

13. System Design and Diagrams

The system design is represented through five draw.io diagrams. Figures 1 to 4 focus on the scout and overall game flow, while Figure 5 focuses on predator agents. Editable sources are stored under documentation/diagrams/final/, and Google Drive copies are listed for submission access.

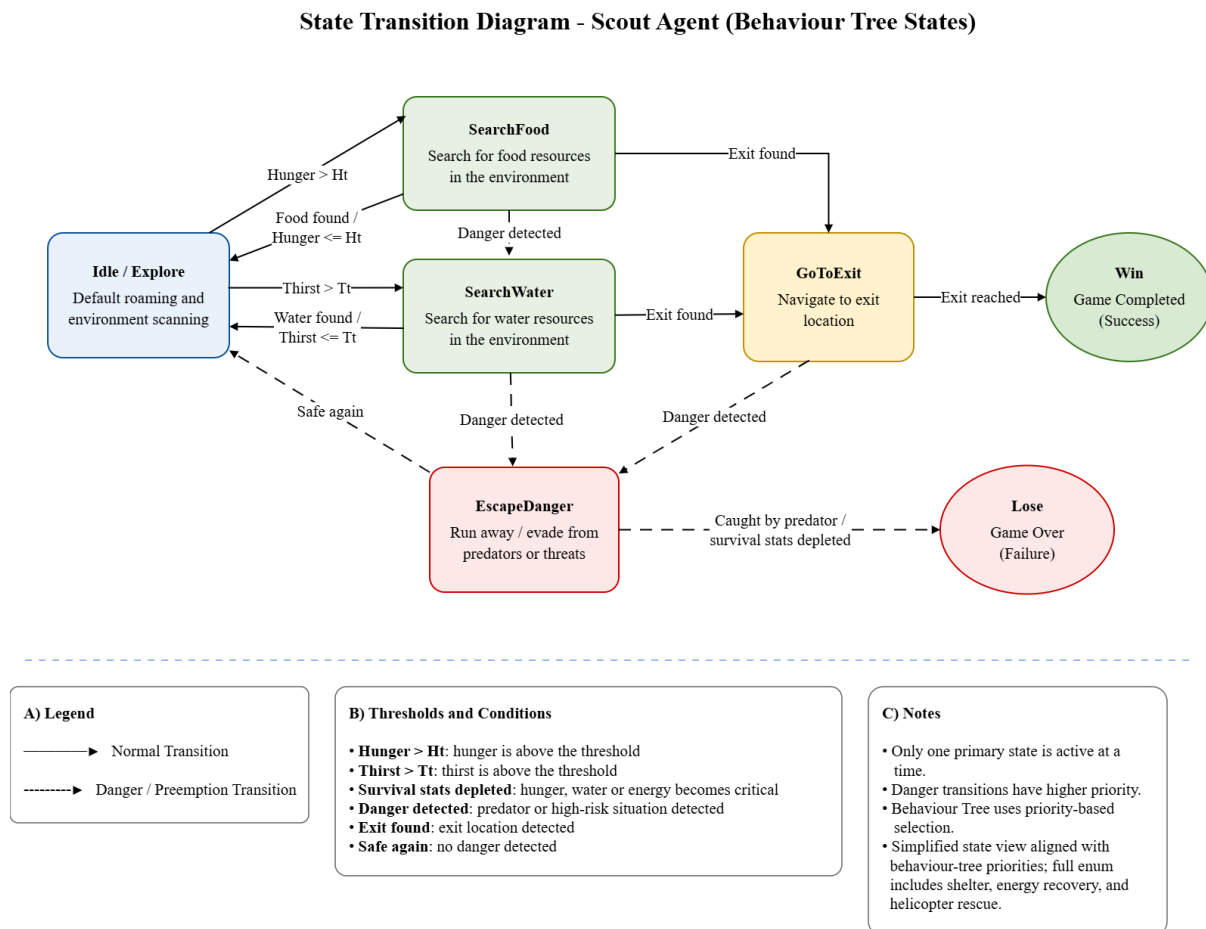


Figure 1: State Transition Diagram

Figure 1 shows the scout's behavioural modes and the main conceptual transitions between them. It supports the state-based explanation in Section 11 by showing how hunger, thirst, danger, weather, exit, and terminal outcomes affect behaviour. This diagram is a conceptual state transition view for explanation and assessment; it should not be read as proof of a literal finite-state-machine engine in the code.

