



Predator-Prey Simulation Using Boids Model





General overview

- Evolution
- Survival probability
- Using nature as design inspiration
- Real world applications



Starting goal

- Develop a realistic simulation replicating natural patterns
- Simulate different types of predator / prey models
- Implement adaptive model configurations
- Large scale simulation



Predator tactics

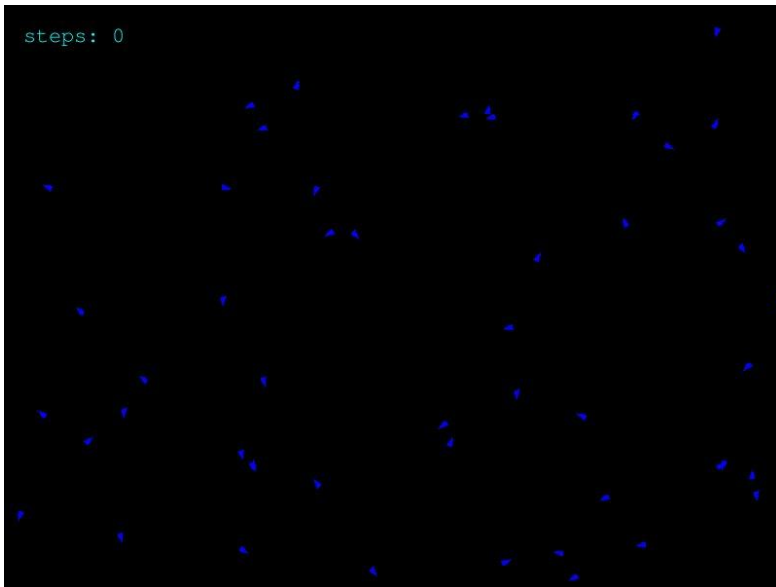
- Attack towards the groups centroid
- Attack nearest
- Attack most peripheral
- Attack at random



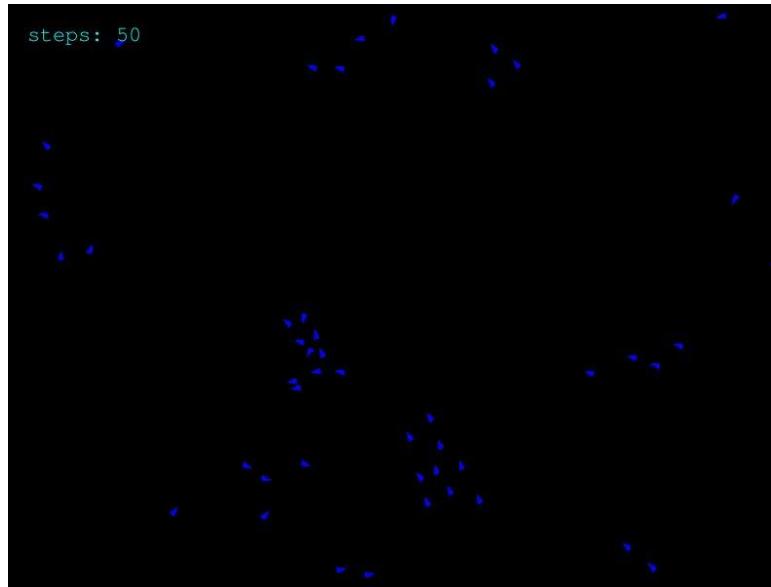
Prey escape maneuvers

- Avoid direction
- Avoid position
- Turn gamma
- Turn random
- Turn time
- Zig zag

