

Angular Heuristics for Coverage Maximization in Multi-Camera Surveillance

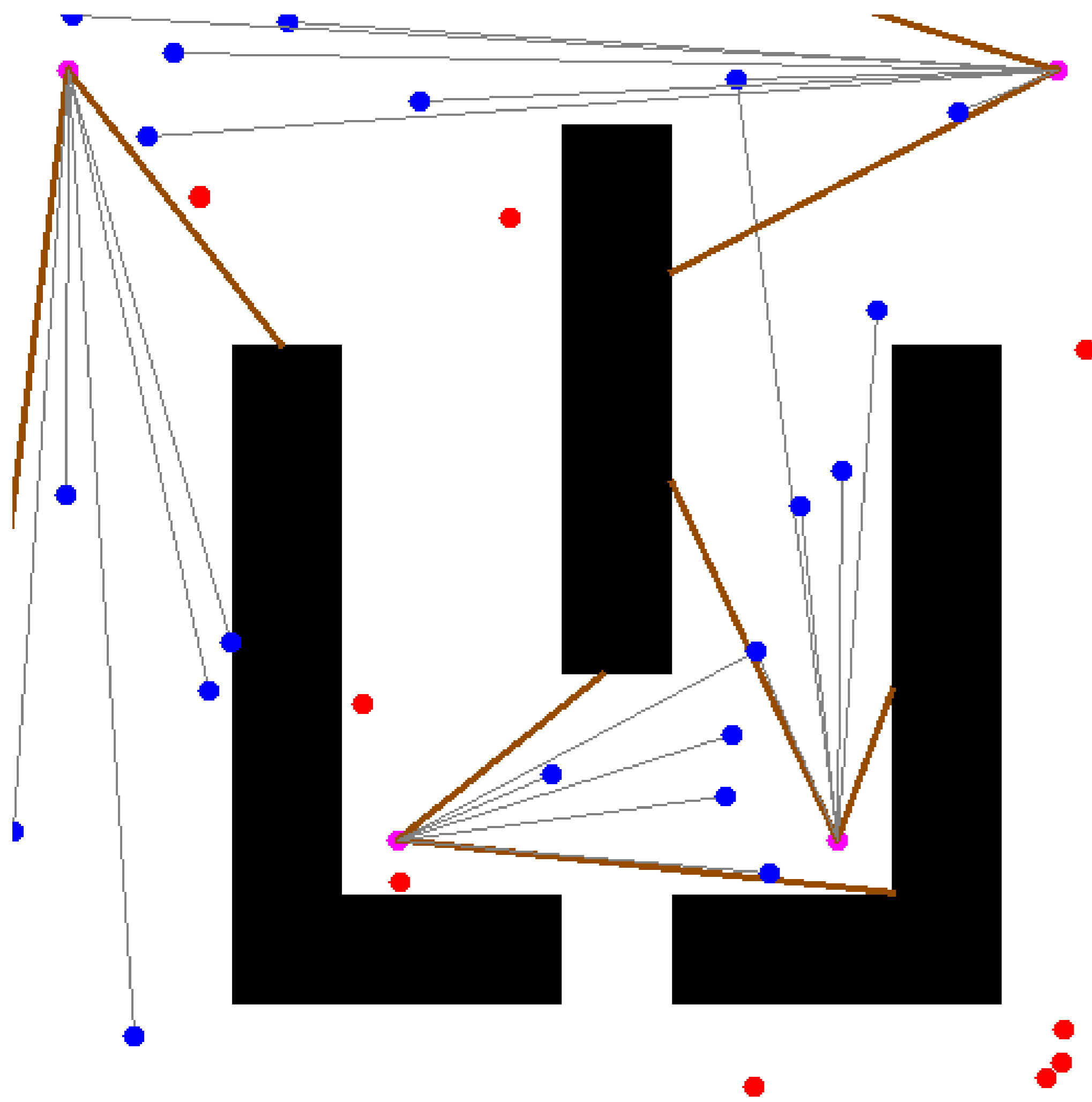
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Problem Definition

- ▶ Targets moving among obstacles
- ▶ Maximize coverage using multiple panning cameras
- ▶ Sample map