- Google Drive: scout_state_transition.drawio https://drive.google.com/file/d/1tW5a2-bBY_4BPFv3yEJ9KEF_PGJ_xlfq/view?usp=sharing

LostBoyScoutAdventure Class Diagram

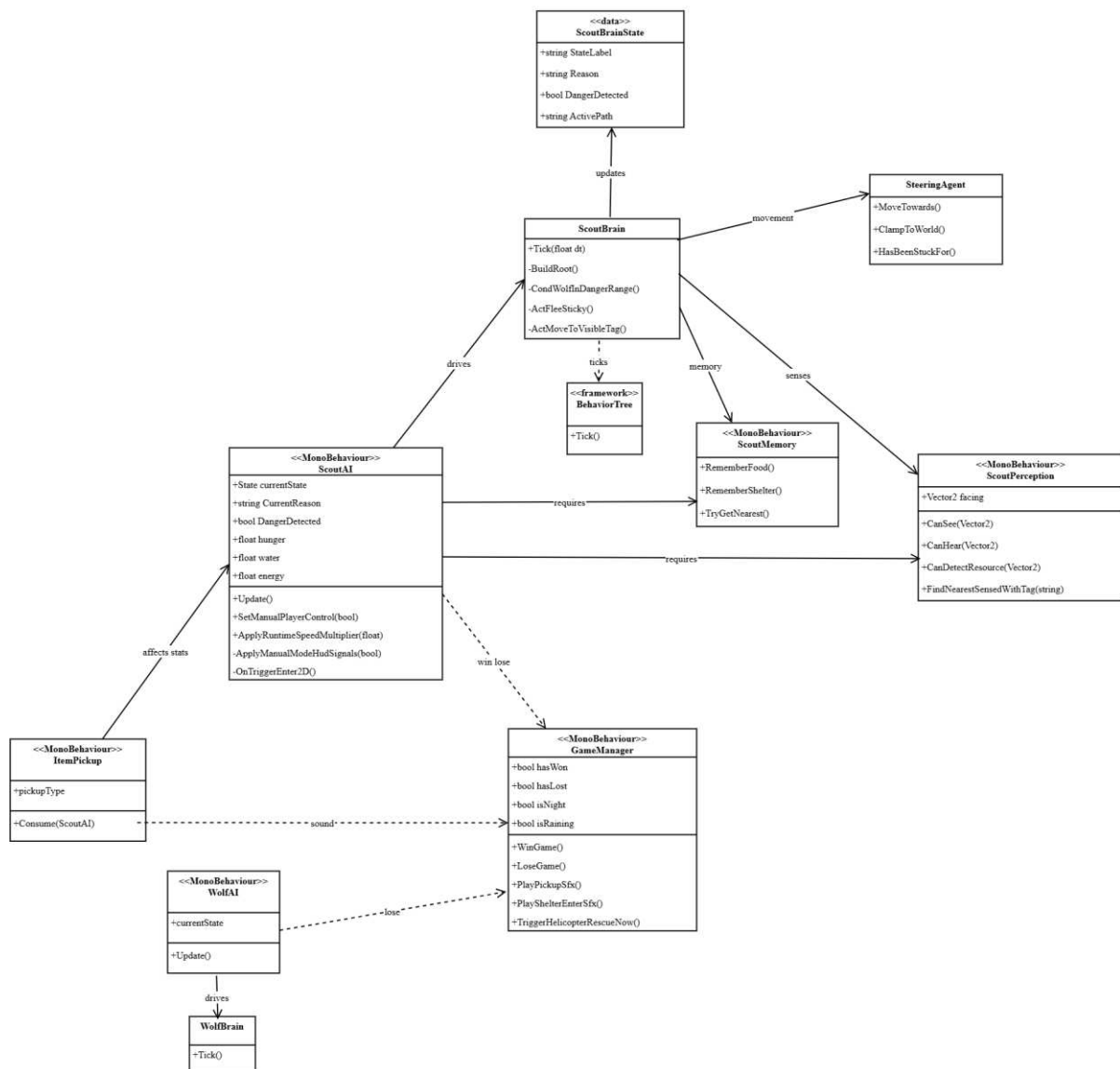


Figure 2: Class Diagram

Figure 2 illustrates the main class structure of the project, including ScoutAI, ScoutBrain, perception, memory, behaviour-tree support, predator scripts, GameManager, and pickups.