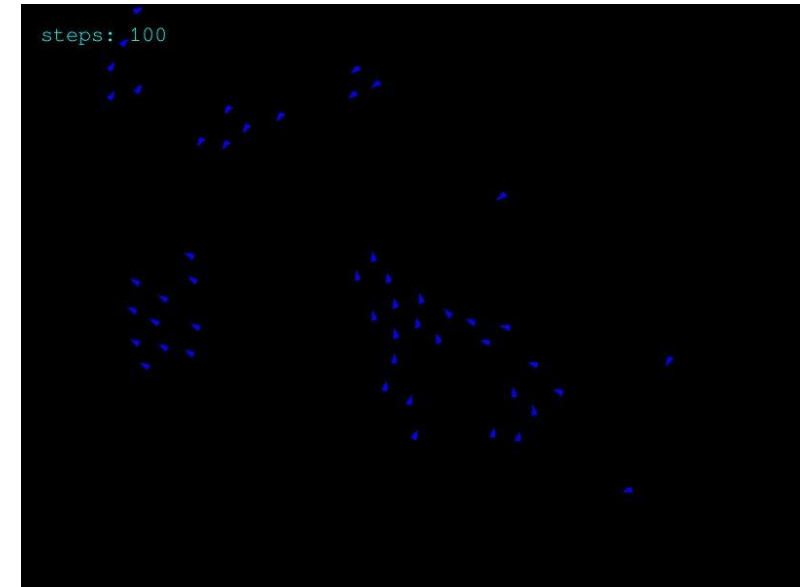
Basic boid model



Starting point

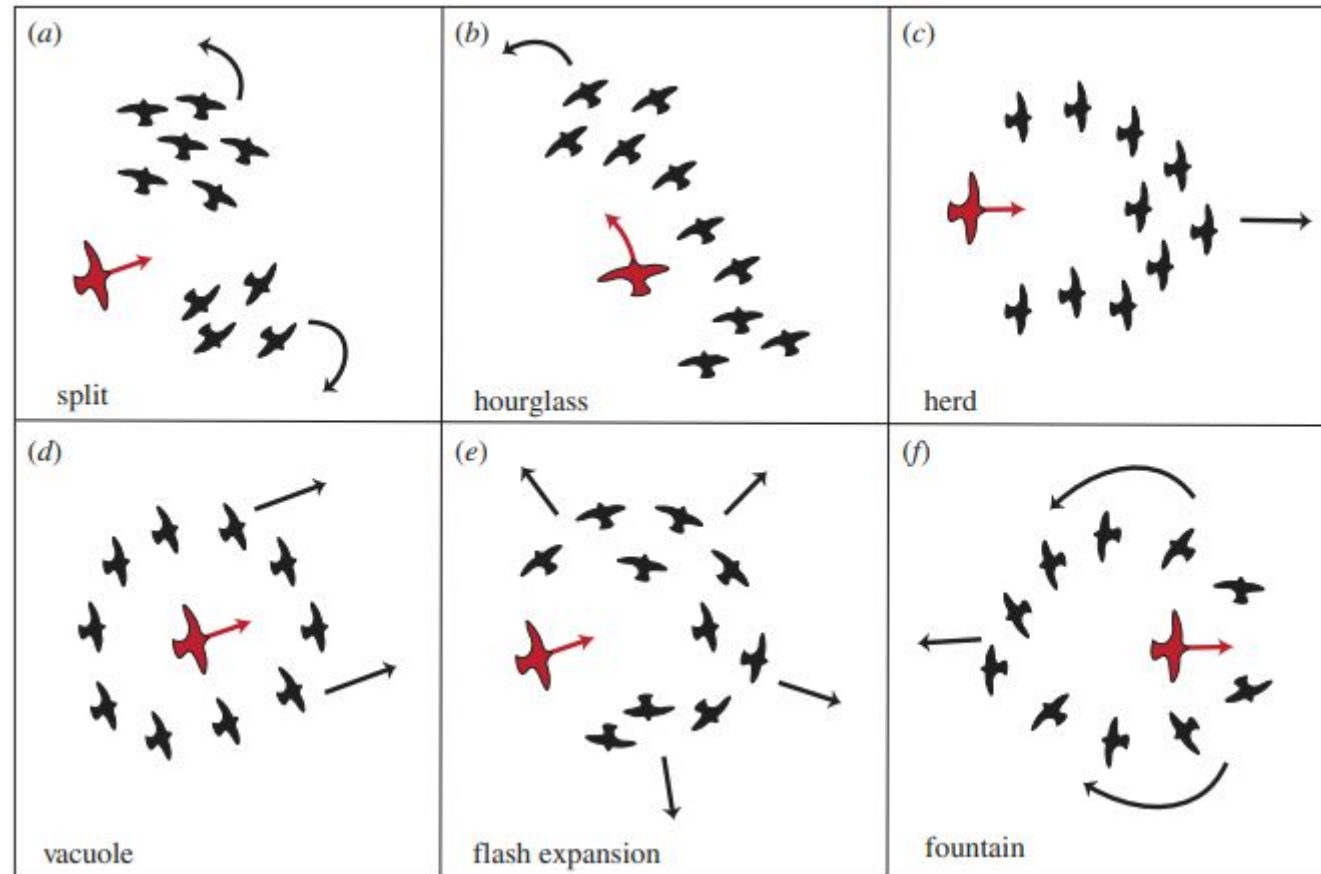


Step 50



