

Appendix A: The Halo AI as Layered Statecharts

Given in this appendix is the full Halo AI recreated as a layered statechart-based AI. The full description of the AI, module listing and description, and key features are outlined in Chap. 5. Verification and corrections from Chap. 8 have been performed and are shown here.

A.1 Sensors

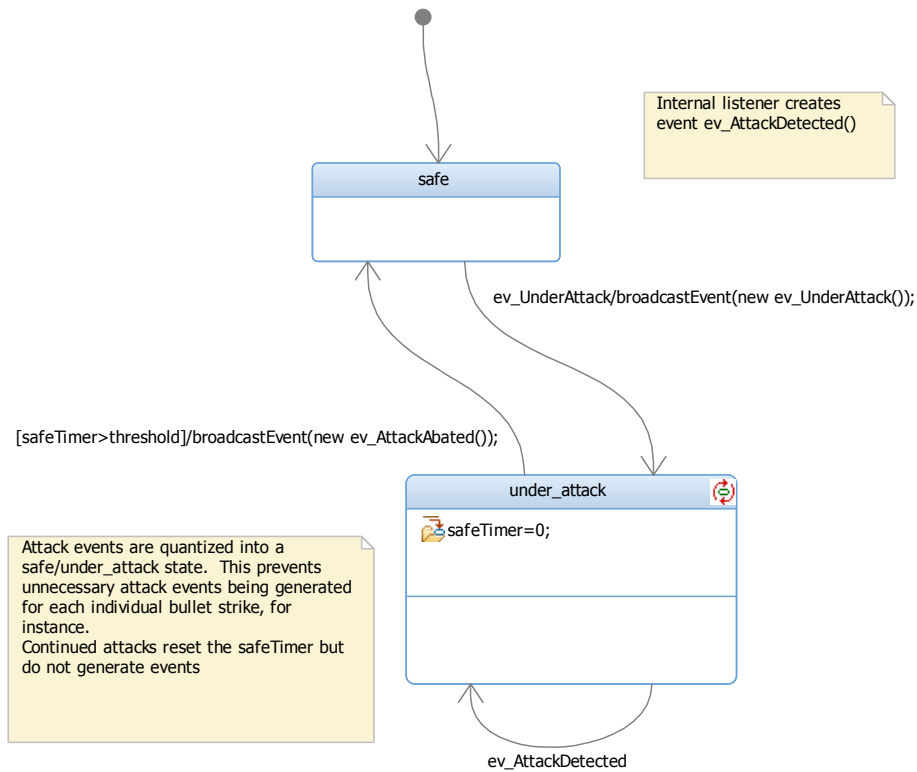


Figure A-1: The *AttackSensor*.

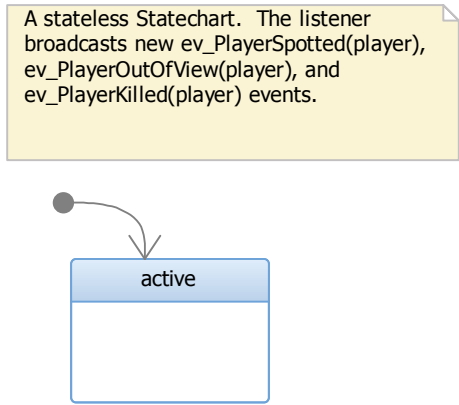


Figure A-2: The *CharacterSensor*.

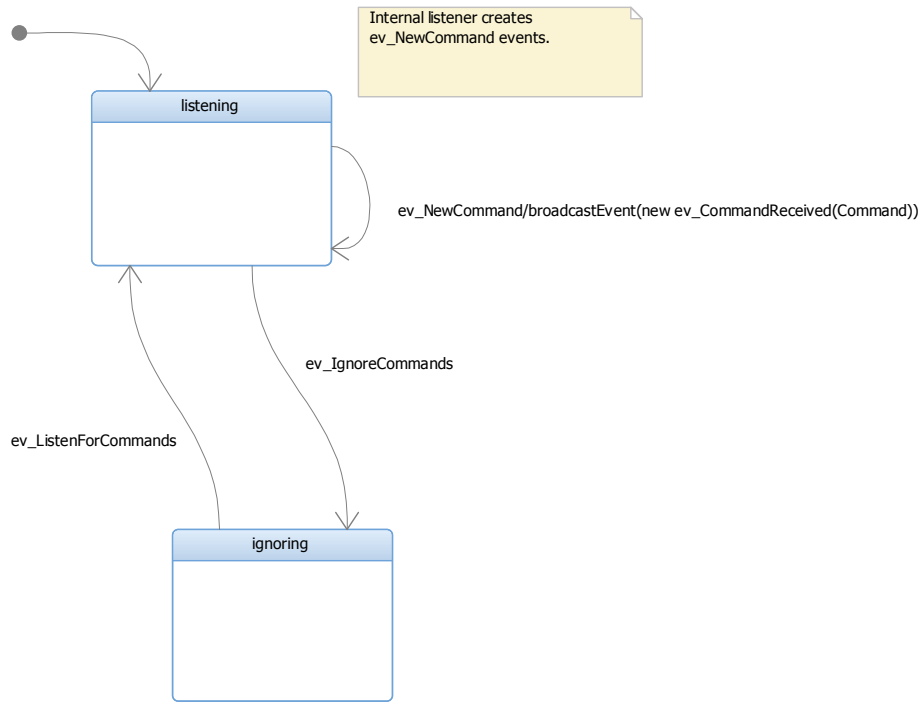


Figure A-3: The *CommandSensor*.

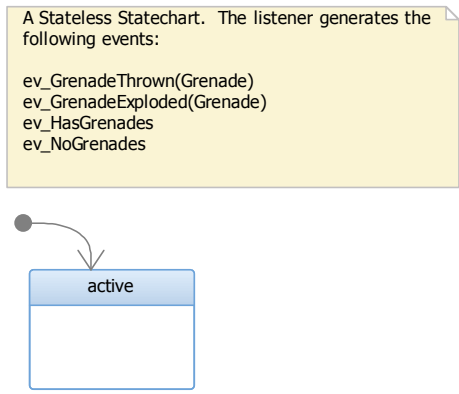


Figure A-4: The *GrenadeSensor*.

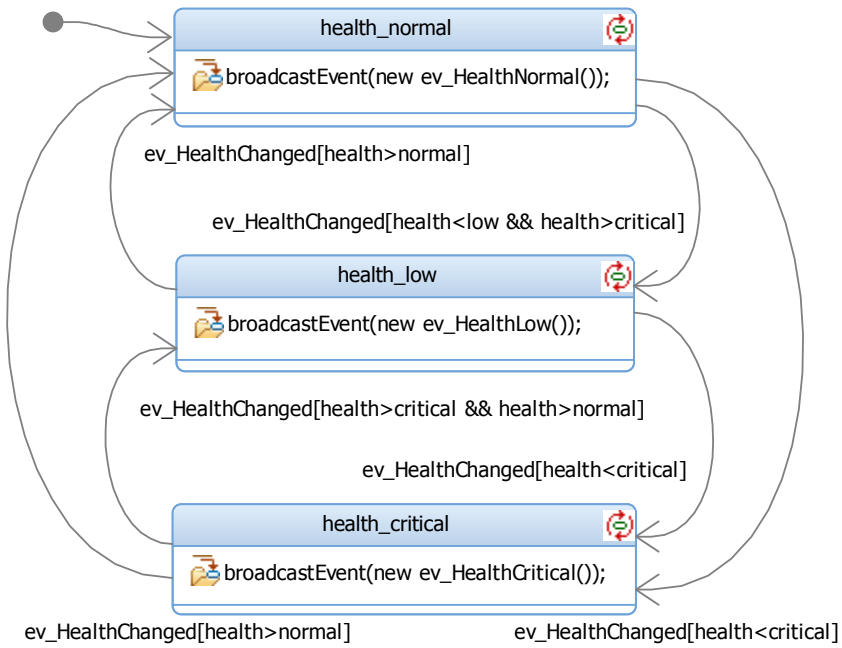


Figure A-5: The *HealthSensor*.

A stateless Statechart. The listener broadcasts the following events:

- ev_ItemSpotted(item)
- ev_ItemOutOfView(item)
- ev_ItemRemoved(item)
- ev_ItemAcquired(item)

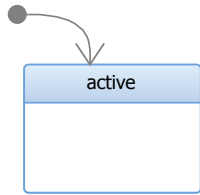


Figure A-6: The *ItemSensor*.

A stateless Statechart. The listener will create and broadcast the following events:

- ev_ObstacleSpotted(Obstacle)
- ev_ObstacleRemoved(Obstacle)

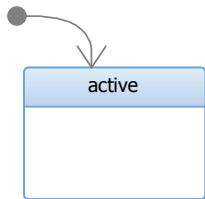


Figure A-7: The *ObstacleSensor*.

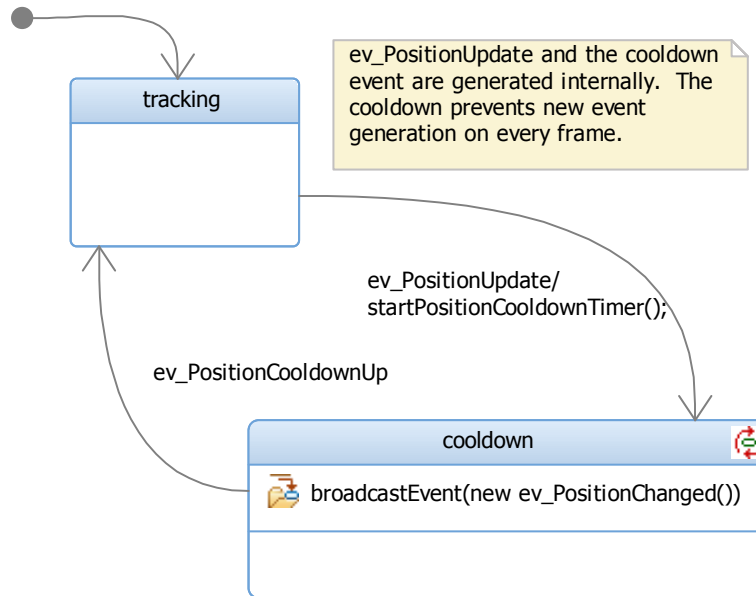


Figure A-8: The *PositionSensor*.

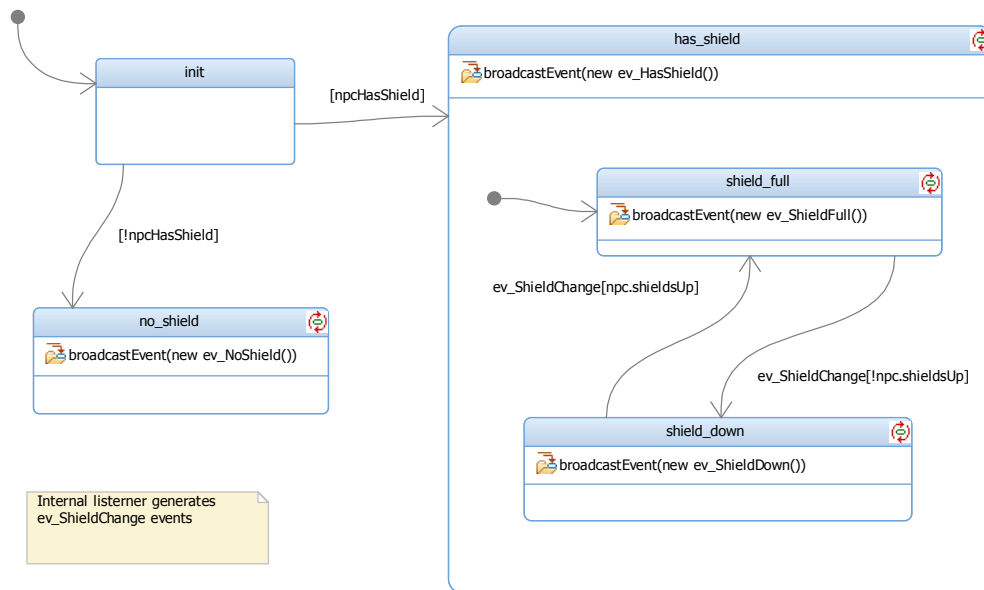


Figure A-9: The *ShieldSensor*.

