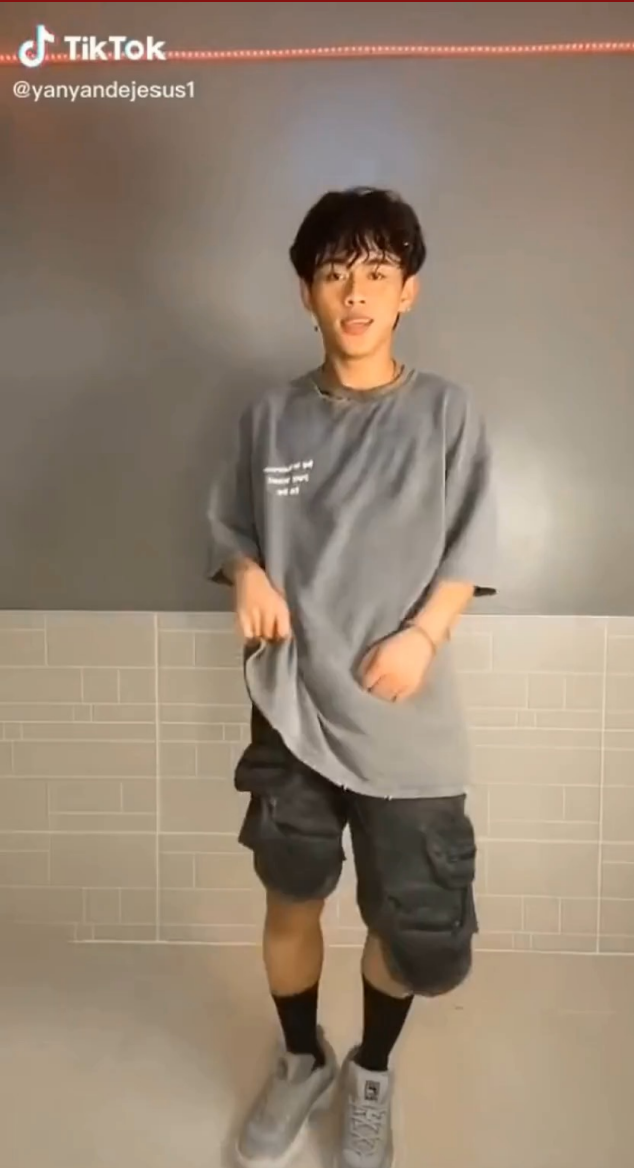
3D Reconstruction of Actors



Scanned datasets. A few hundred 3D models.



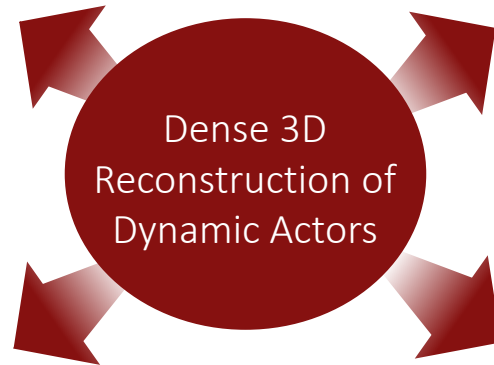
3D Reconstruction of Actors



MultiFlyCam Impacts



Bio-mechanics of People
+ Animals



Cultural Preservation
Social Interactions



Principal Investigators and Organizations



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Associate Research Professor
The Robotics Institute
Carnegie Mellon University



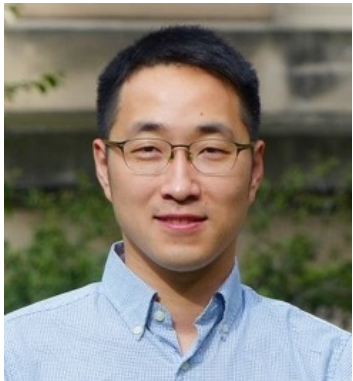
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