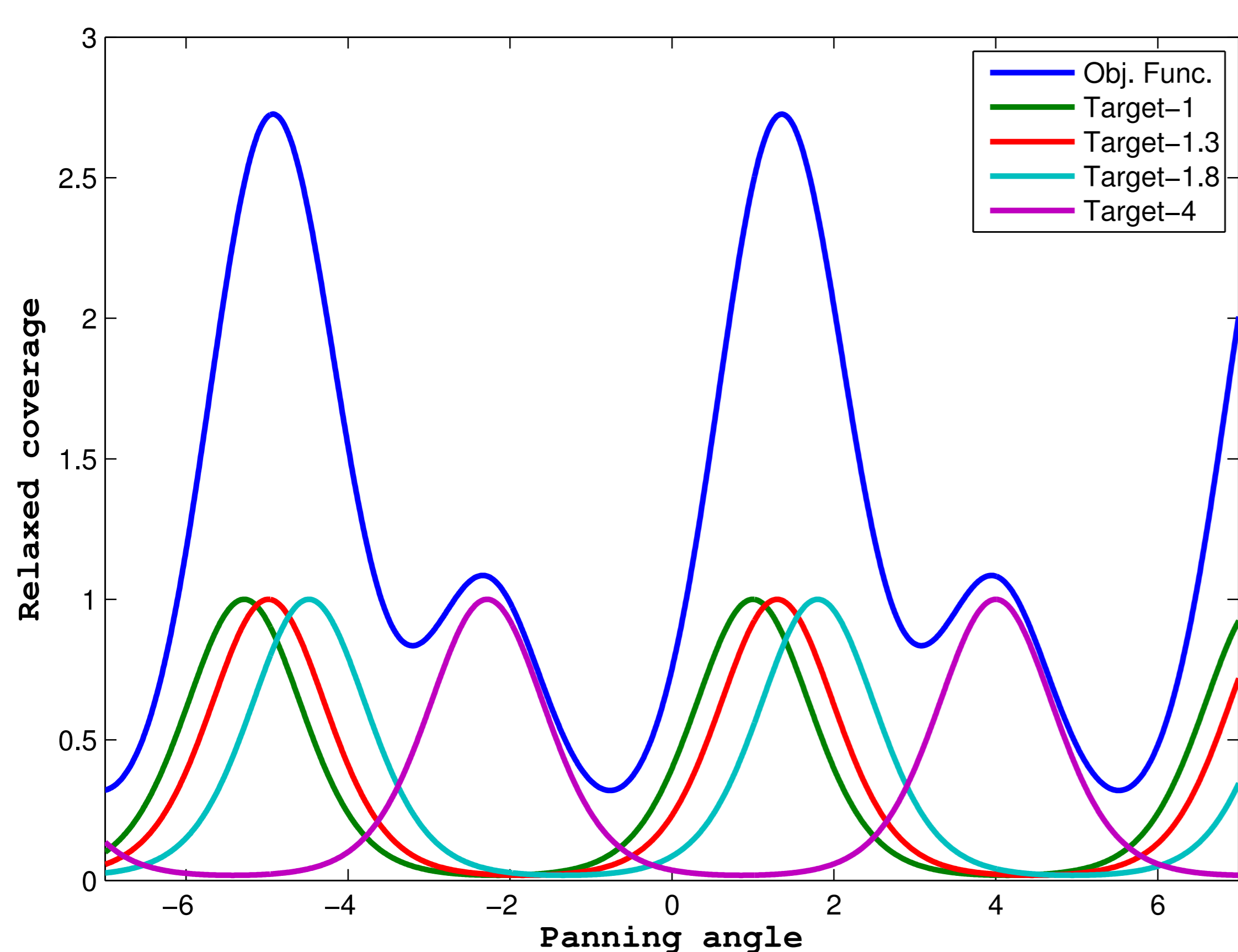


Contribution and Related Work

- ▶ Superior performance: coverage and runtime
- ▶ Continuous panning instead of a predefined fixed number of orientations
- ▶ Comparison against:
 - ▷ OPT: brute force search, try all combinations of orientations
 - ▷ CGA [Abouzeid, 2006]: iteratively select highest (camera, orientation)
 - ▷ CFA [Abu-Ghazaleh, 2010]: normalize (camera, orientation) by camera total