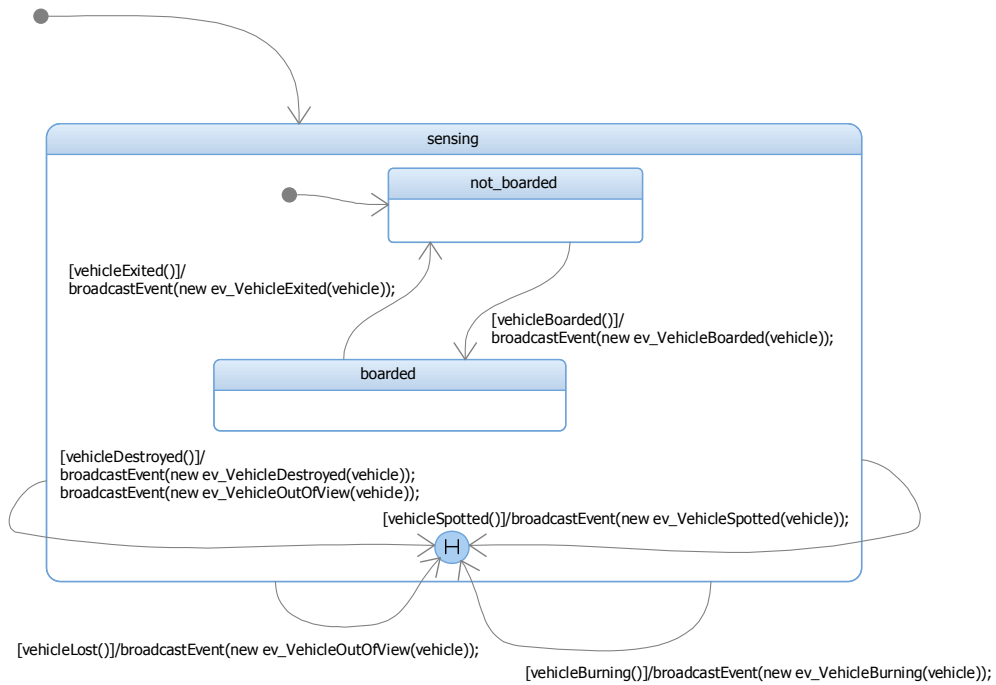


Figure A-10: The *VehicleSensor*.

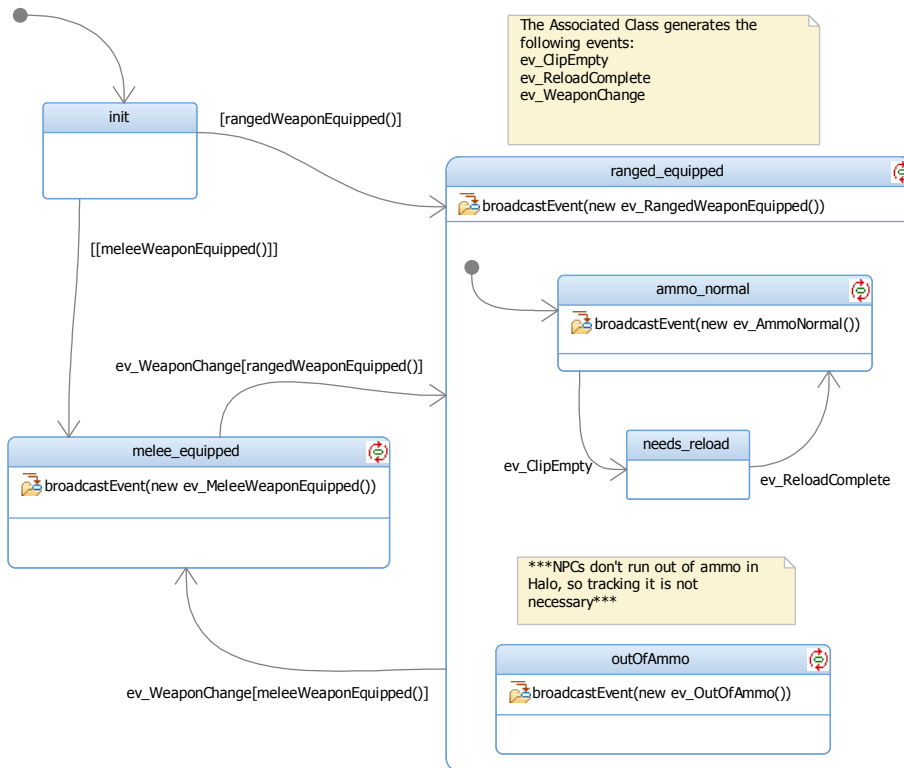


Figure A-11: The *WeaponSensor*.

A.2 Analyzers

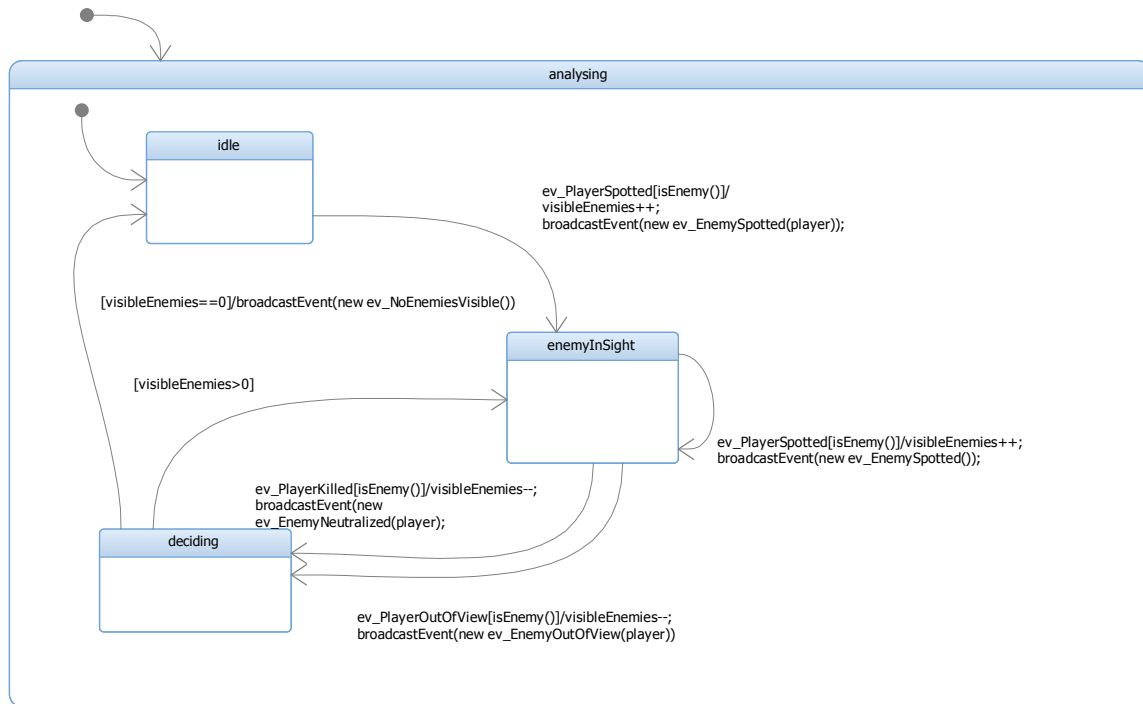


Figure A-12: The *EnemyAnalyzer*.

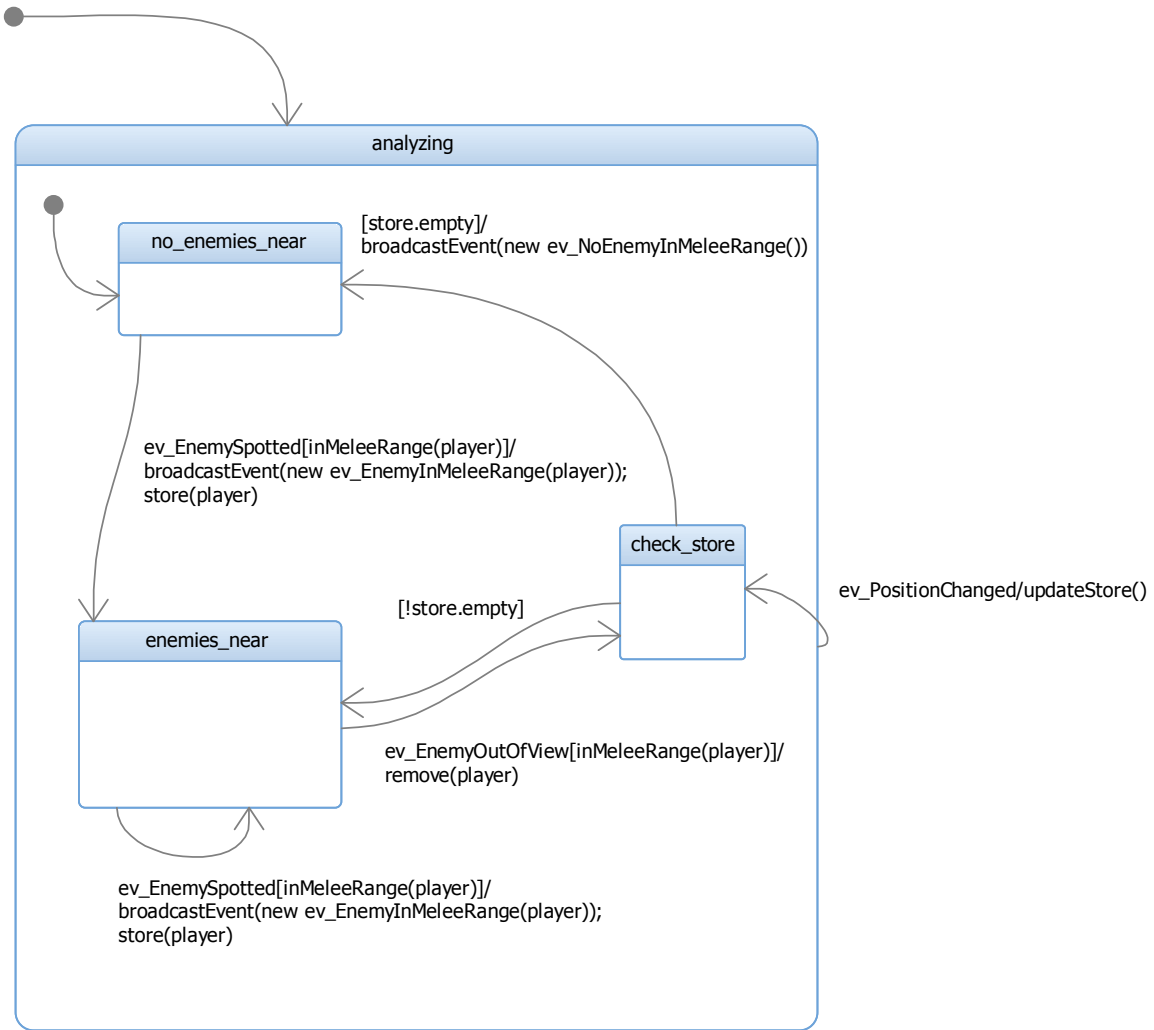


Figure A-13: The *EnemyProximityAnalyzer*.