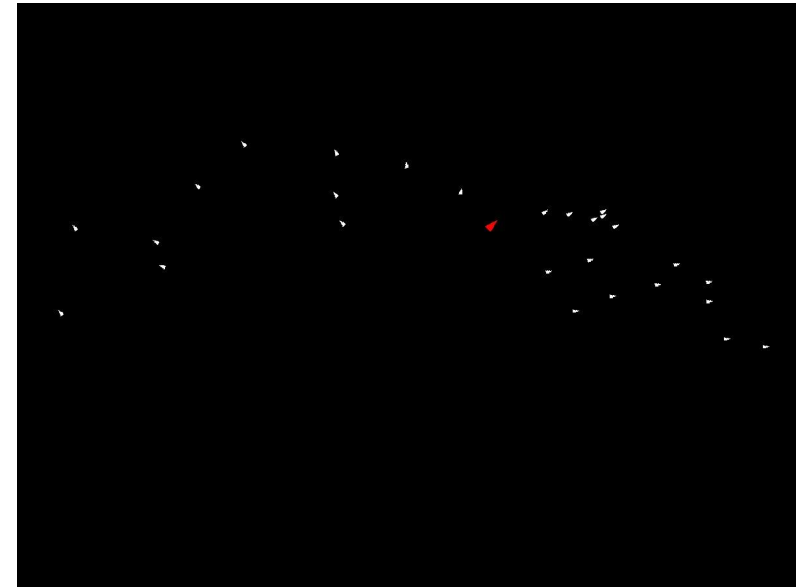
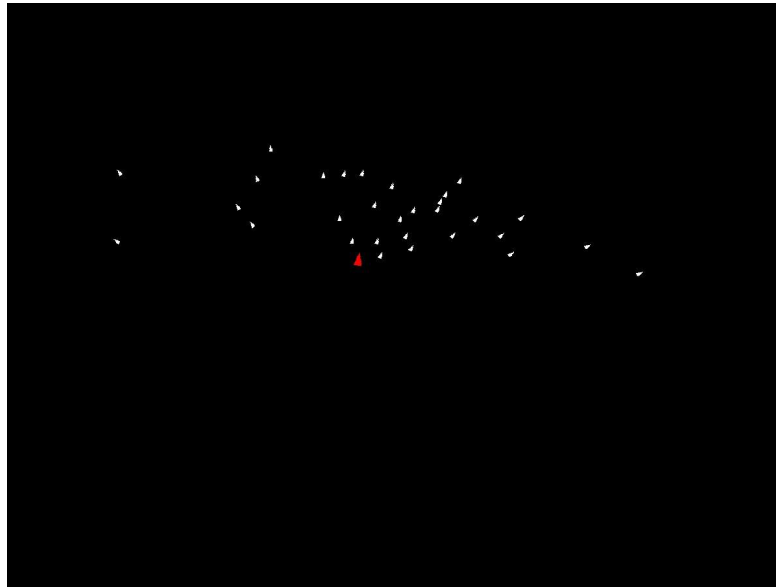
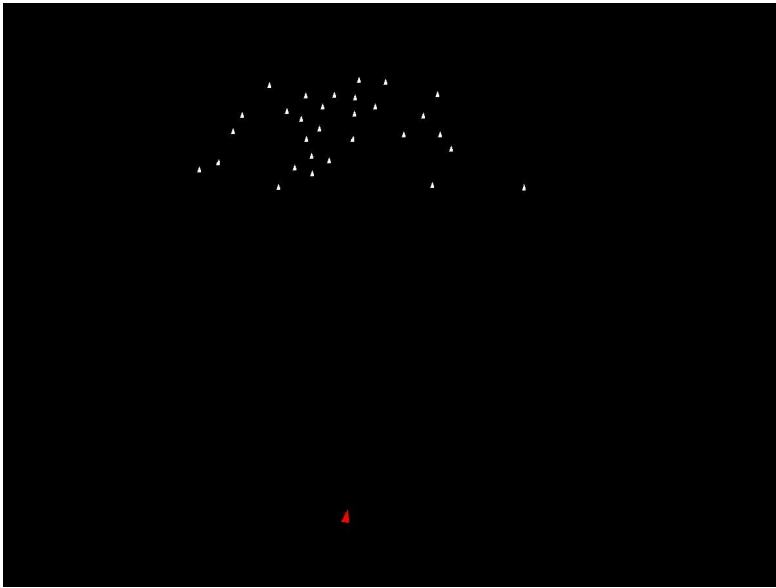
Step 100