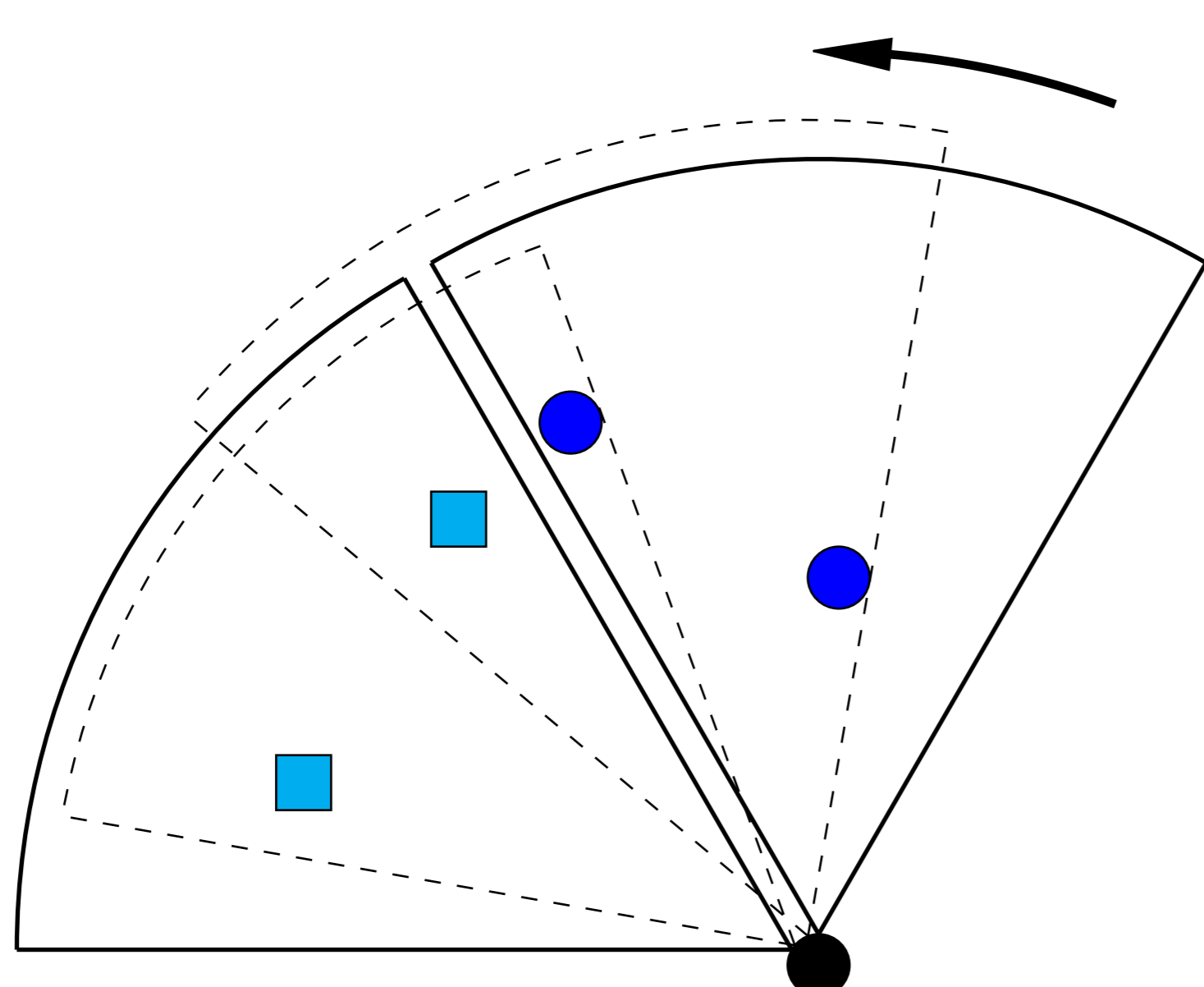
Angular Relaxation (AR)