- Google Drive: class_diagram.drawio

https://drive.google.com/file/d/1rpWSHait61Vp4hwvaJ7_vhOCAP2F91UR/view?usp=sharing

Main Gameplay Loop of the Scout Intelligent Agent

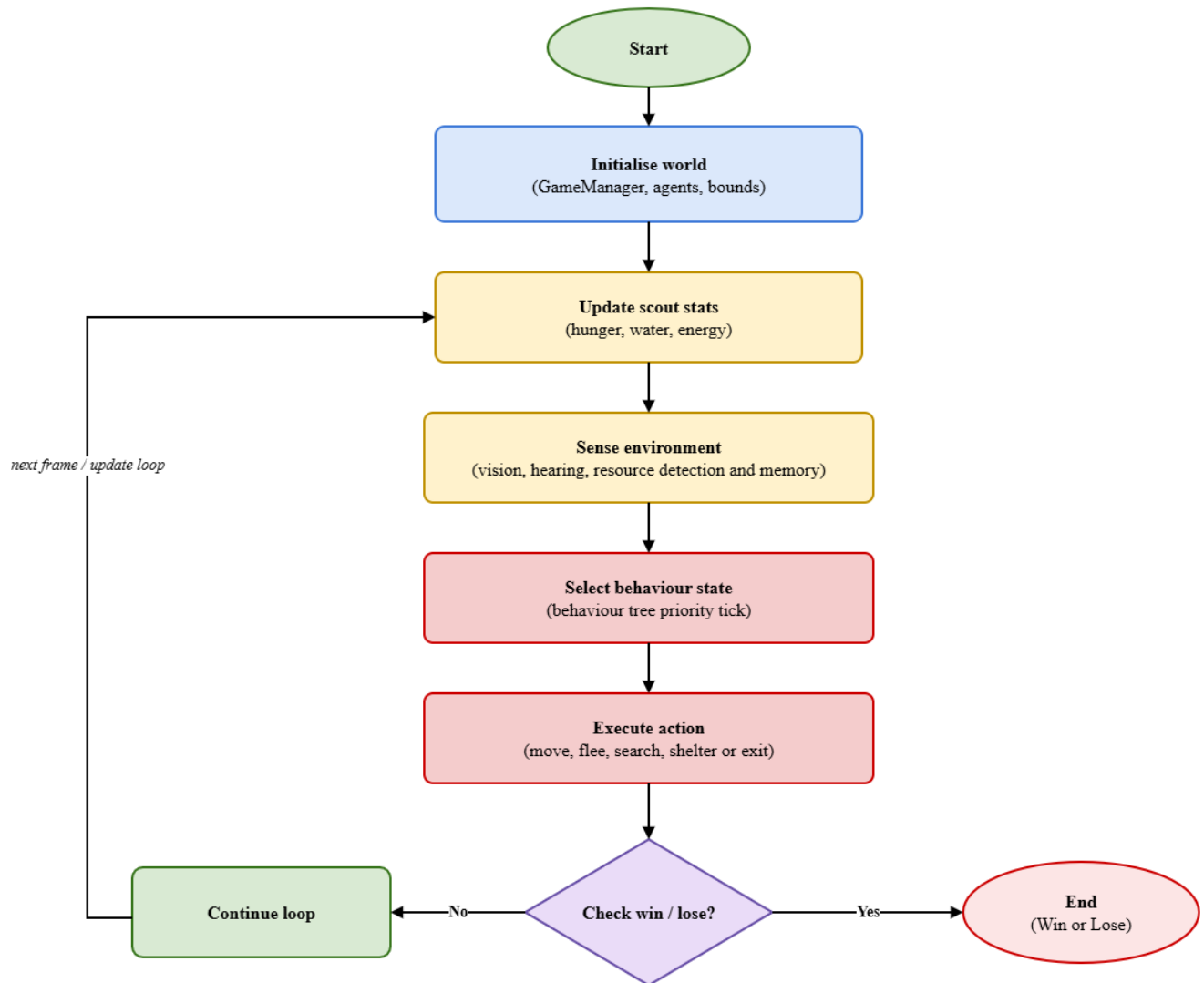


Figure 3: Game Flowchart

Figure 3 presents the high-level runtime loop. The game initialises, updates stats, senses the environment, runs the behaviour-tree decision logic, performs actions, checks win/lose conditions, and repeats until a terminal state is reached.