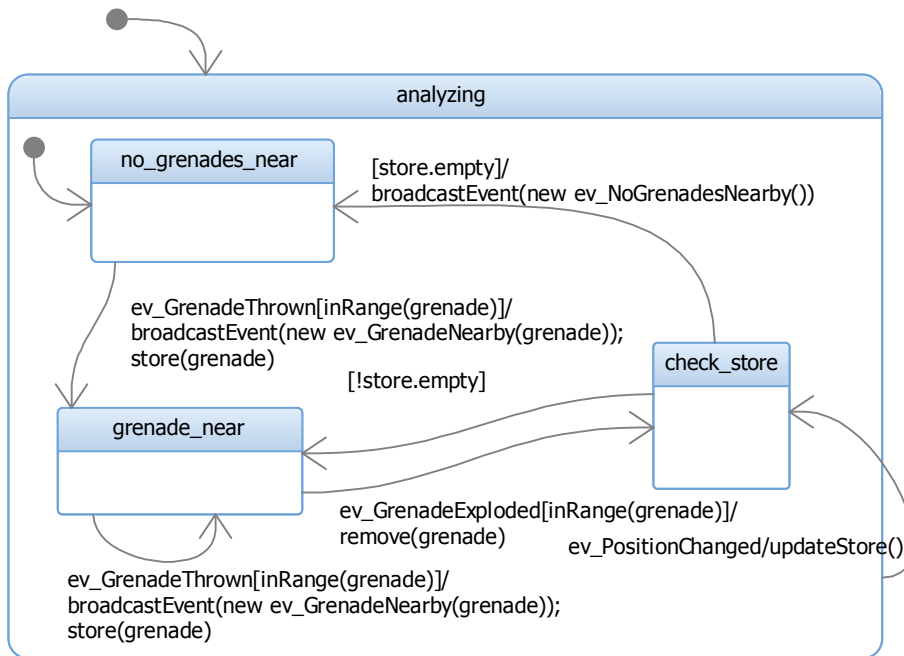


Figure A-14: The *GrenadeProximityAnalyzer*.

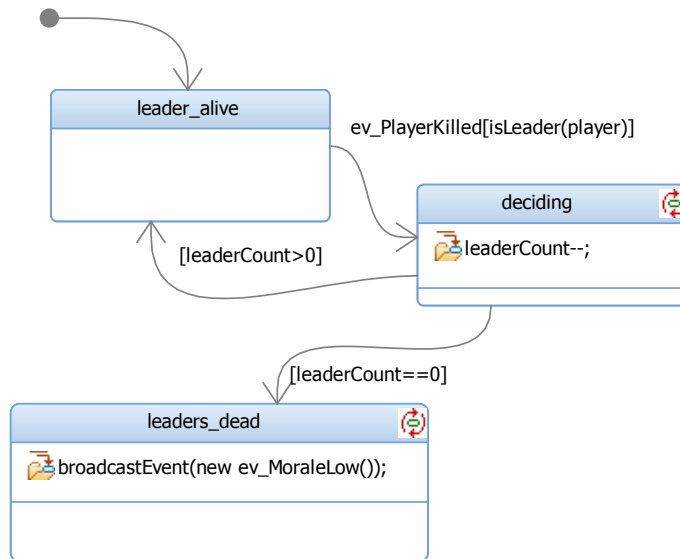


Figure A-15: The *LowMoraleAnalyzer*.

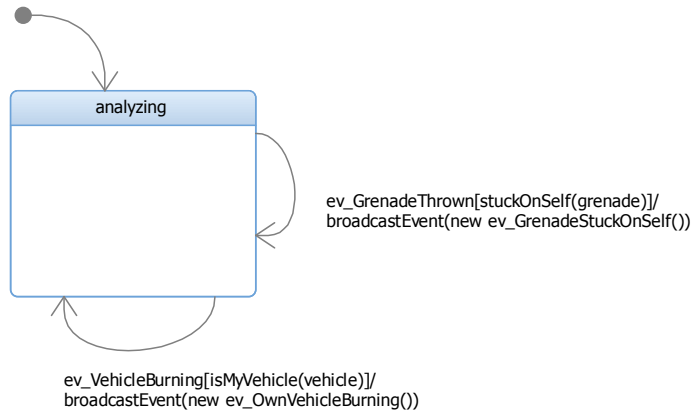


Figure A-16: The *SpecialEventAnalyzer*.

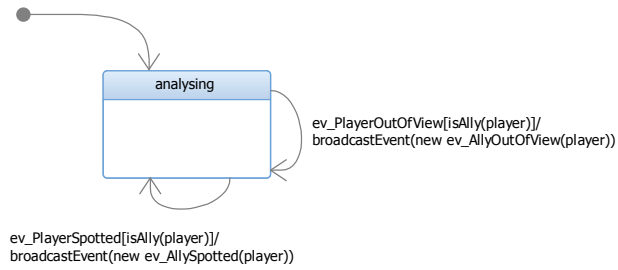


Figure A-17: The *SquadAnalyzer*.

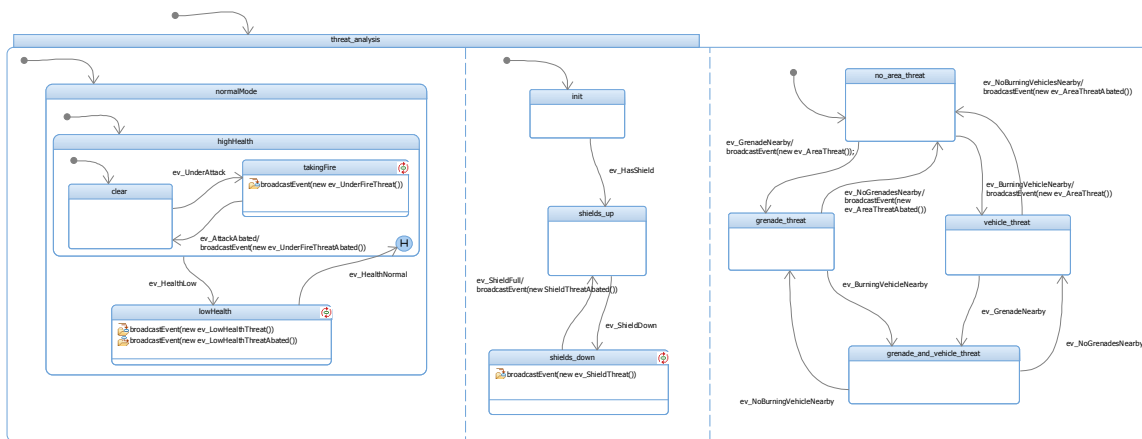


Figure A-18: The *ThreatAnalyzer*.

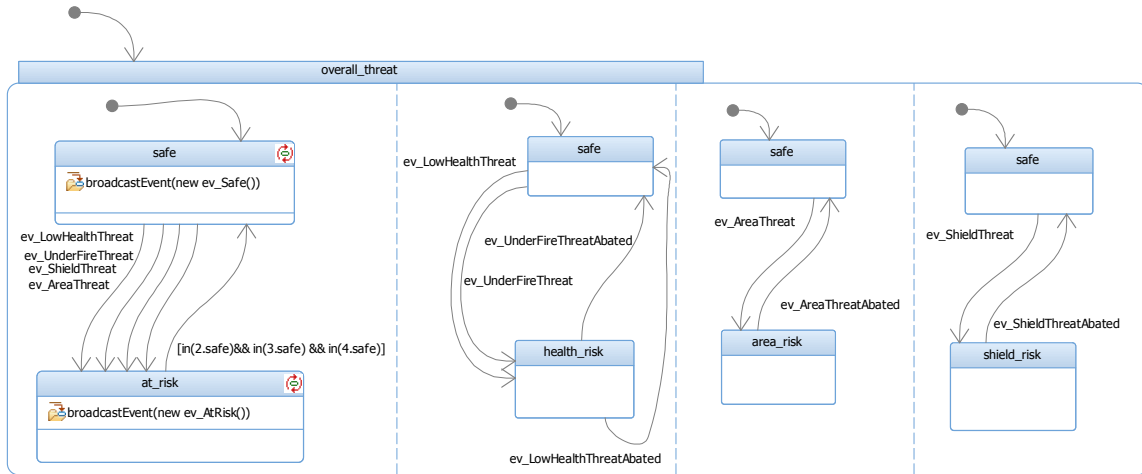


Figure A-19: The *ThreatCompilerAnalyzer*.

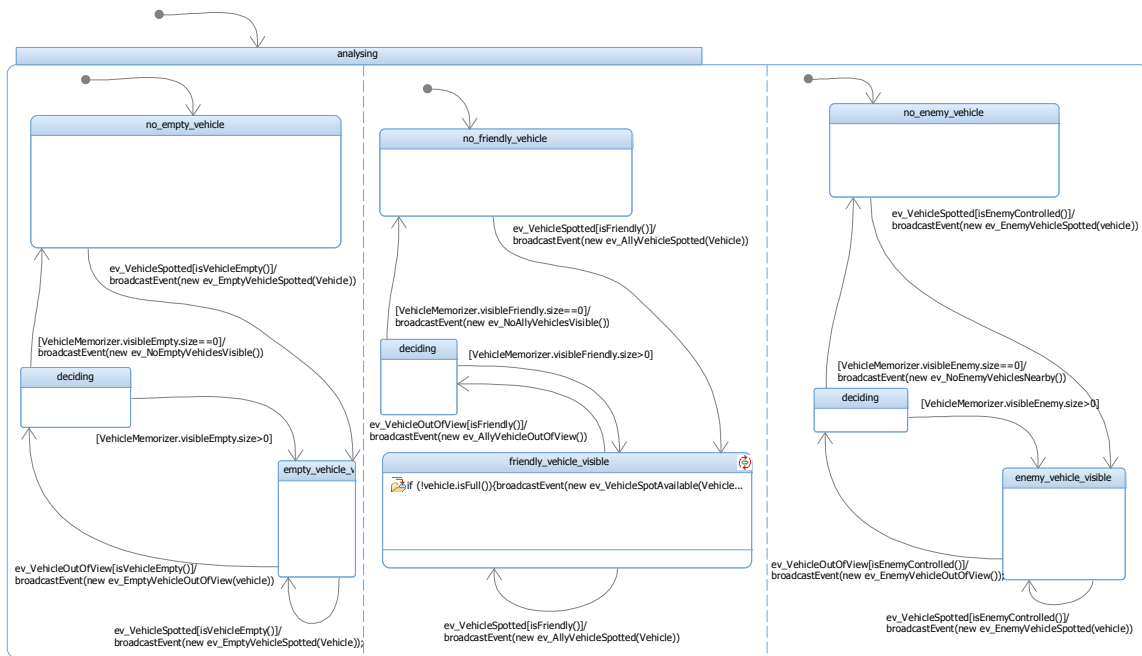


Figure A-20: The *VehicleAnalyzer*.