- ▶ Define a heat function around the angle at which each target is located
- ▶ Choose the panning angle that maximizes the sum over all visible targets



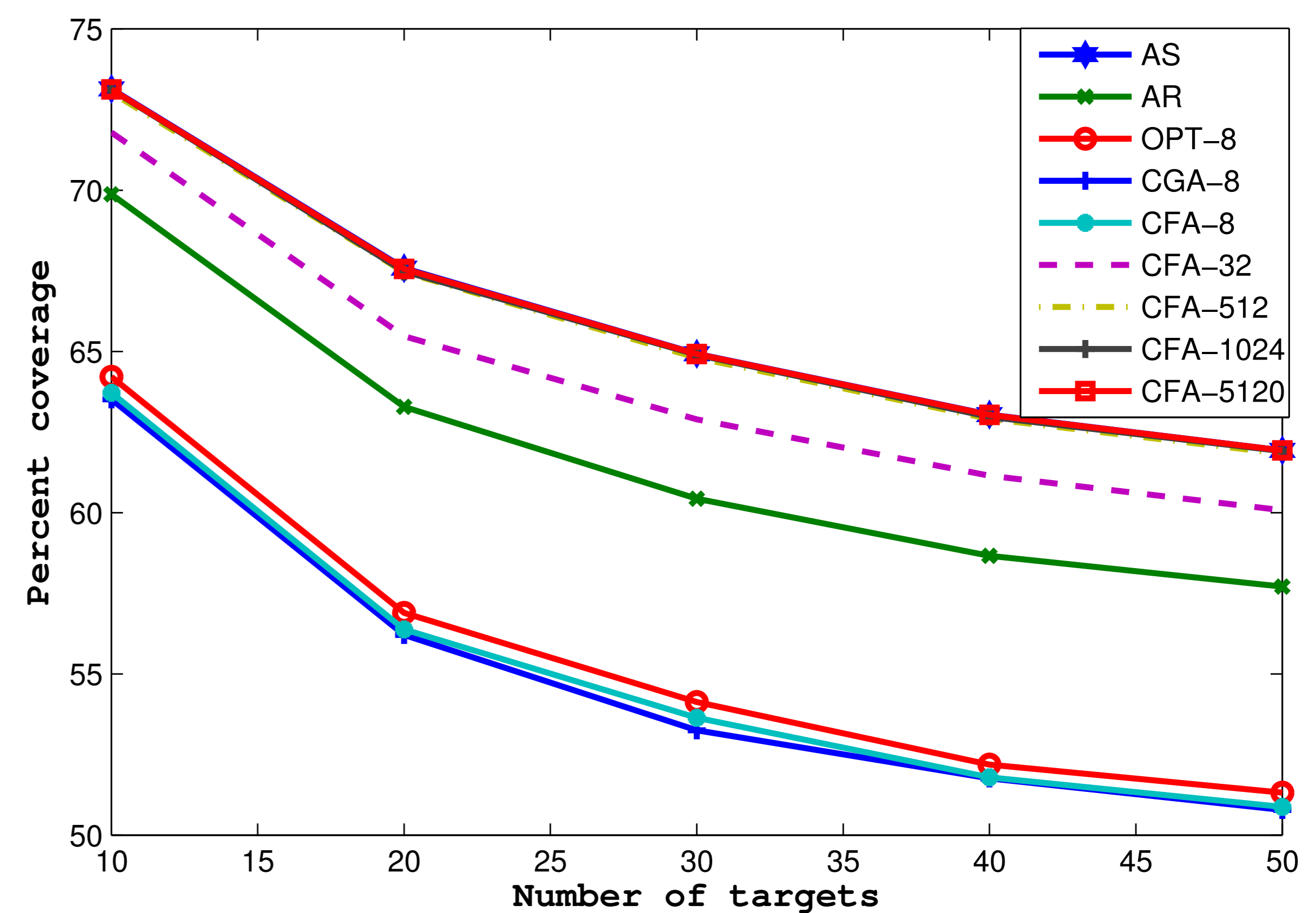
Angular Sweep (AS)

- ▶ Check all maximal groupings that include each target by making it rightmost in the camera FOV