Introduction of a predator

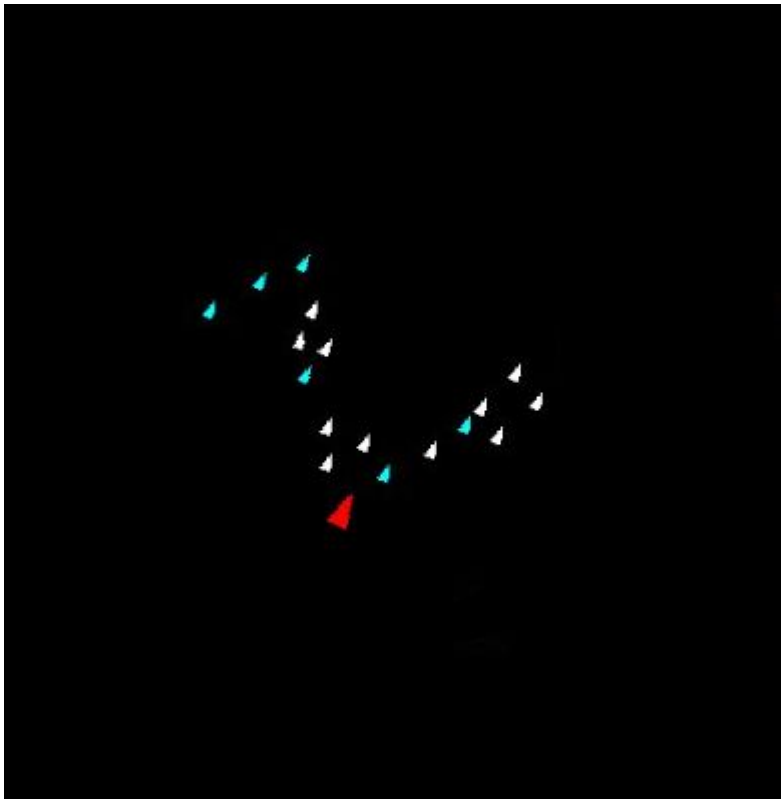


Generated patterns of collective escape

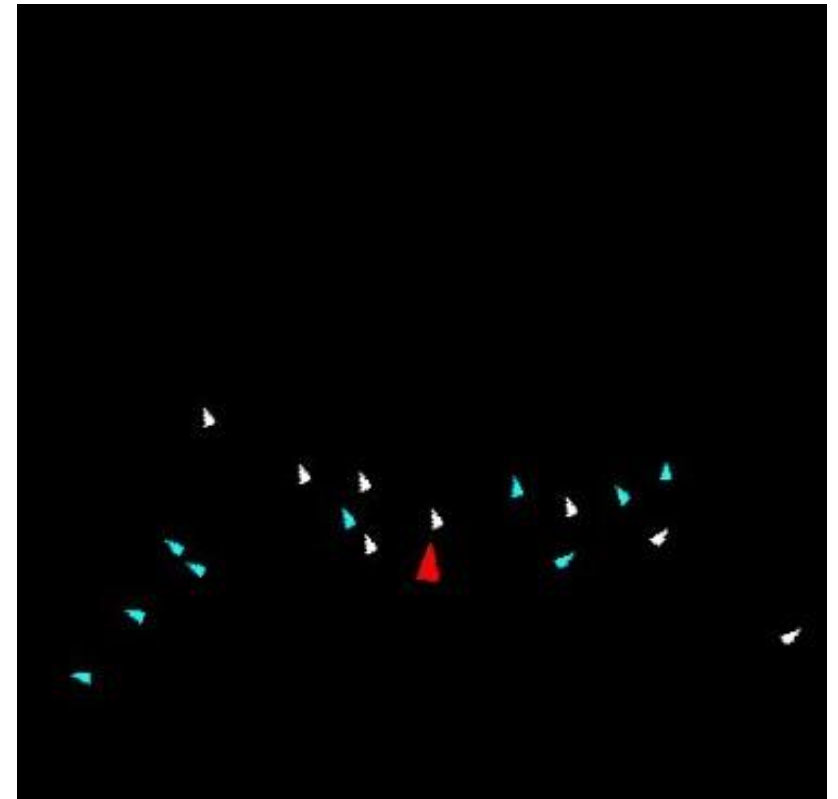
Split



Generated patterns of collective escape

