



Swarm Robotics

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Overview

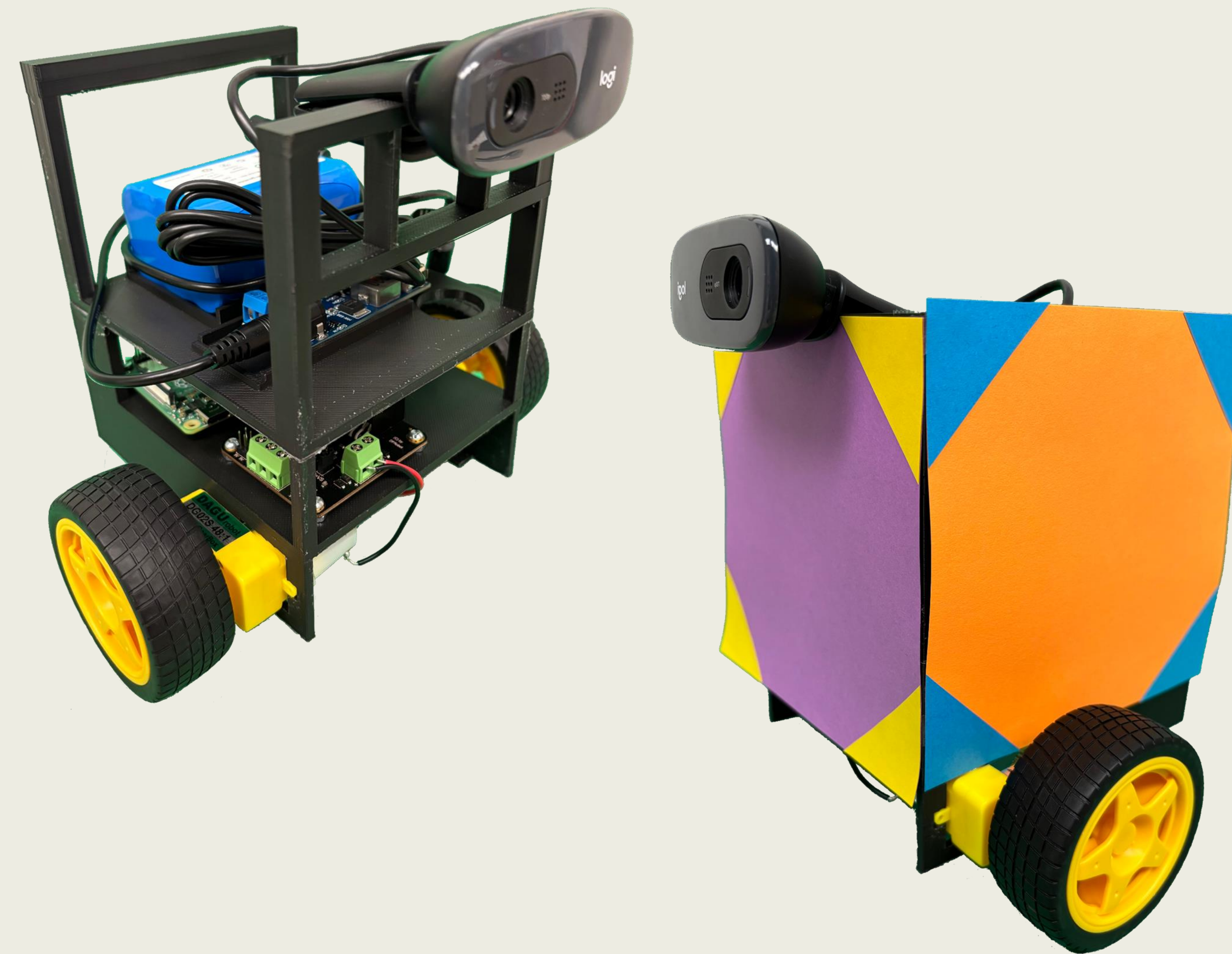
We developed a robotic swarm that exhibits flocking behavior using Boids algorithm.

