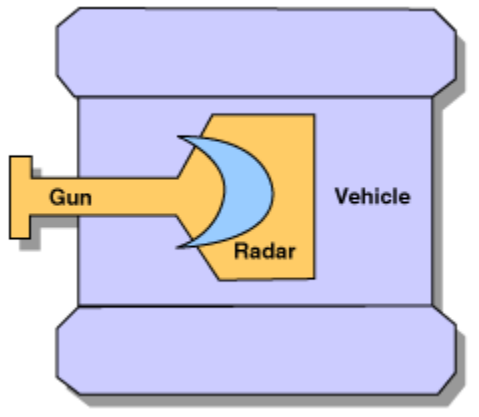
Bozilla

by Grabner, Guetz, Hofer, Jetzinger

System Architecture

- *AdvancedRobot* class provides callback methods
  - *onScannedRobot(event), onHitByBullet(event),..*
- Inside *run()* endless loop is started
- Melee robot -> can handle multiple enemies
- We separated the parts of the robot in different classes
  - Radar
  - Movement
  - Gun targeting

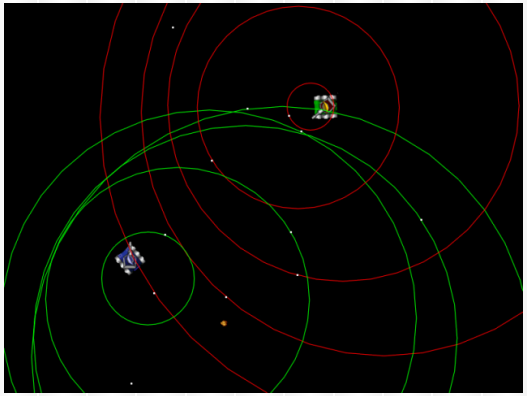


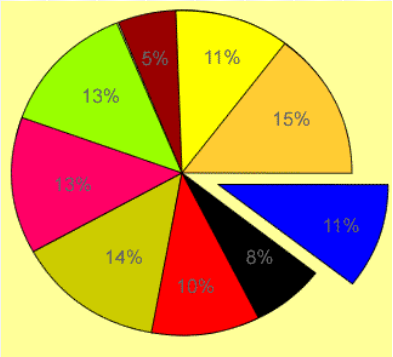
Radar

- Inside *Enemy* class *ScannedRobotEvent*s are stored
  - Enemy's velocity, bearing, distance,...
- Class *EnemiesCache*: Map of enemy names to *Enemy* class
- Easy: Turning radar around all the time
  - *setTurnRadarRightRadians(POSITIVE_INFINITY);*
- Better: Turn radar to all last known locations of enemies
- Locking of radar on enemies also possible
  - Needed for our targeting
  - Switch between the modes
  - Lock on nearest enemy

Wave Surfing

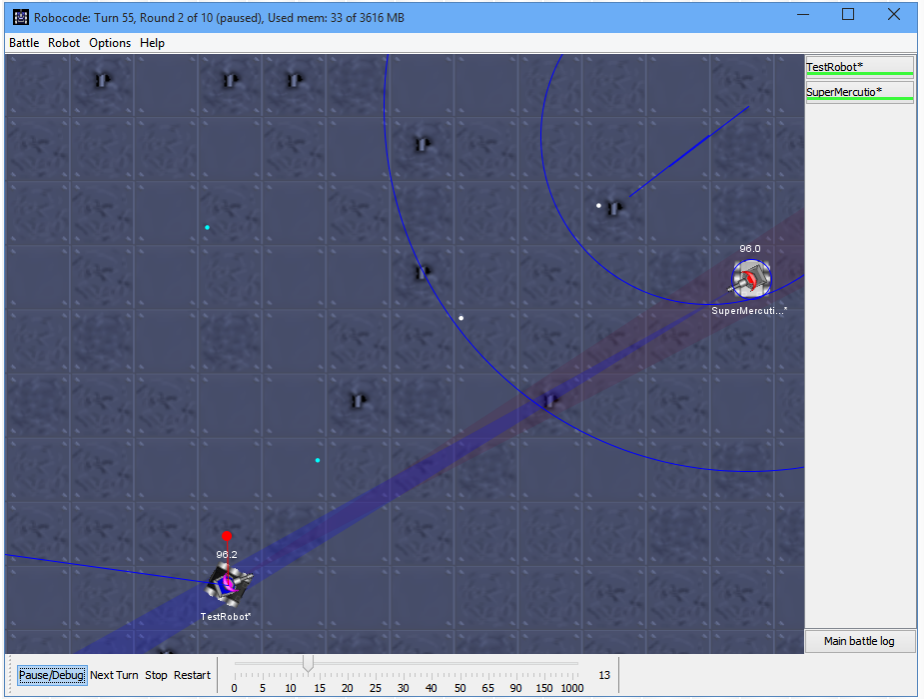
- Track bullet with “waves”
- At target hit, we know the relativ
  firing angle → increment bin (segment)
- After a few iterations we know the most
  popular bins → learning!
- Try to avoid these bins!