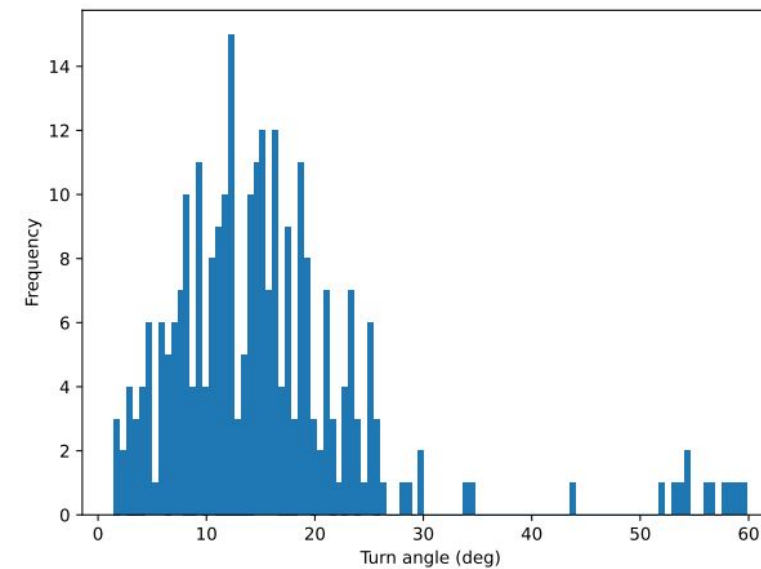
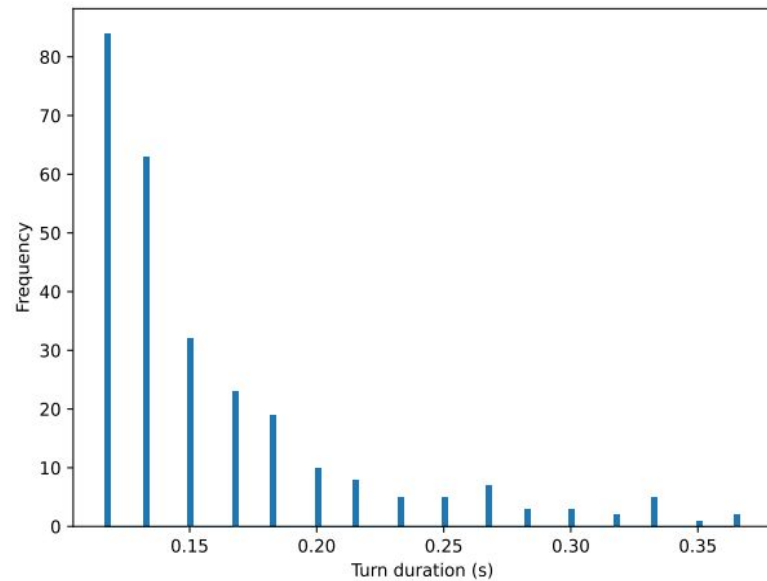
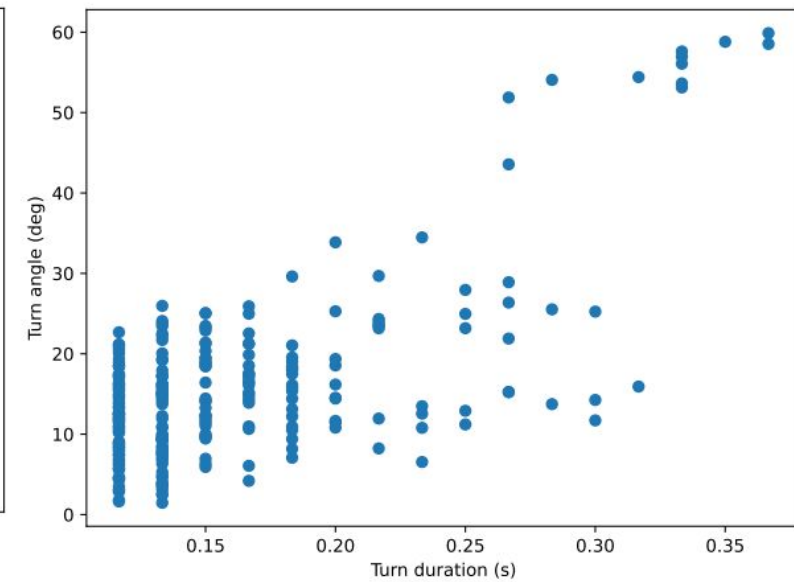
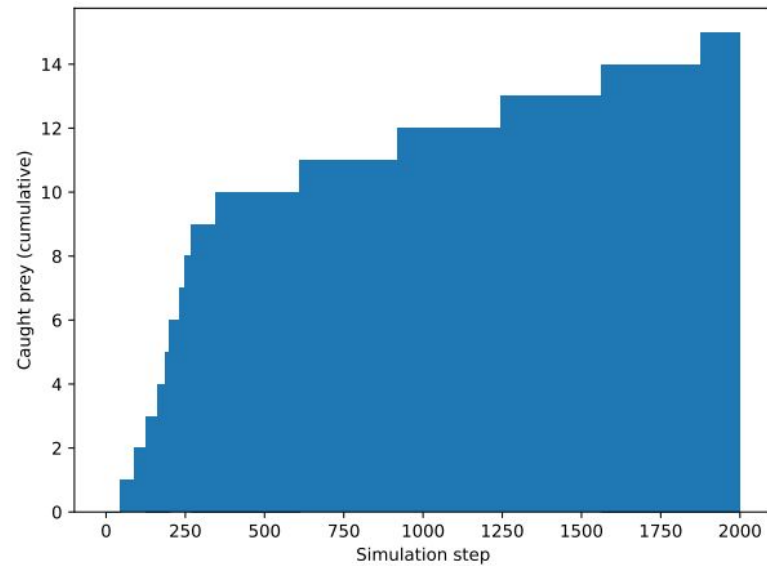