Benefits of distributed algorithms:

- Scalable to many agents
- Robust to single failures

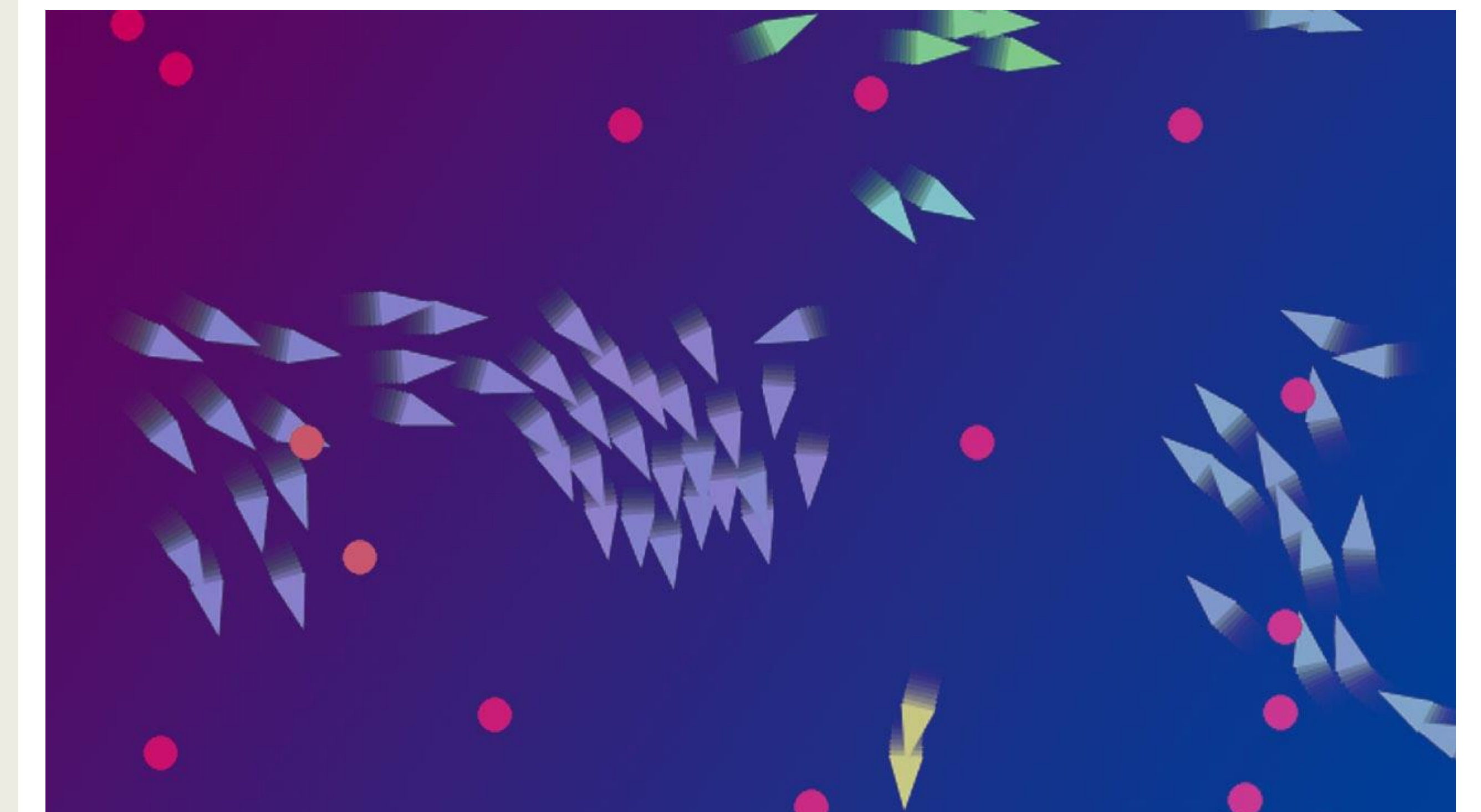
Applications:

- search and rescue
- land mapping
- mesh networks



Boids Algorithm

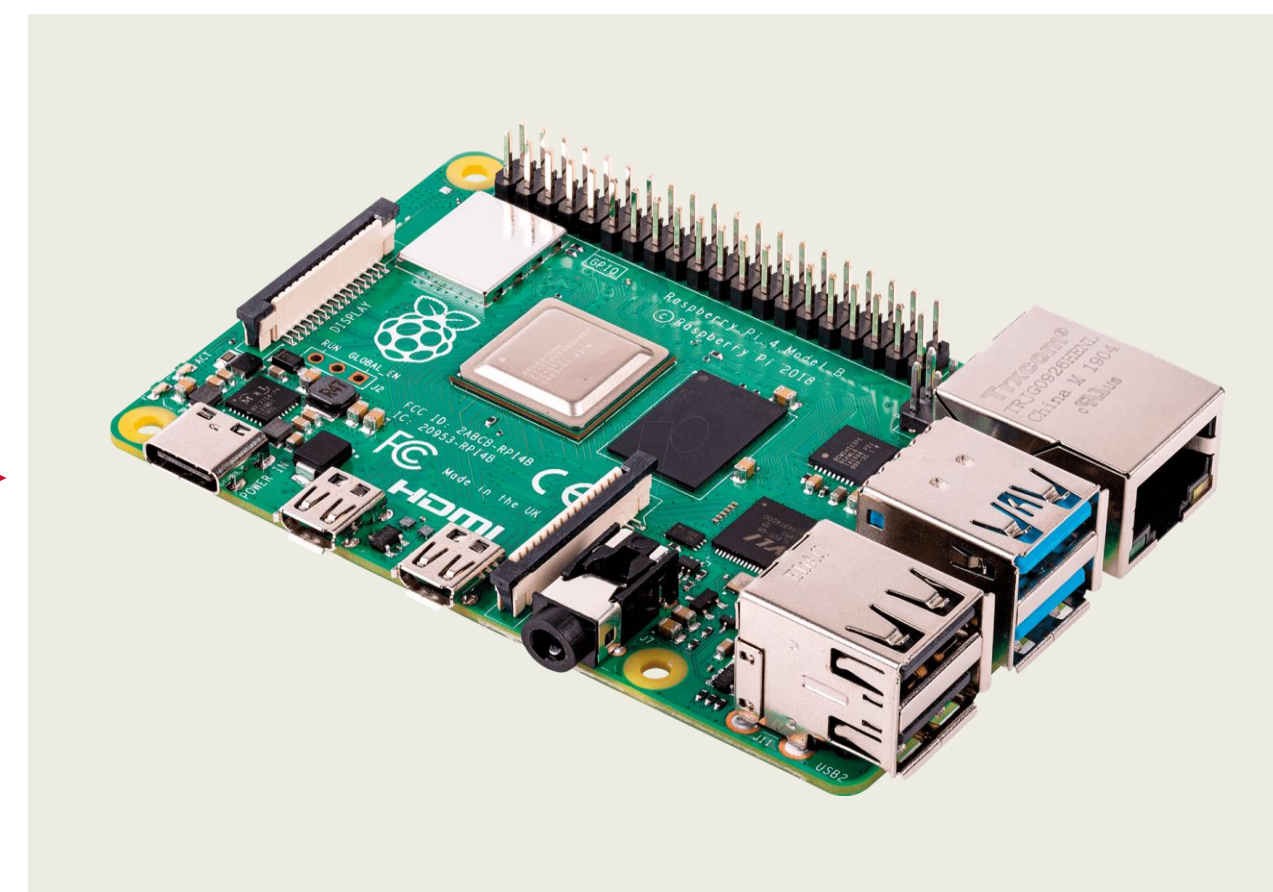
Boids is a swarm robotics algorithm that simulates flocking. These bird-oid objects, or *boids*, follow three simple rules (separation, alignment, and cohesion) that create emergent