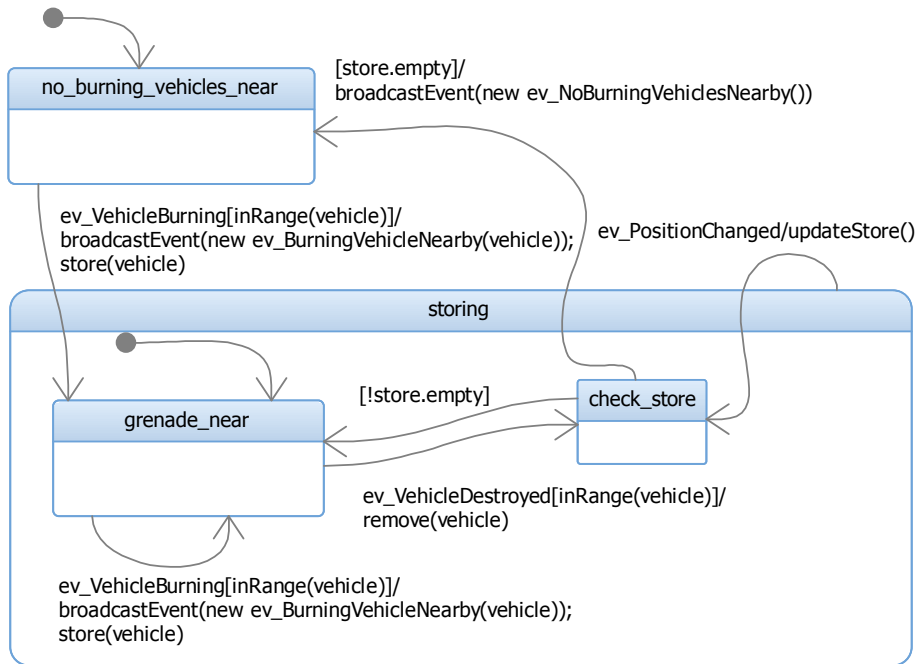


Figure A-21: The *VehicleProximityAnalyzer*.

A.3 Memorizers

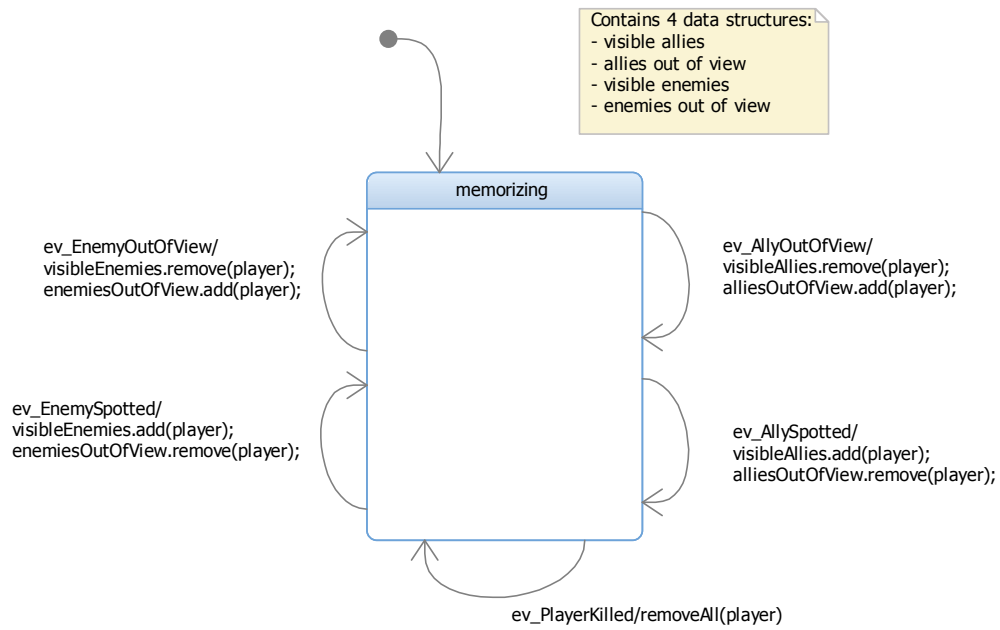


Figure A-22: The *CharacterMemorizer*.

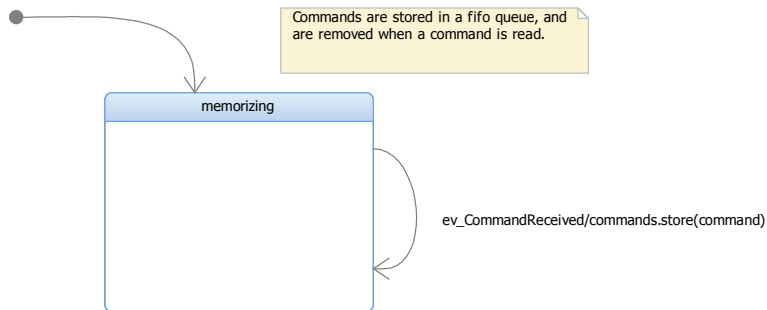


Figure A-23: The *CommandMemorizer*.

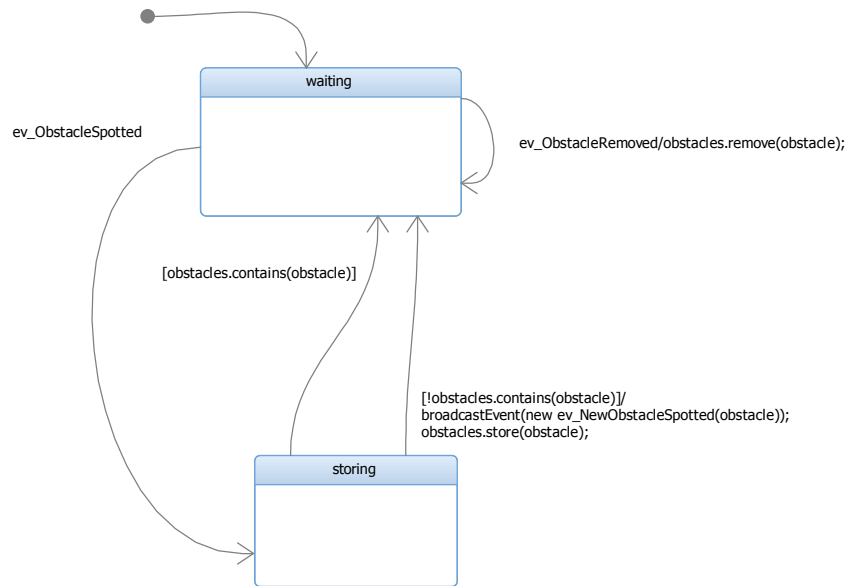


Figure A-24: The *ObstacleMemorizer*.

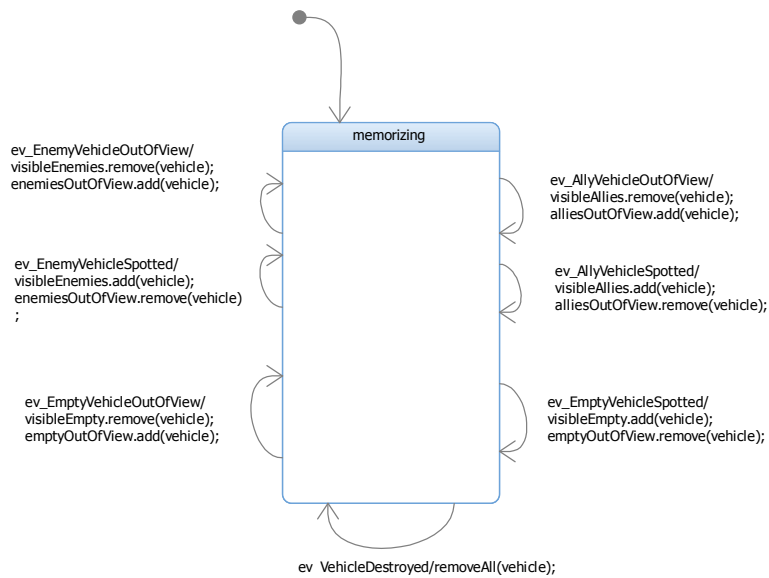


Figure A-25: The *VehicleMemorizer*.

A.4 Strategizer

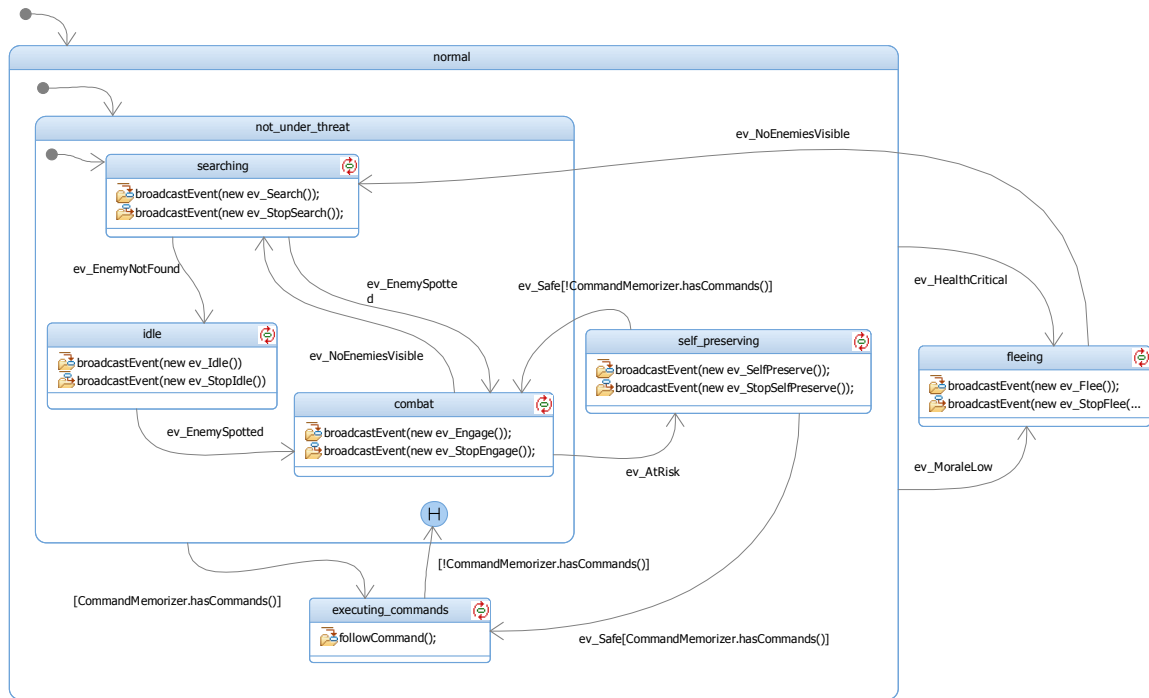


Figure A-26: The *Brain*.