Herd

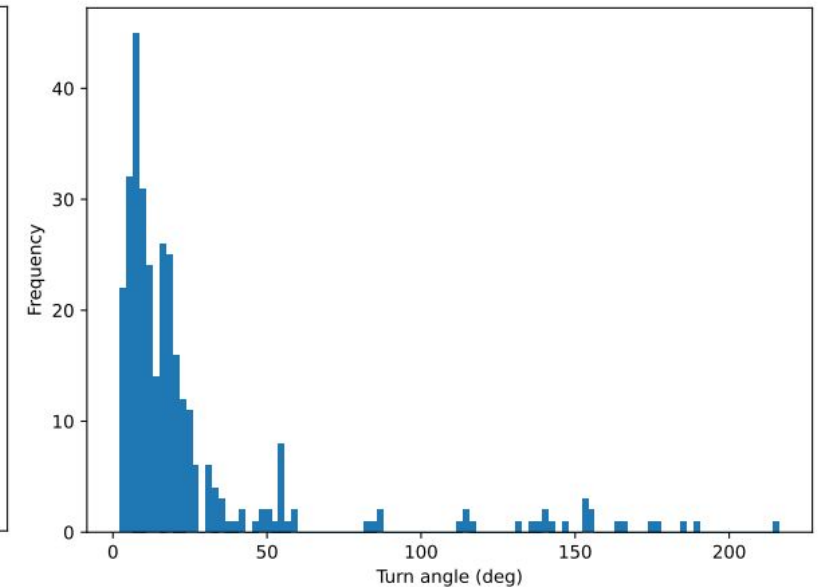
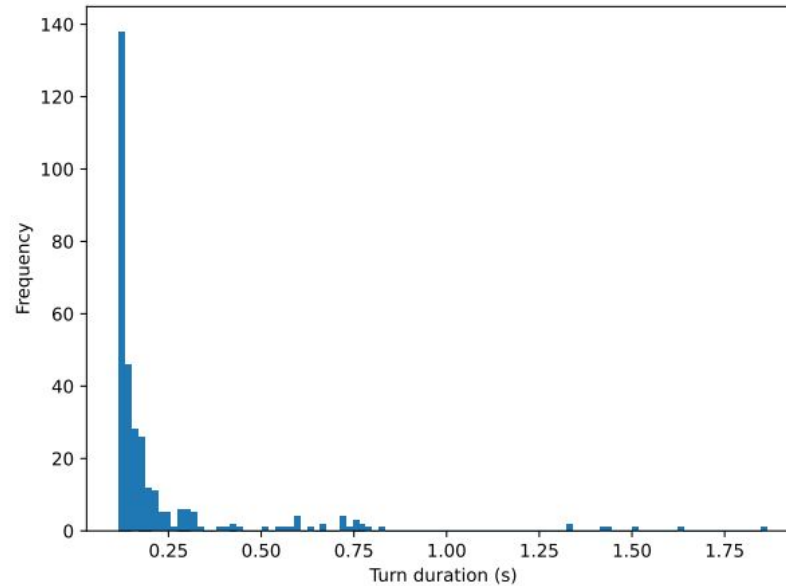
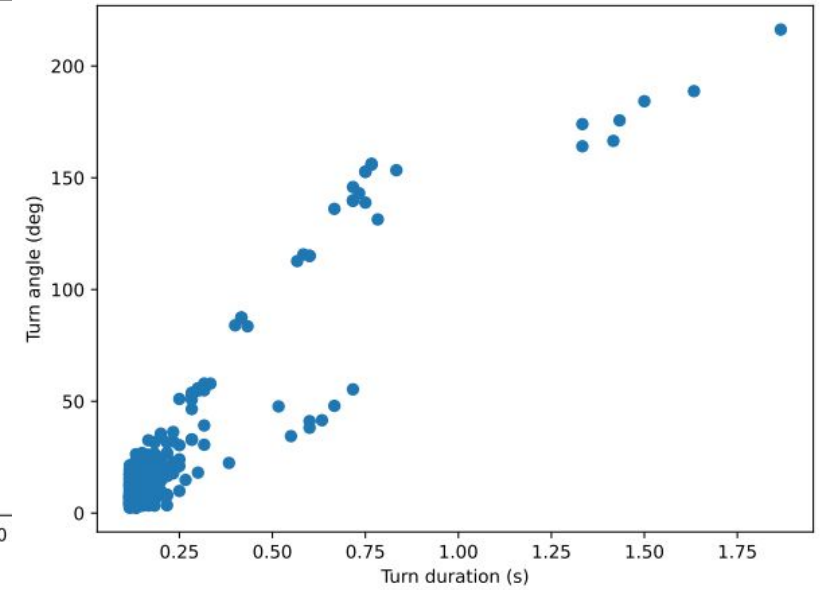
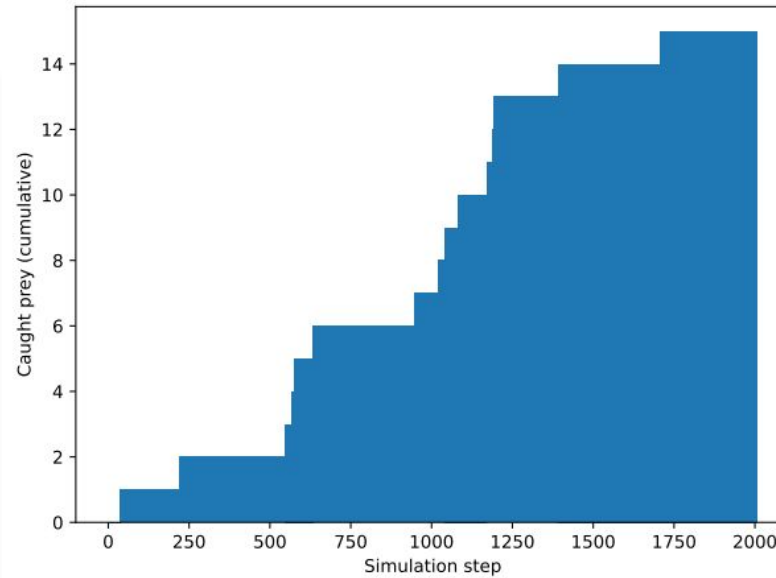