Visual Sensing Methodology



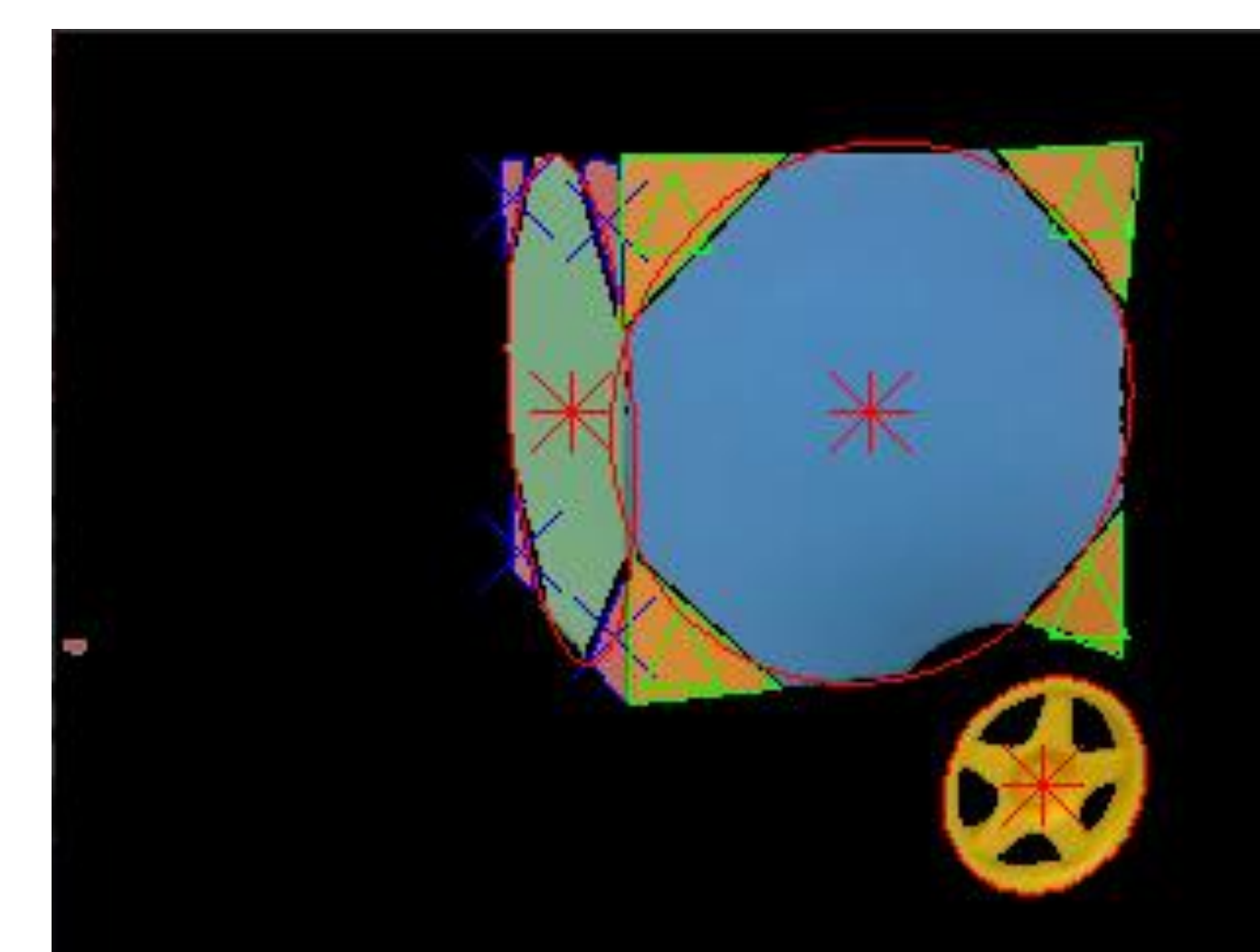
Camera



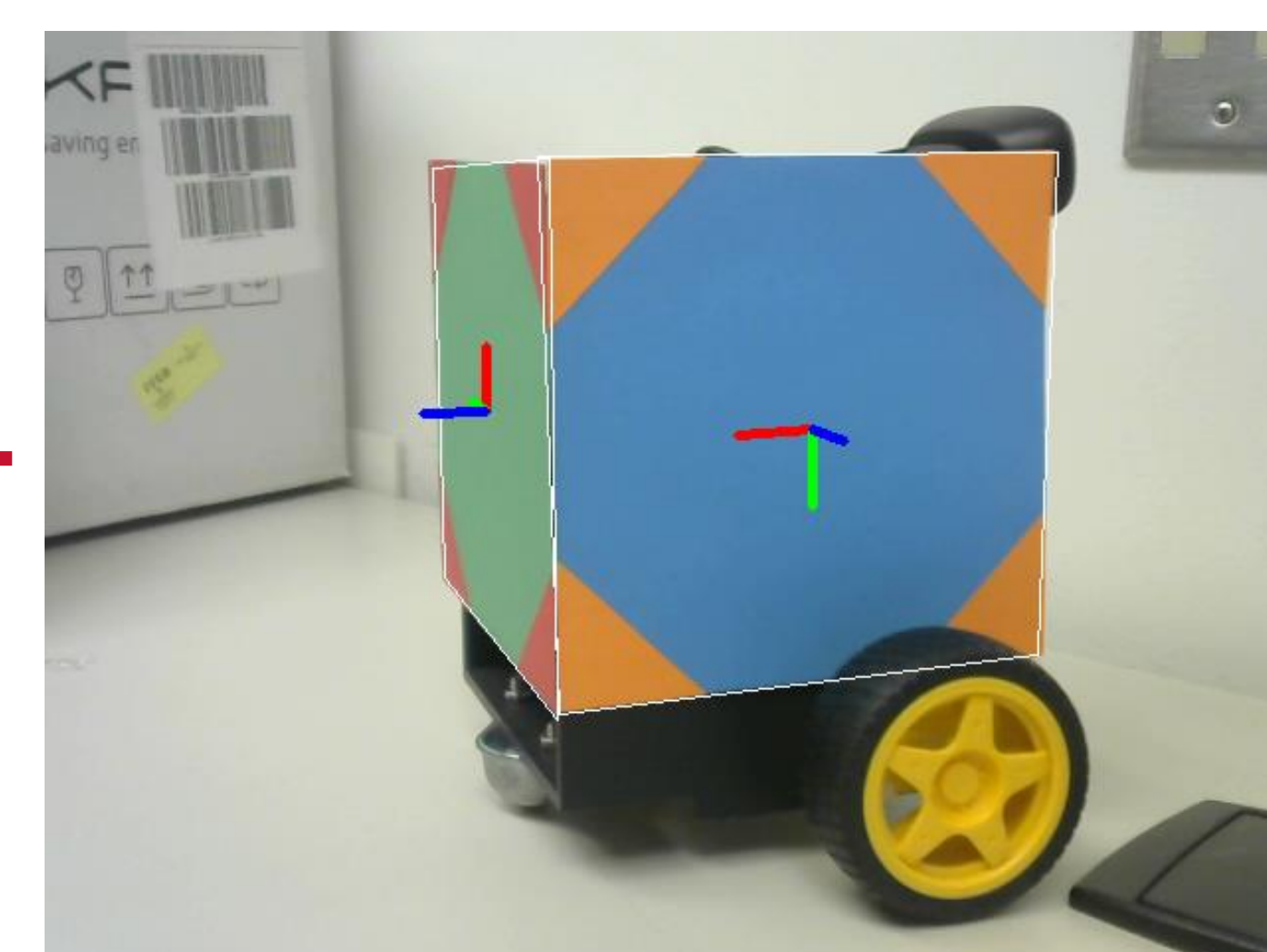