Anti-Gravity movement

- “Force field” repels robot
- Move to position with min force
- Used for avoiding
  - walls
  - enemies
- Combine movement strategies
  - Low force: use waves
  - High force: use anti gravity



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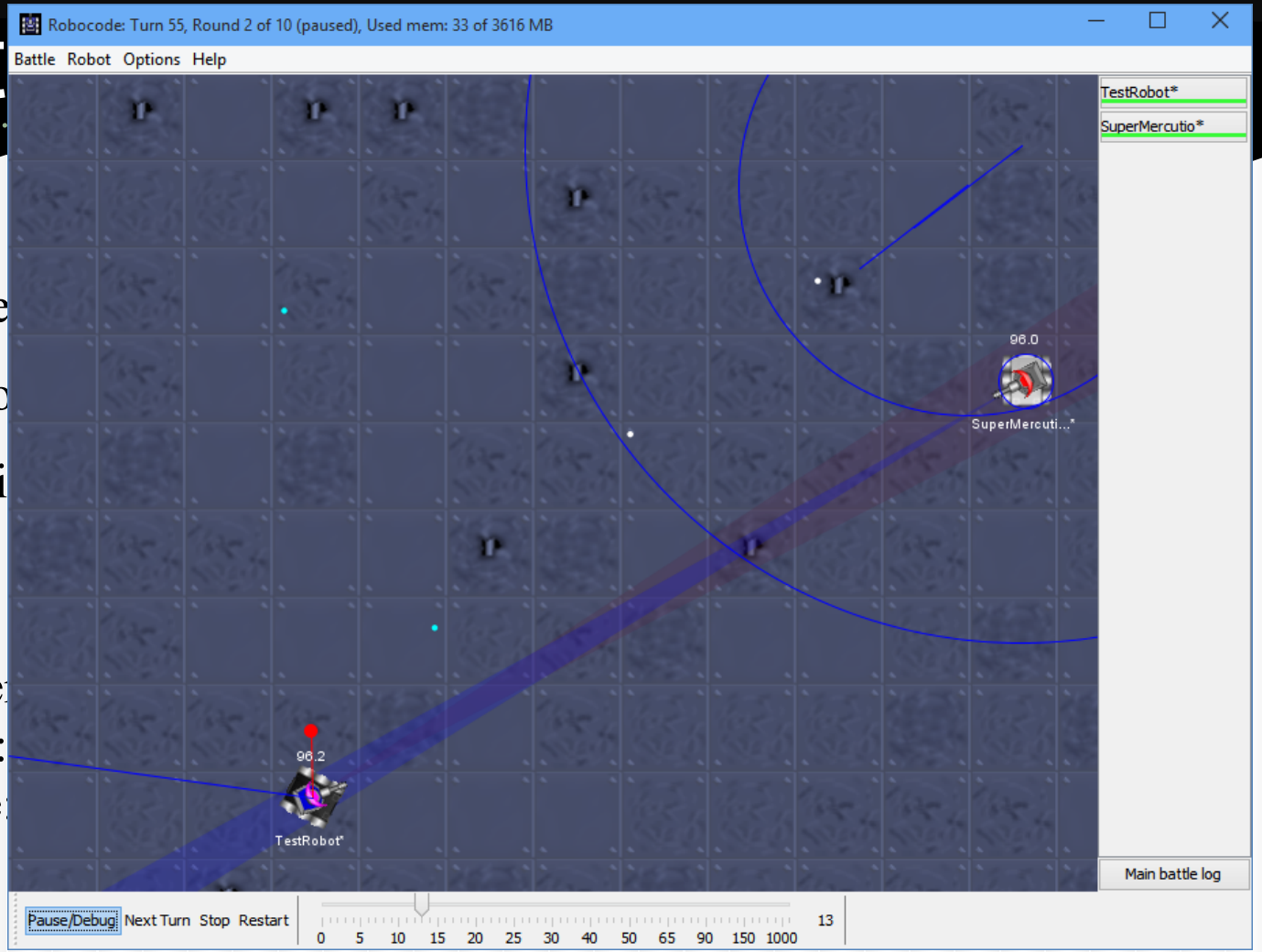


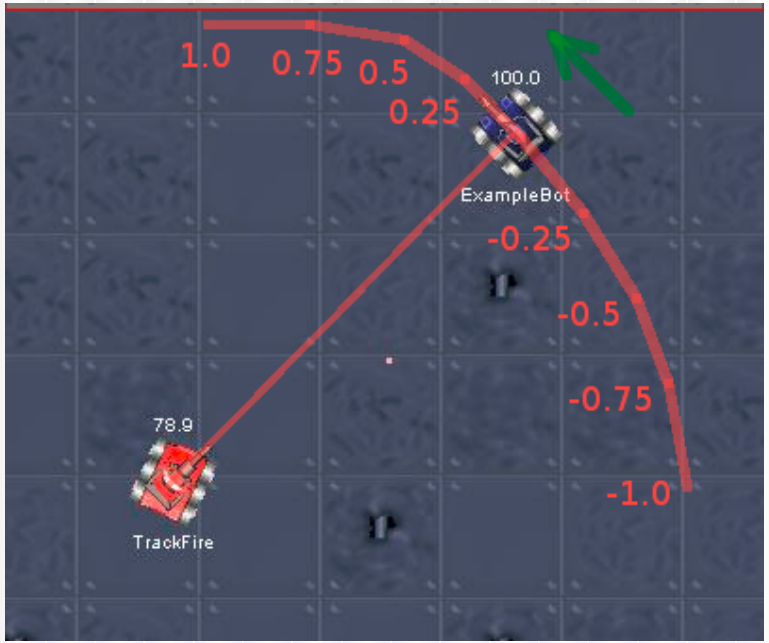
Guess Factor Targeting

- Choose angle within "*Maximum Escape Angle*"
  - ESA: Furthest angle an enemy can be (after bullet-travel-time), relative to position when bozilla fires

- Detect statistical trends
  - Aim to direction with most hits

    → `wave.mostVisitedBearingOffset()`

- Collect data using *waves*
- Basic segmentation [info about enemy]
  - distance, velocity, last velocity



Guess Factor Targeting

- Alter bullet power in relation to enemies distance
  → the closer an enemy is, the harder it gets hit

$$firePower = POWER_{MAX} - \left(\frac{distance_{enemy}}{DISTANCE_{MAX}}\right) * POWER_{MAX}$$

Thanks for the Attention