Flash expansion

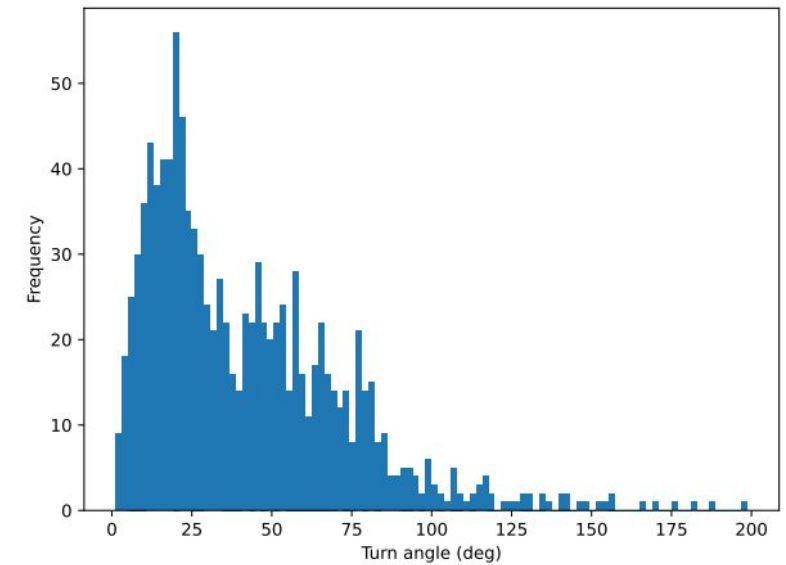
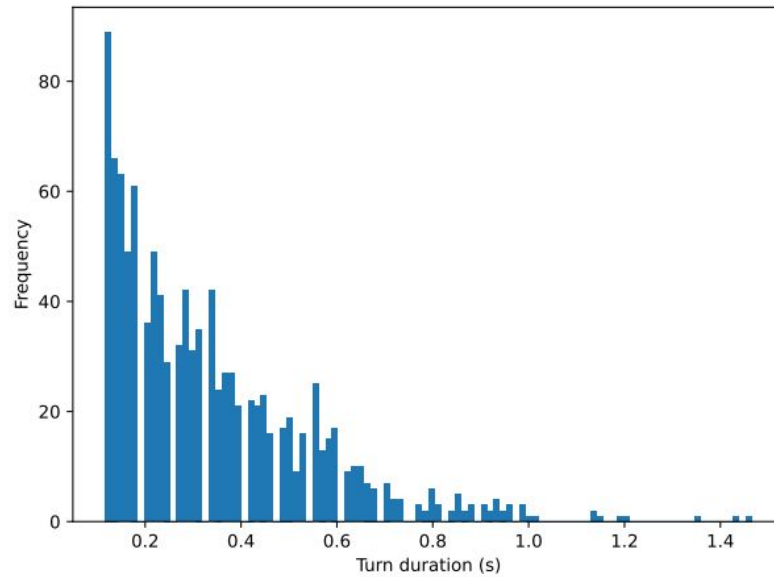
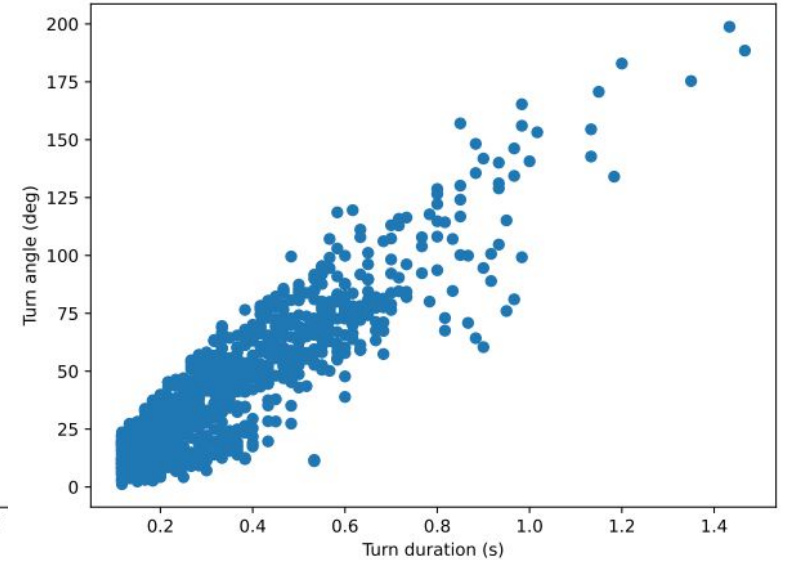
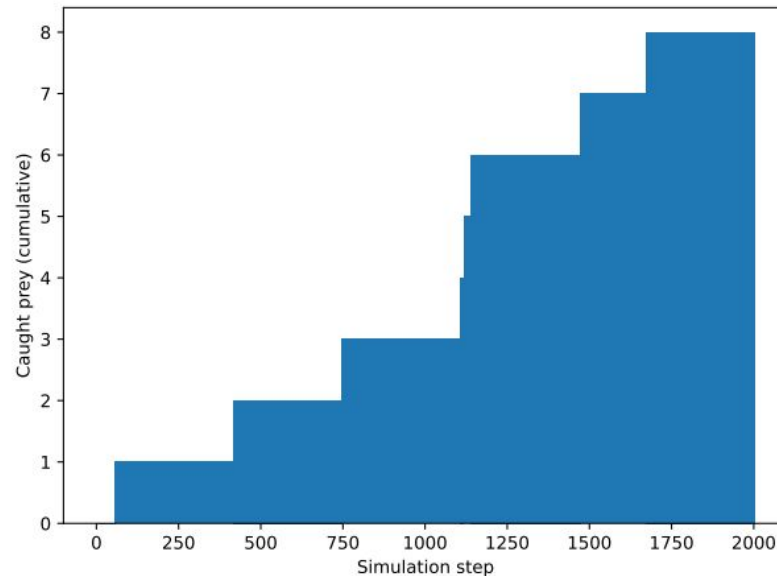
Attack nearest and avoid direction