Raspberry Pi 4B



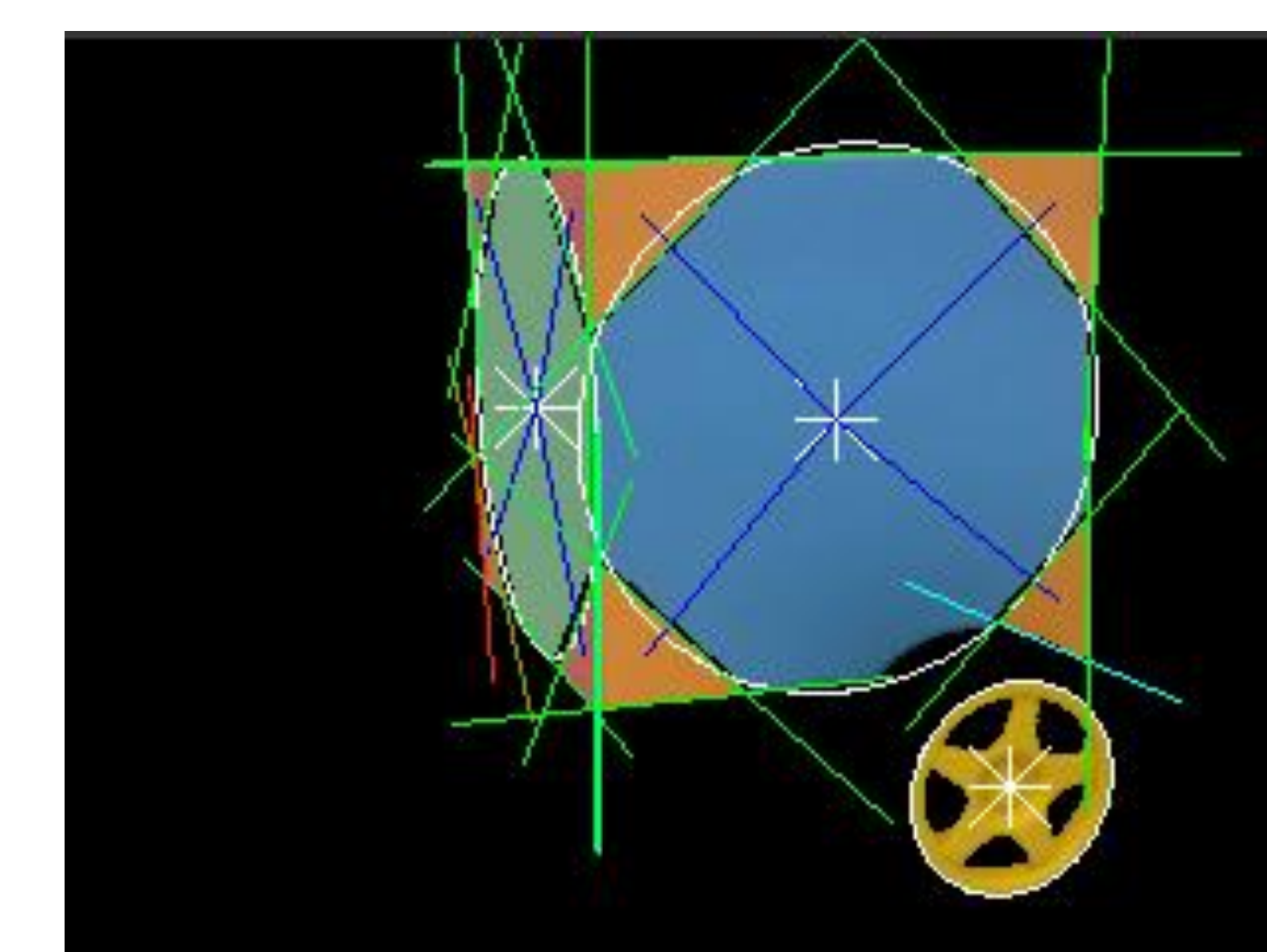
Original Image



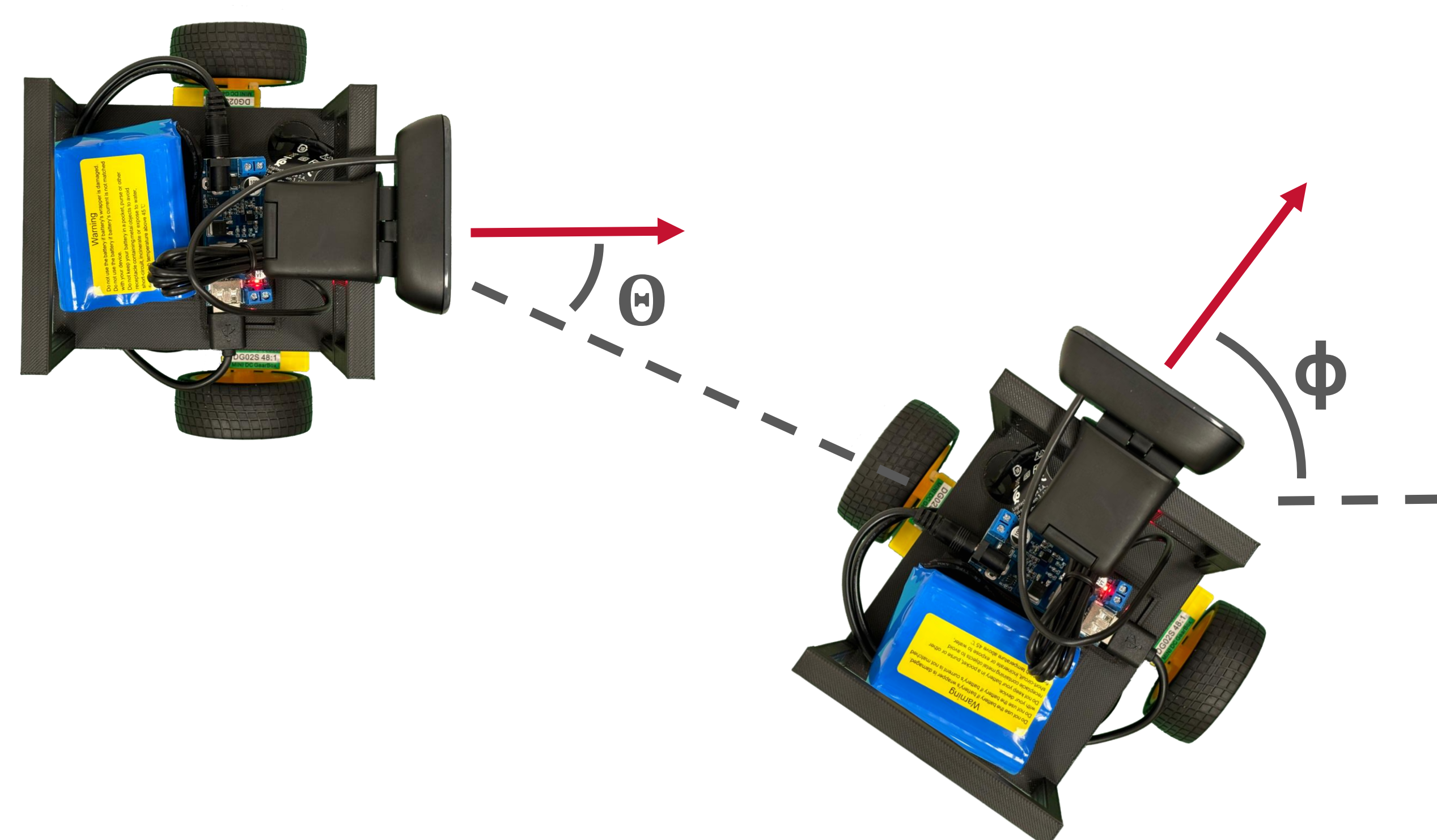
Shape Decomposition



Pose Estimation



Tag Construction



Chassis Design

- Custom 3D printed chassis
- Two-layer design to facilitate assembly and replacement of parts
- Differential drive motion system