- Google Drive: scout_gameplay_loop_game_flowchart.drawio
<https://drive.google.com/file/d/15TmLYgeITaejQ1kMq2wng69BbECL4Pbr/view?usp=sharing>

PEAS Model for the Scout Intelligent Agent

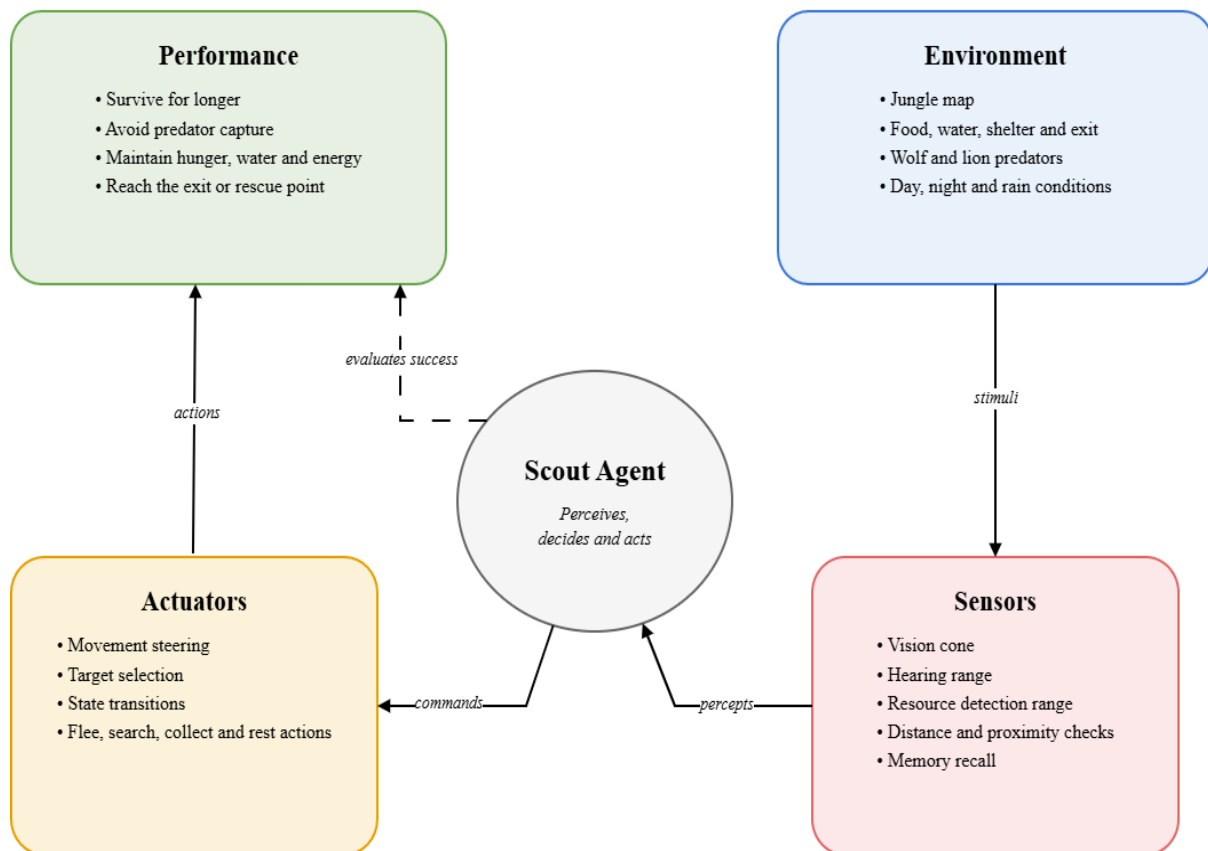


Figure 4: P.E.A.S Model

Figure 4 summarises the scout P.E.A.S model visually. It supports Table 3 by showing the scout's performance measure, environment, actuators, and sensors.