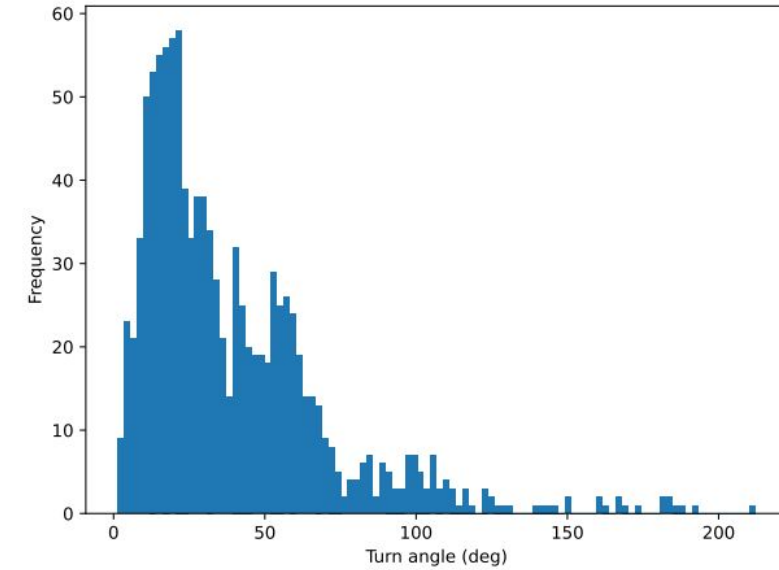
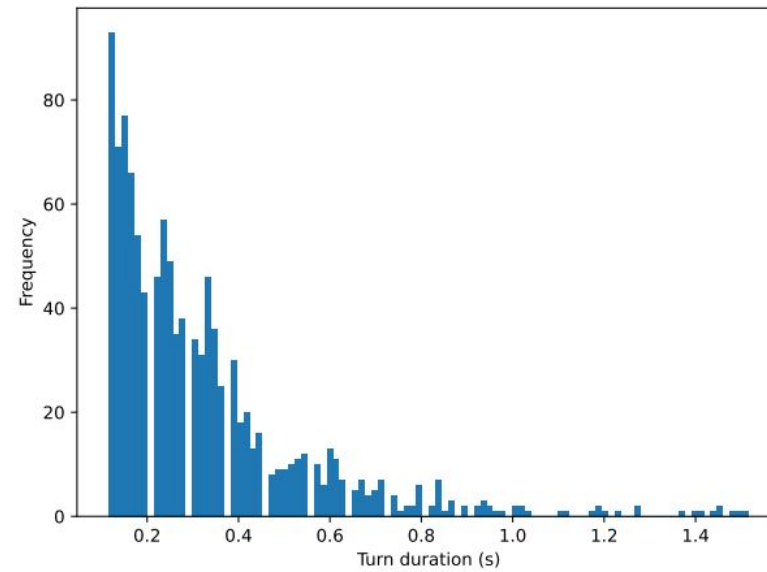
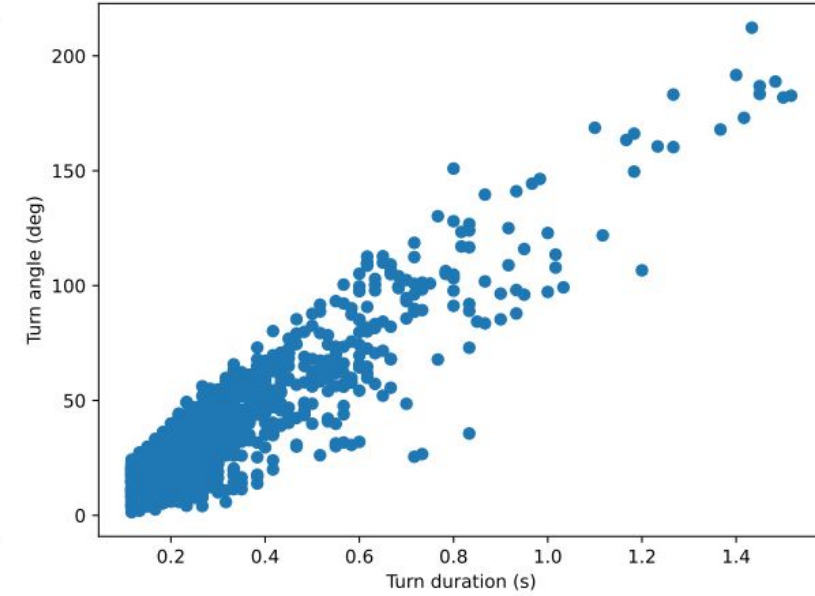
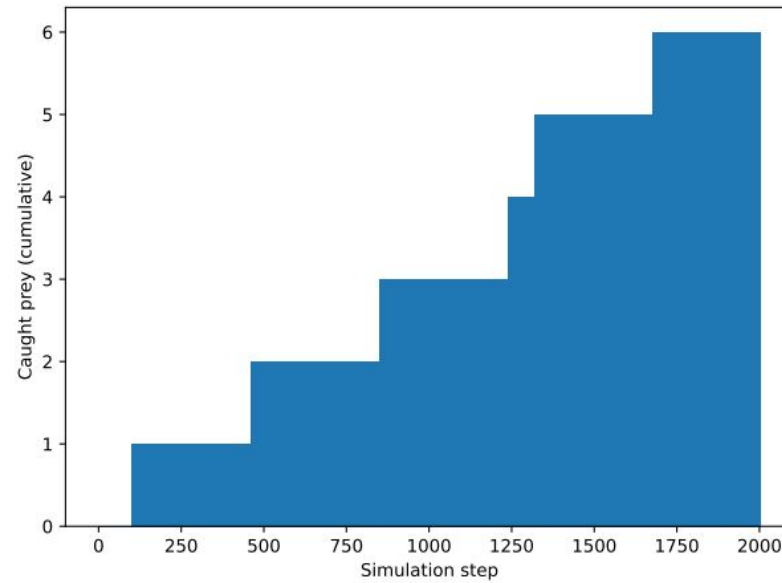
Attack most
peripheral and
avoid direction



Attack nearest and avoid position



Attack most
peripheral and
avoid position





Biggest challenges

- Scalable codebase (boids, behaviours)
- Debugging
- Toroidal coordinates
- Predator vision



Starting from scratch

- Parametrizacija simulacije
- Hitrejši začetek