A.5 Deciders

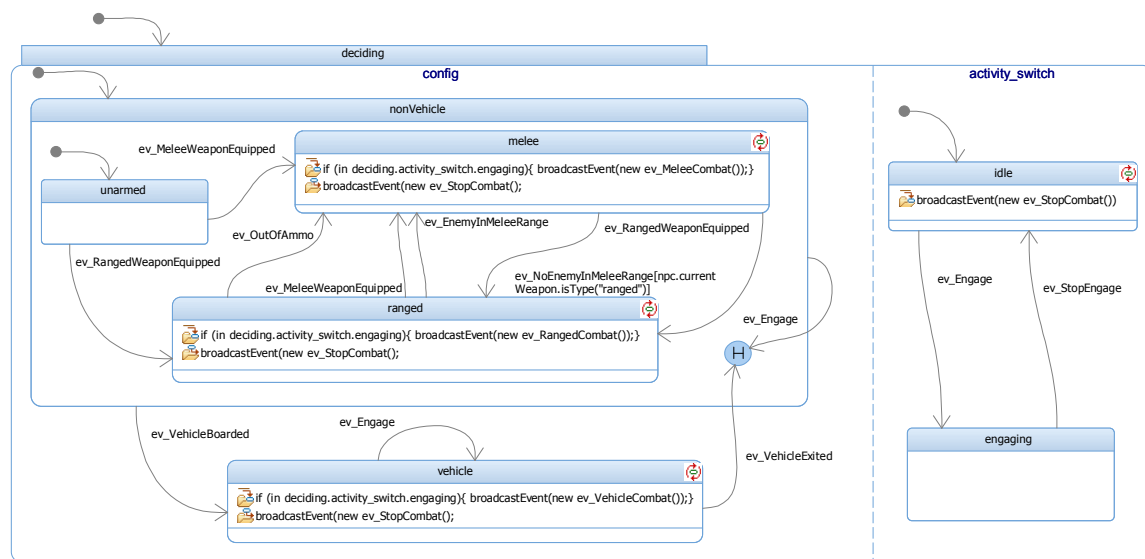


Figure A–27: The *CombatDecider*.

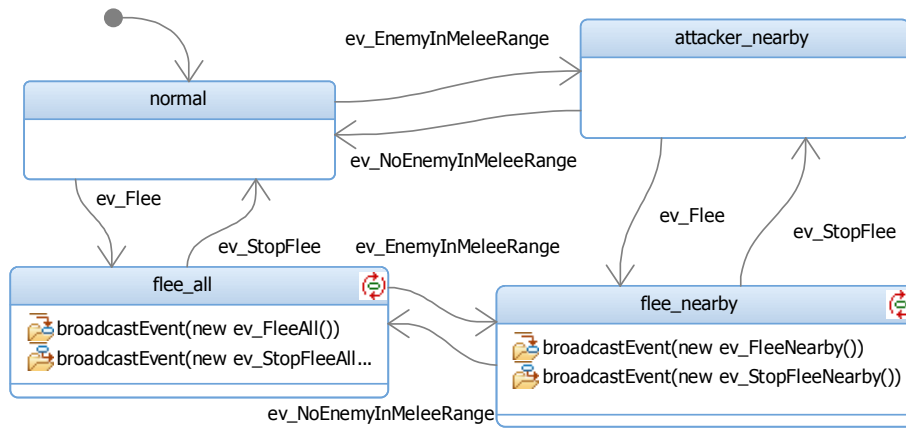


Figure A-28: The *FleeDecider*.

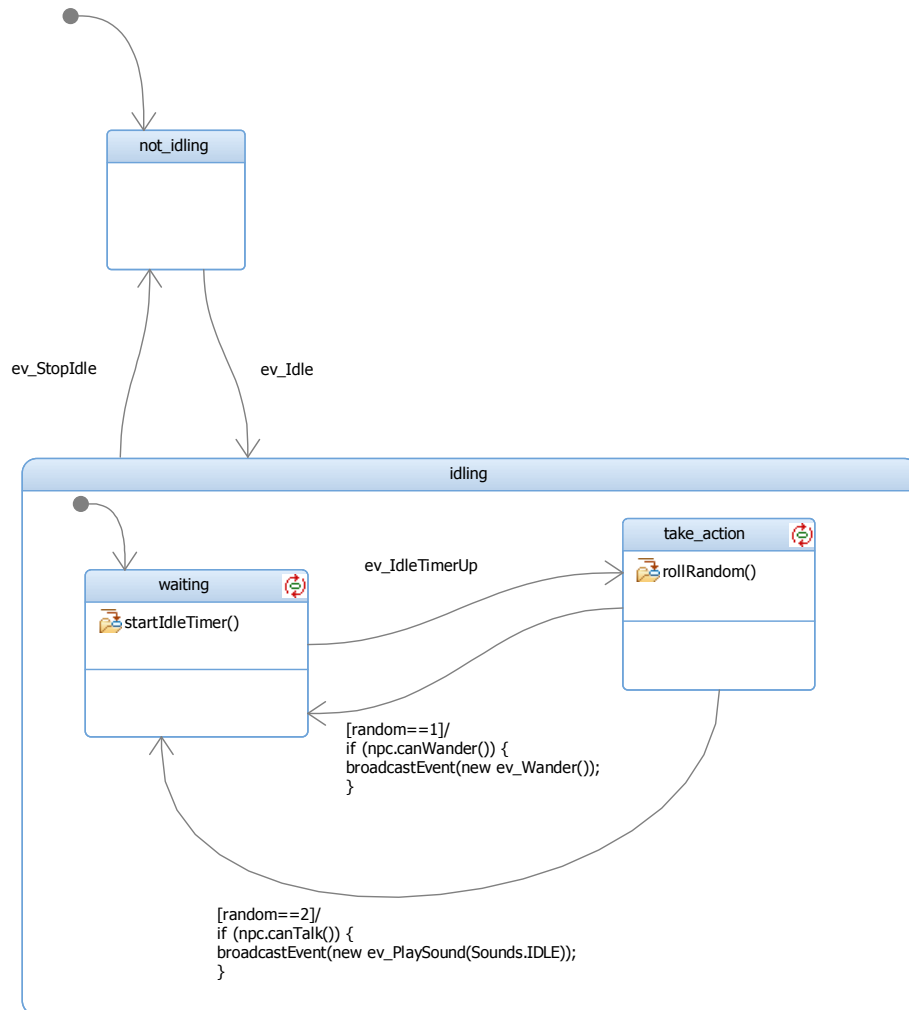


Figure A-29: The *IdleDecider*.

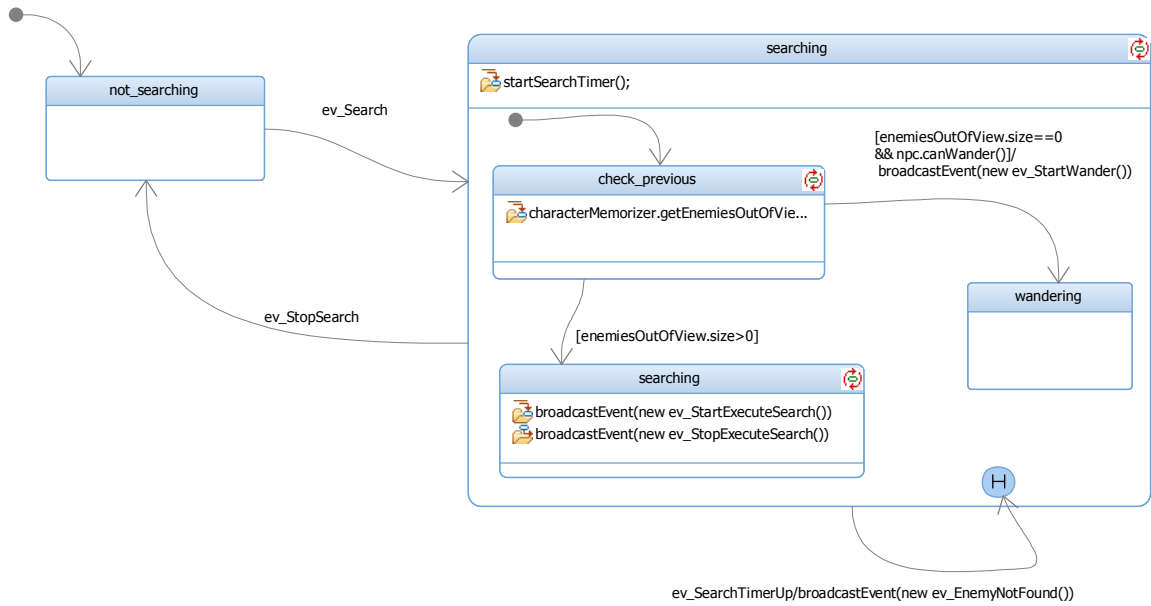


Figure A-30: The *SearchDecider*.

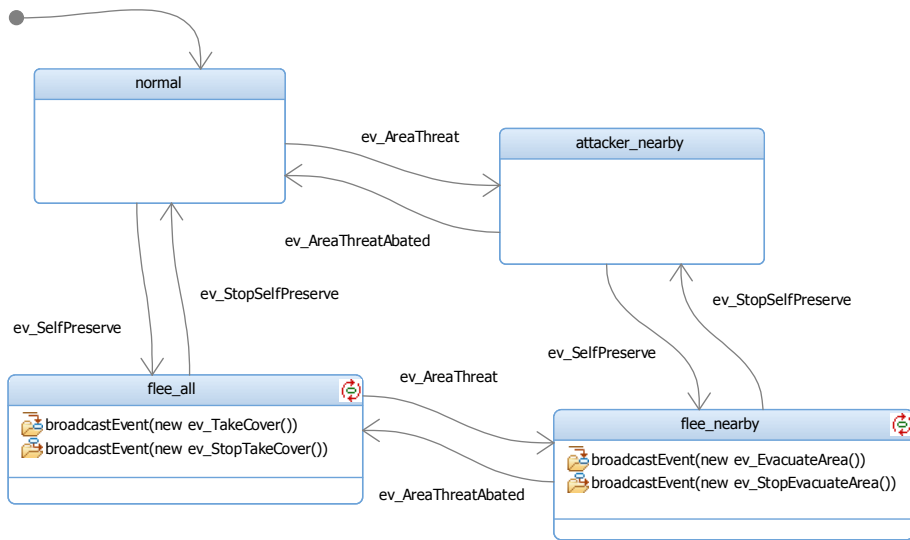


Figure A-31: The *SelfPreservationDecider*.

A.6 Executors

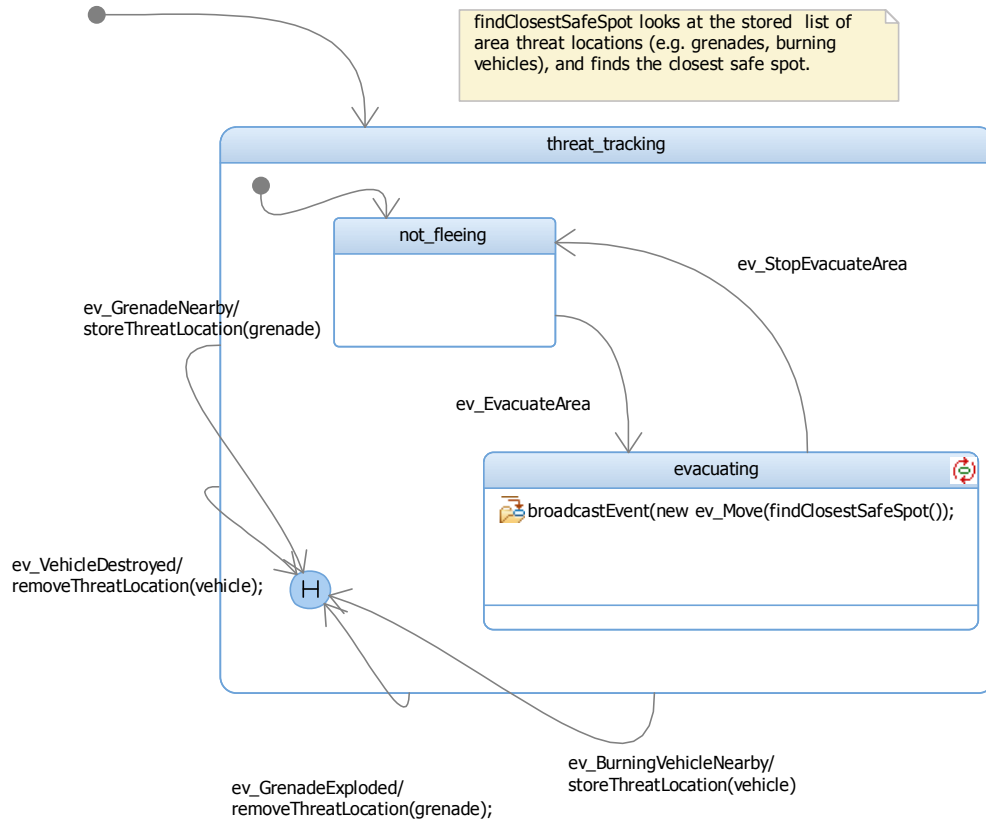


Figure A-32: The *ClearAreaExecutor*.