- Google Drive: scout_peas_model.drawio
<https://drive.google.com/file/d/1LmGUCKlwtq6zti6K2FUdJ1ImCSD1SCqV/view?usp=sharing>

PEAS Model for Predator Agents

(Wolf / Lion, shared behaviour-tree model)

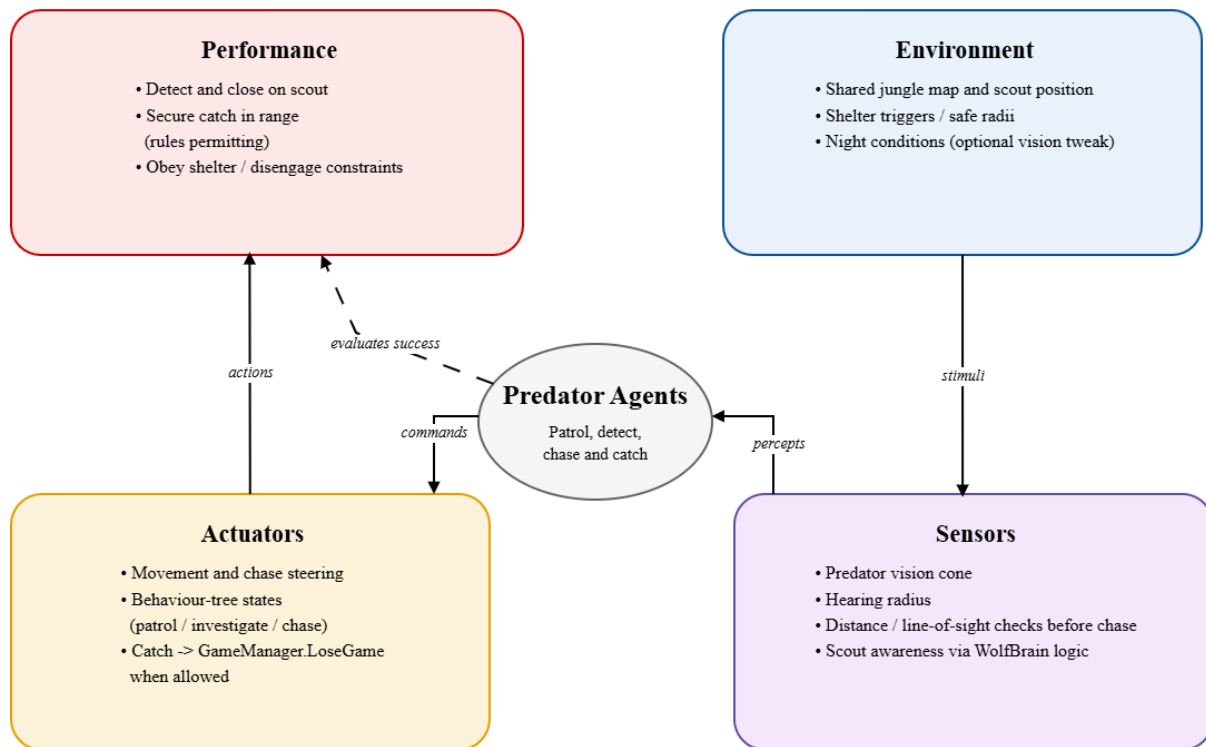


Figure 5: Predator Agents P.E.A.S Model

Figure 5 shows the predator-agent P.E.A.S model for the wolf and lion. It links to Table 4 and explains how adversarial agents contribute to the survival challenge.

- Google Drive: predator_agents_peas_model.drawio <https://drive.google.com/file/d/1n-JIir-TUiyKf3wVgvKyNWWBi78pfefF/view?usp=sharing>