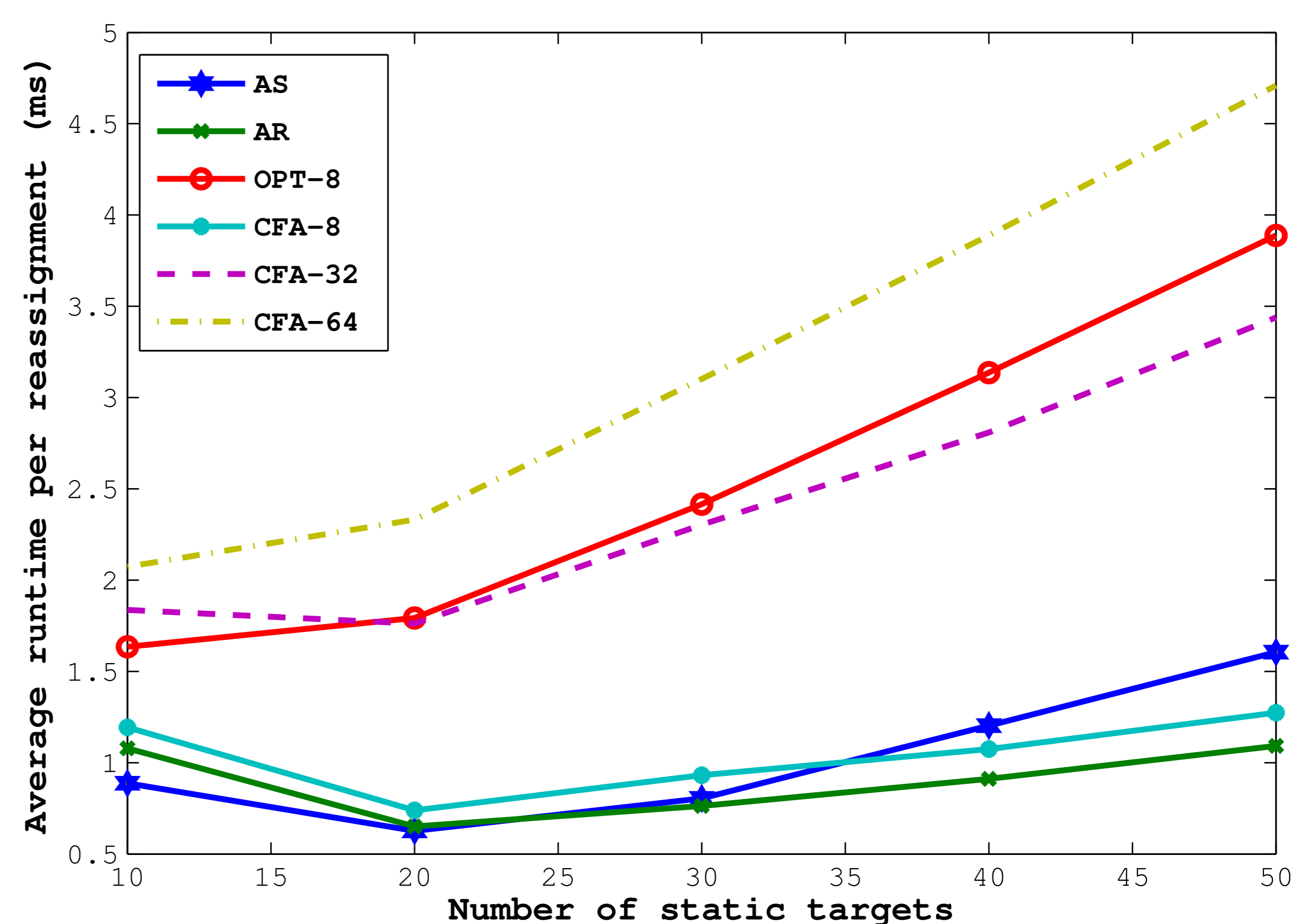
Results - Static Targets

- ▶ AS outperforms CFA no matter how many fixed orientations are used



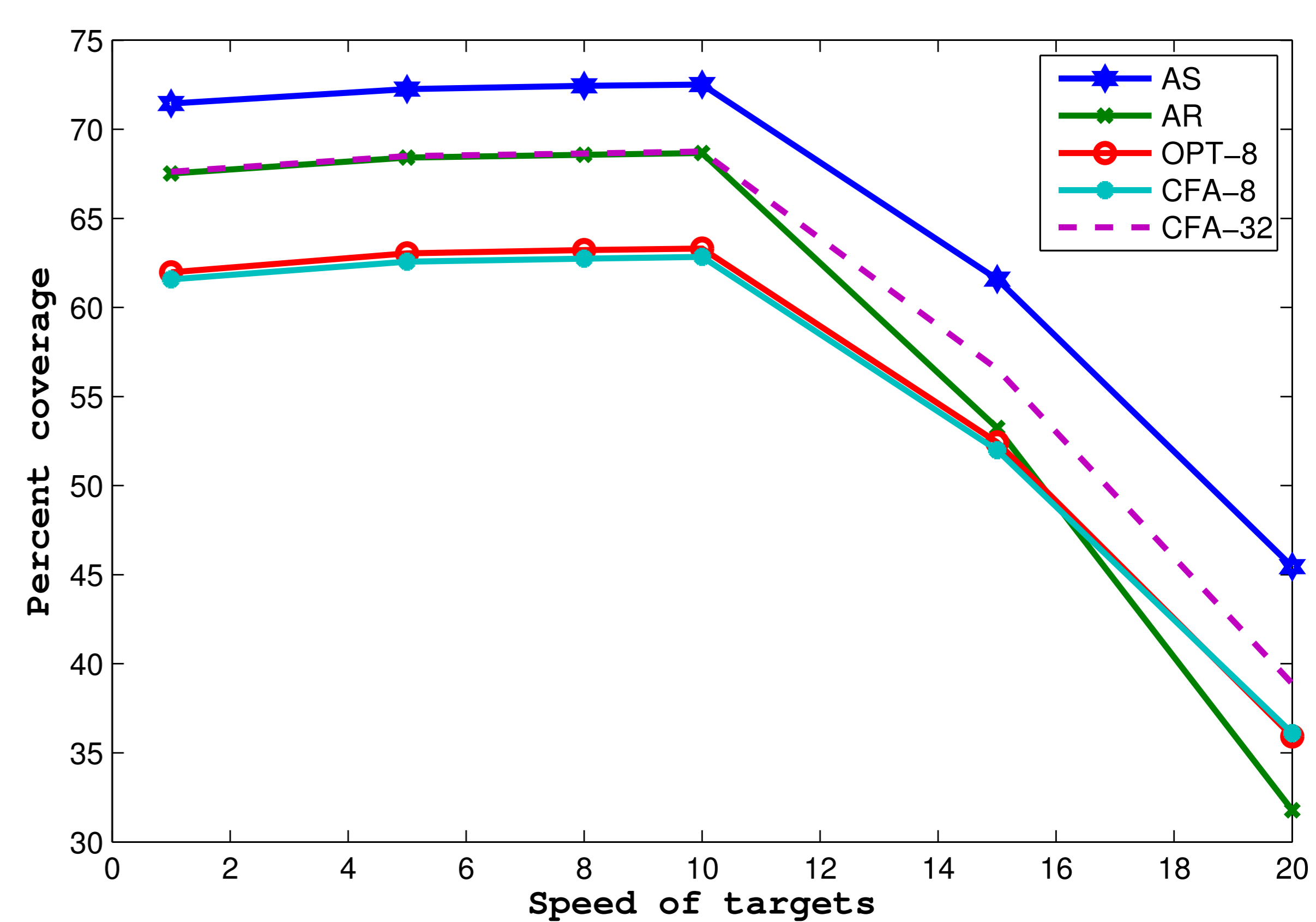
Results - Average Runtime

- ▶ CFA much slower as no. of orientations increase, no higher coverage achieved



Results - Mobile Targets

- ▶ Constant speed for all targets, reassign cameras every 10 steps (30 targets)



Future Work

- ▶ Experimental realization
- ▶ Motion modeling and target path prediction
- ▶ Quality of coverage trade-offs e.g. zooming

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