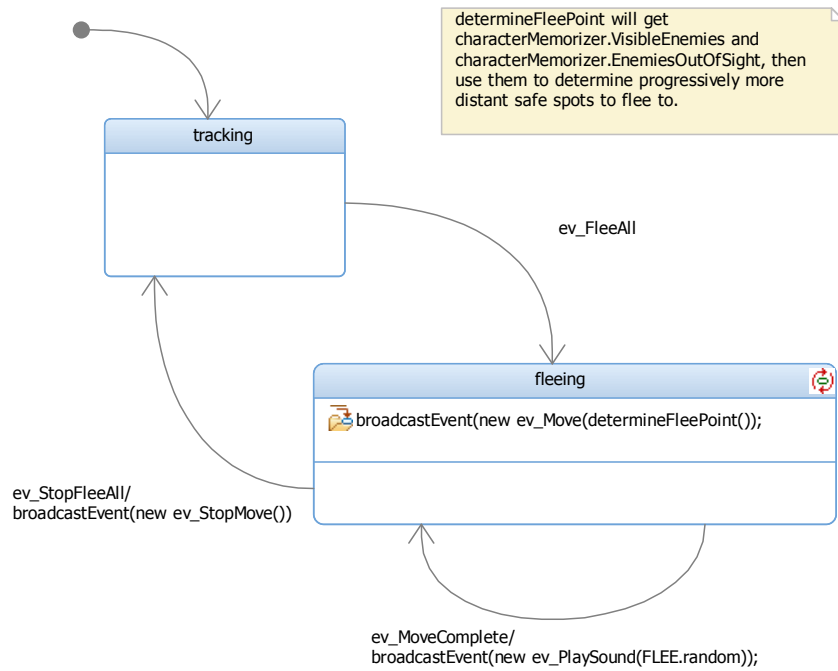
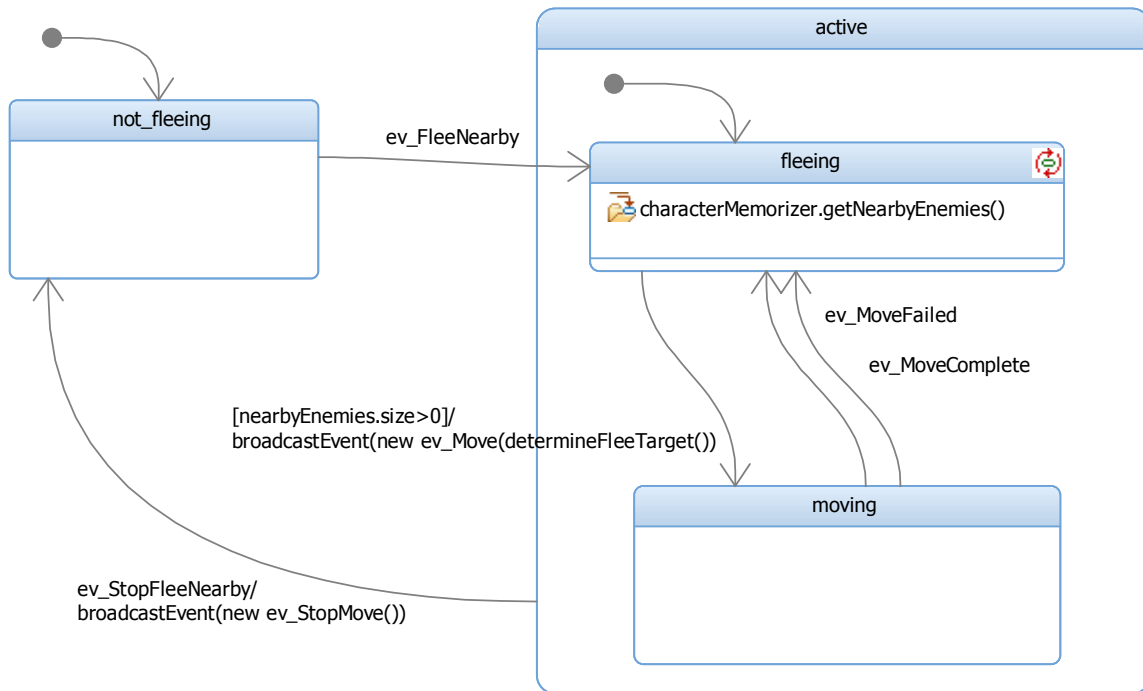


Figure A-33: The *FleeAllExecutor*.



determineFleeTarget takes in a list of nearby enemies and returns a position that is the chosen spot to which to flee.

Figure A-34: The *FleeNearbyExecutor*.

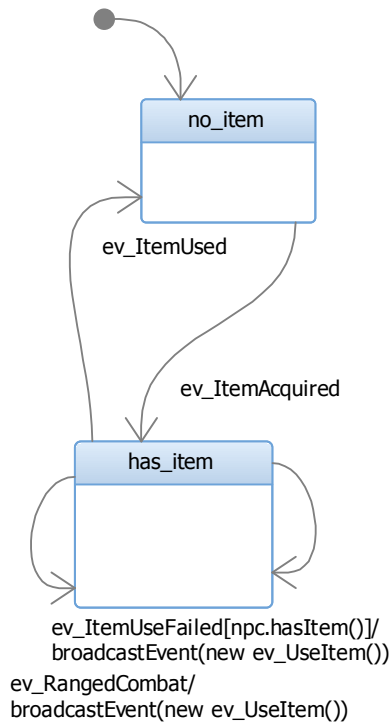


Figure A-35: The *ItemExecutor*.

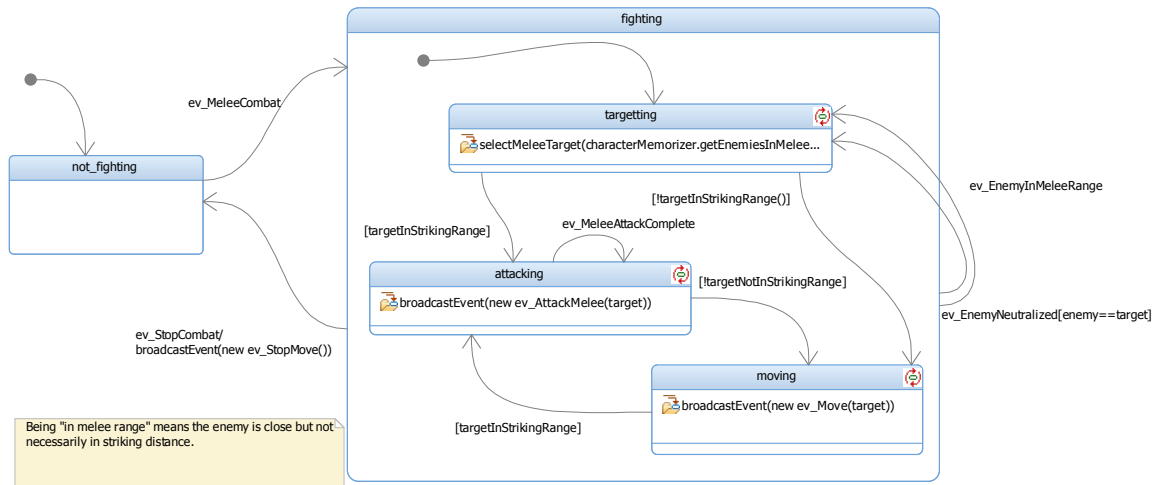


Figure A-36: The *MeleeCombatExecutor*.

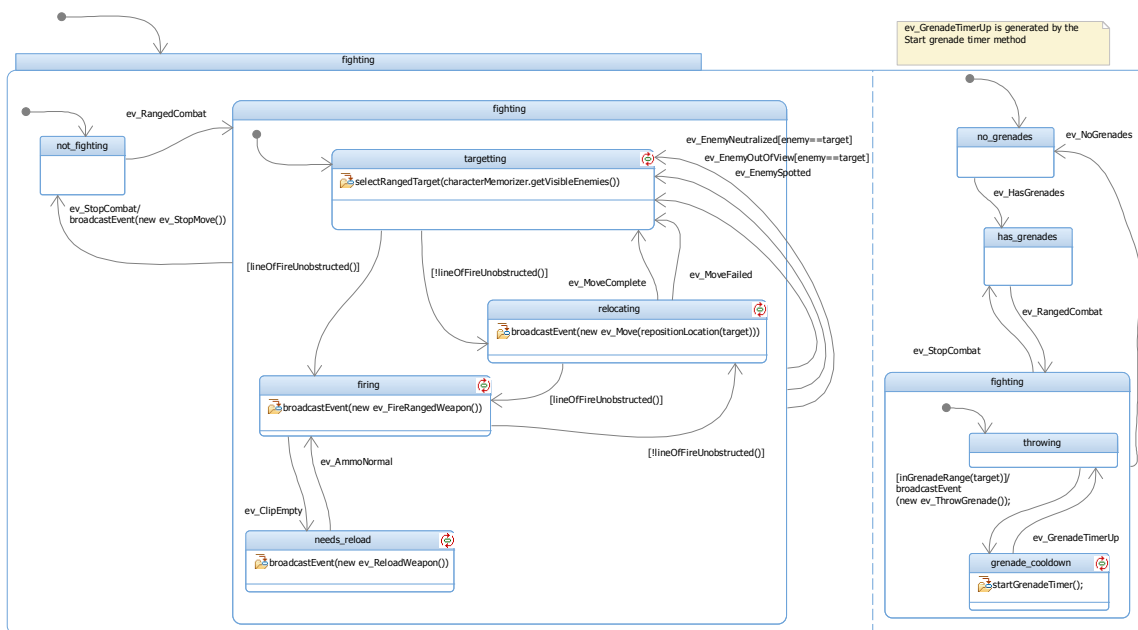


Figure A-37: The *RangedCombatExecutor*.

