**Goal:**
Players score hits on each other as in Laser Tag!

**Equipment:**
Each player has an Android 4.0+ device and a printed target

**Challenge:**
Line up your sights on your opponent’s target and shoot!

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**UDP Protocol Networking**
WiFi Peer-to-Peer Game Network For Real-Time Tag Detection and Scoring

- Simple Setup: Discover → Connect → Poke → Play Game
- Android Wi-Fi Direct P2P Connectivity
- No Internet Required
- User Datagram Protocol (UDP)
- Auto-assigns one device as Server
- Clients initiate a poll/response at 200 ms intervals

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**ORB: Oriented FAST, Rotation Aware BRIEF**

- FAST Keypoints Multiple Scales
- Orientation Appx. By Intensity Centroid
- Harris Cornerness Ordering
- Smoothed Integral Image
- Compute rotated BRIEF descriptors

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**ORB Marker Detection**

- ORB Feature Detection
- ORB Descriptor Extraction
- BruteForce CrossCheck Matching
- Homography Estimation
- Detection Boolean

**ORB:**
- Robust to scale and rotation. ~100x faster than SIFT
- Allows for extensible targets - algorithm does not preclude the use of additional targets.
- On going work: Investigating faster algorithms based on efficient marker detection.

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**Reference Image**

- ROI Frame
- ORB Feature Detection
- ORB Descriptor Extraction
- BruteForce CrossCheck Matching
- Homography Estimation
- Detection Boolean

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