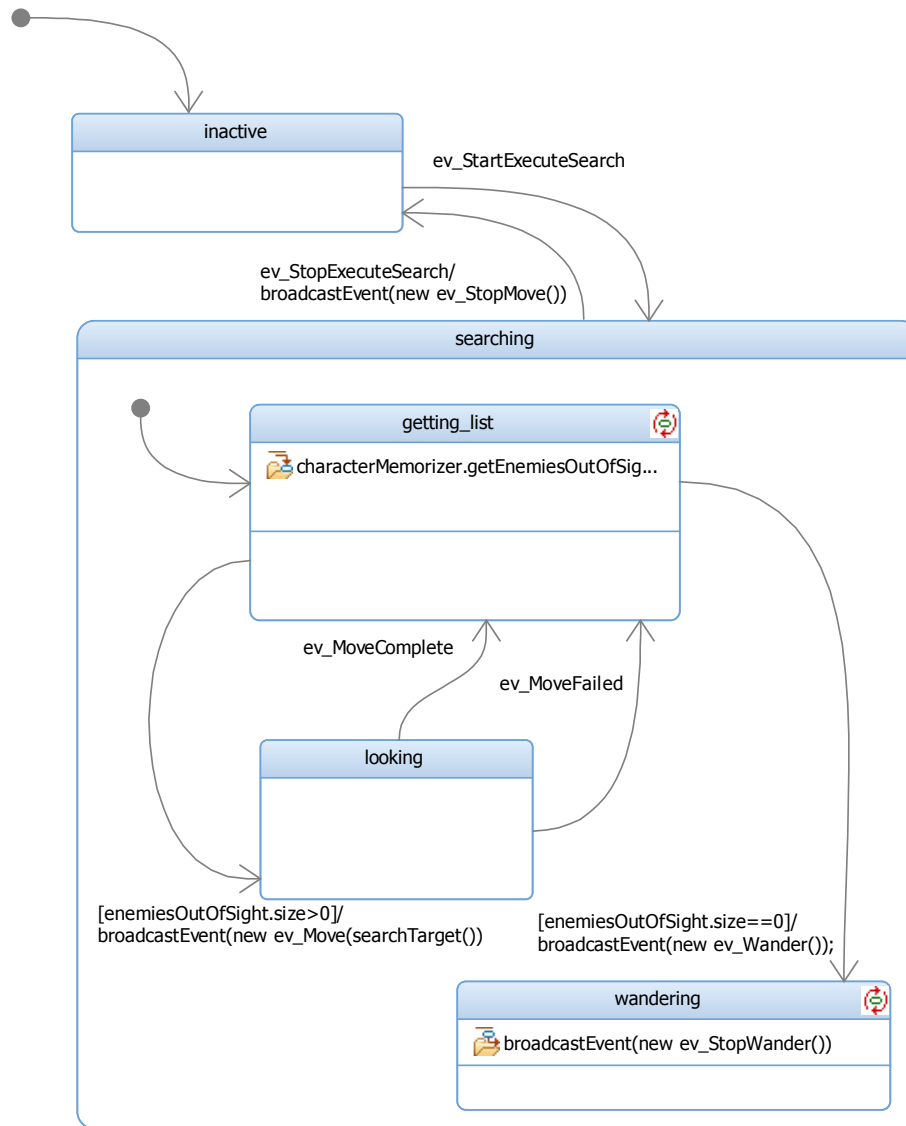


Figure A-38: The *SearchExecutor*.

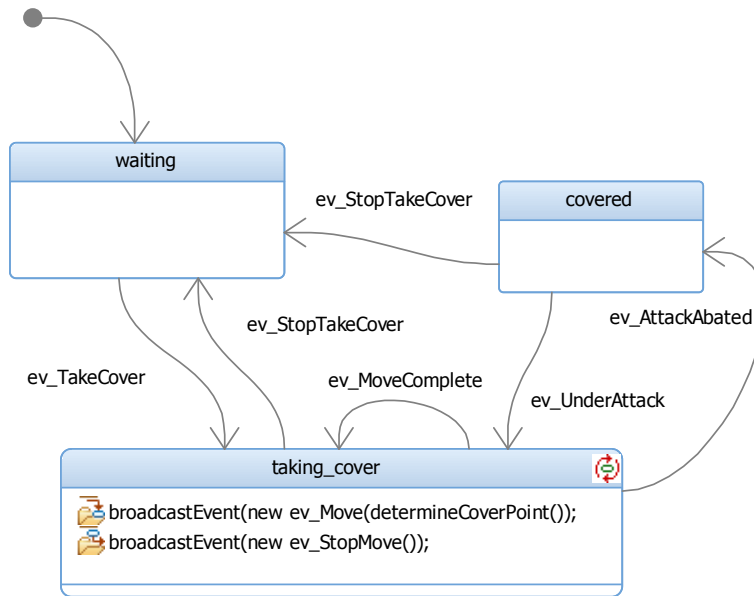


Figure A-39: The *TakeCoverExecutor*.

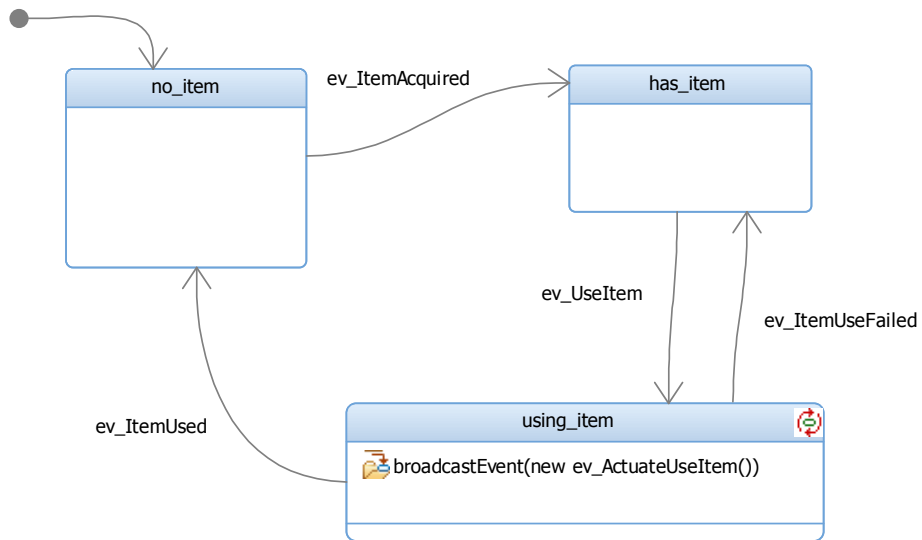
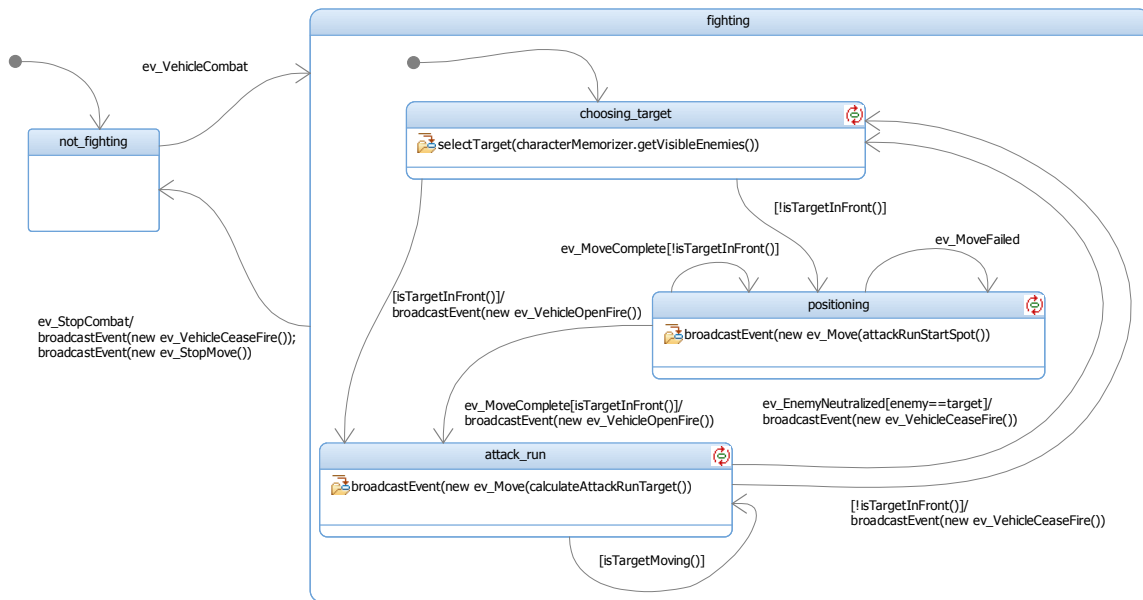
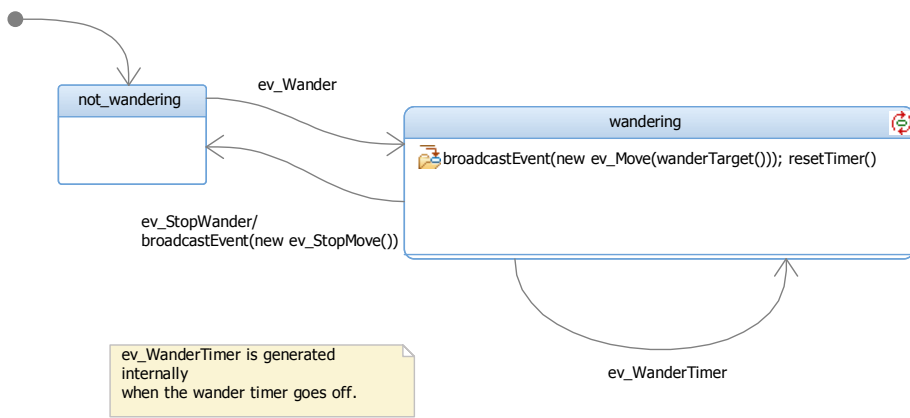


Figure A-40: The *UseItemExecutor*.



This Statechart uses 4 methods to effect vehicle combat. First, the selectTarget(Players[]) selects the most appropriate attack target. Then, the isTargetInFront method quickly determines if the target is in a cone in front of the NPC. If not, the attackRunStartSpot method will select an appropriate spot from which to attack. Finally, the calculateAttackRunTarget will choose a spot behind the target, in an attempt to run down the target.

Figure A-41: The *VehicleCombatExecutor*.



ev_WanderTimer is generated internally when the wander timer goes off.

Figure A-42: The *WanderExecutor*.

A.7 Coordinators

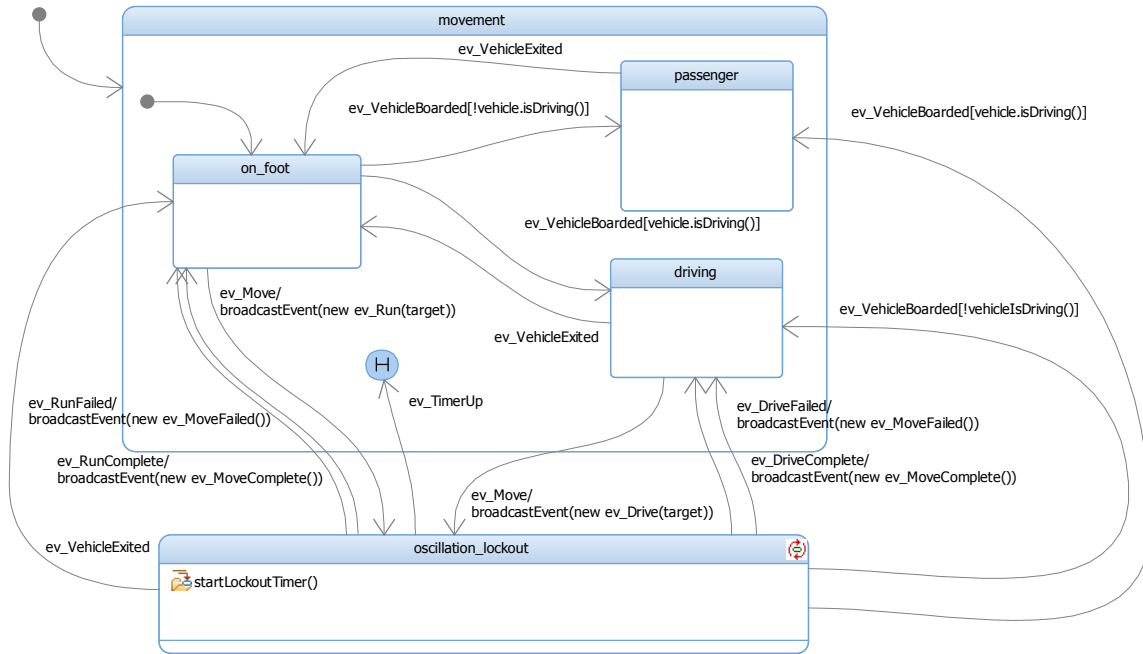


Figure A-43: The *MovementCoordinator*.

A.8 Actuators

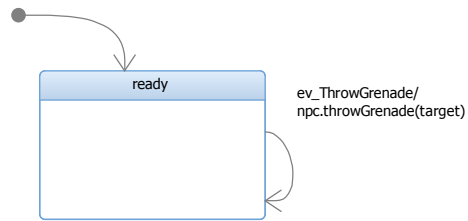


Figure A-44: The *GrenadeActor*.

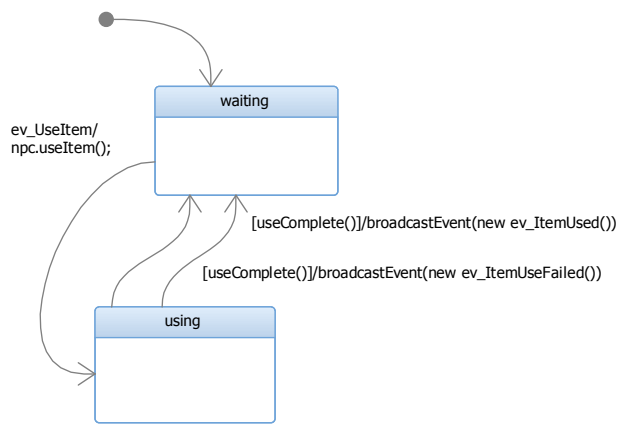


Figure A-45: The *ItemActor*.

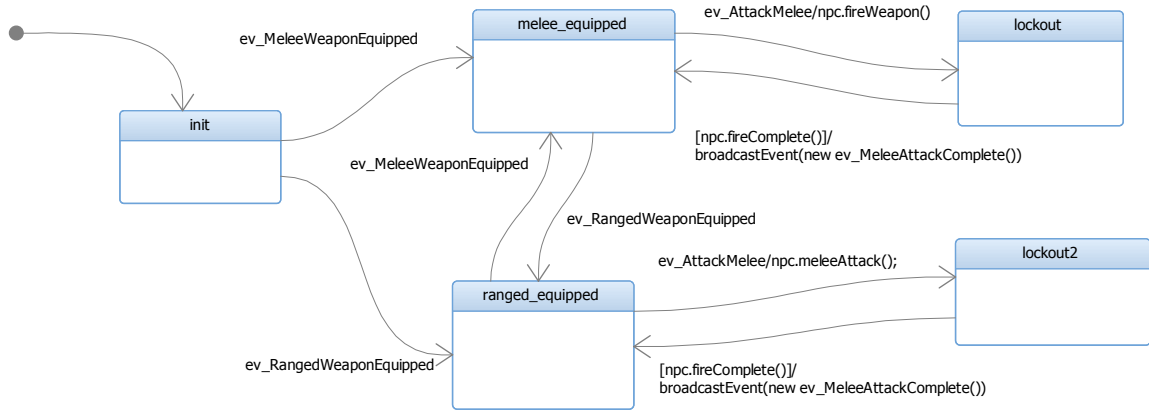


Figure A-46: The *MeleeActuator*.

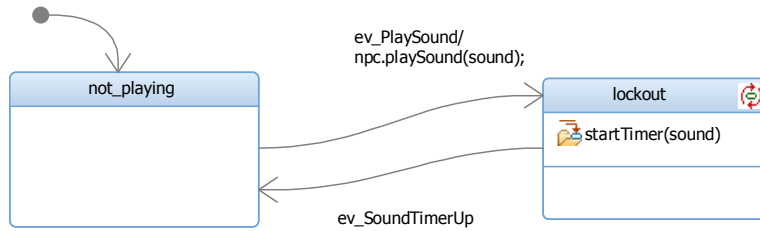


Figure A-47: The *SoundActuator*.

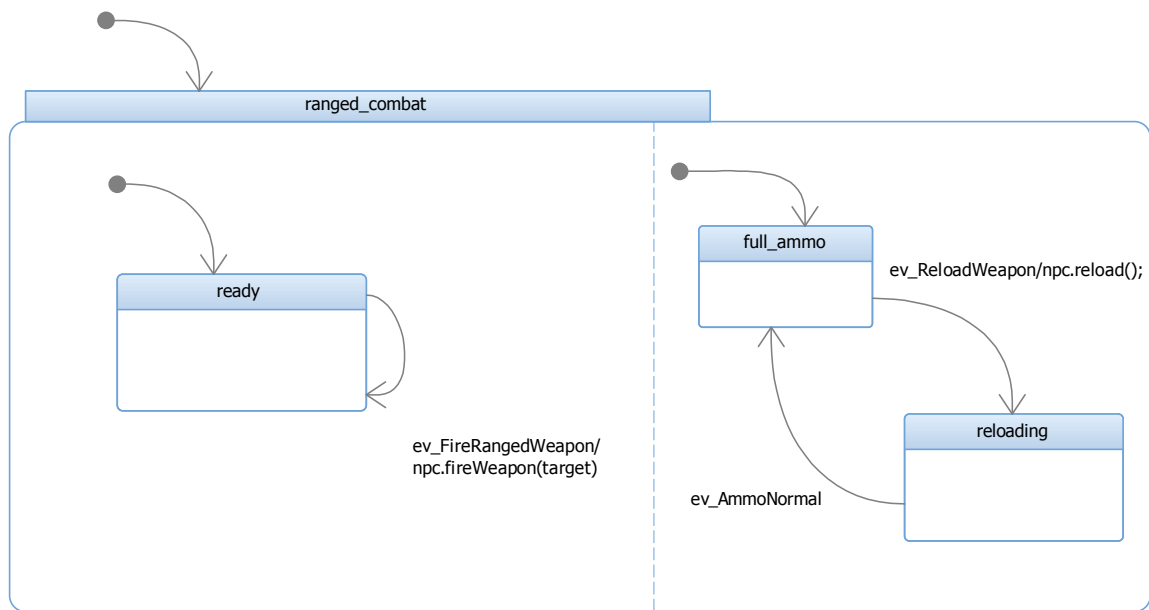


Figure A-48: The *RangedCombatActuator*.

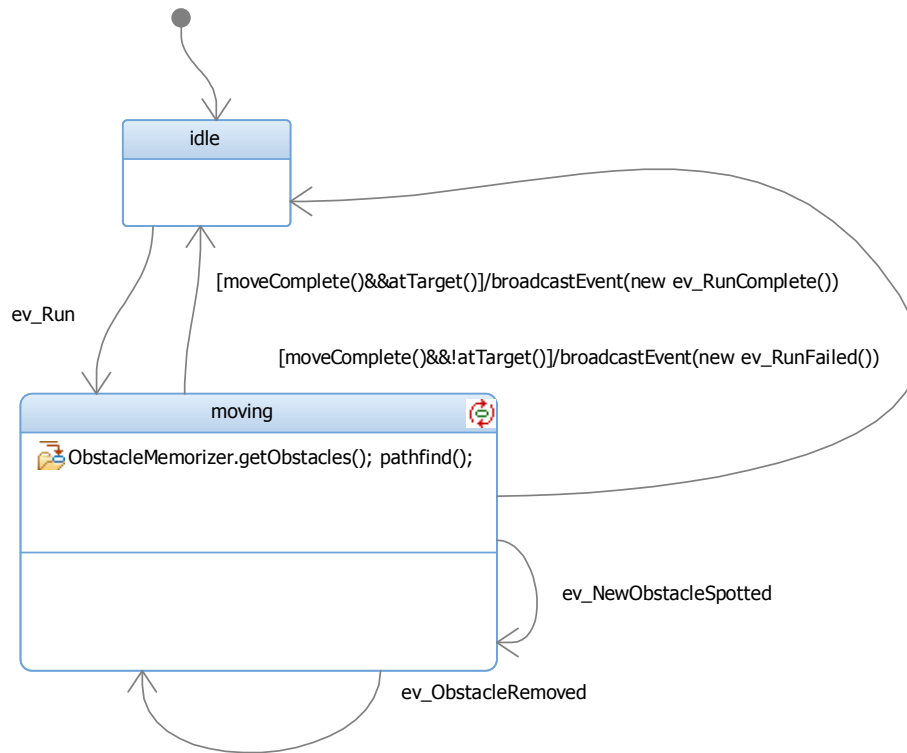


Figure A-49: The *RunActor*.

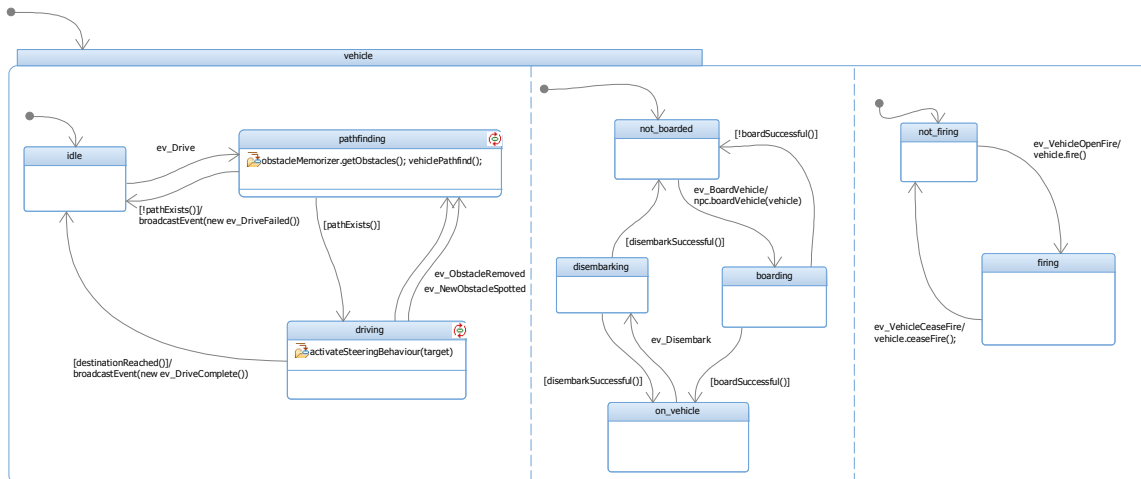


Figure A-50: The *VehicleActor*.