

# WUMPUS WORLD AUTONOMOUS ADAPTIVE AGENT

*Exploring efficiently*



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# THE WUMPUS WORLD



Pits

Breeze

Agent

Wumpus

Stench

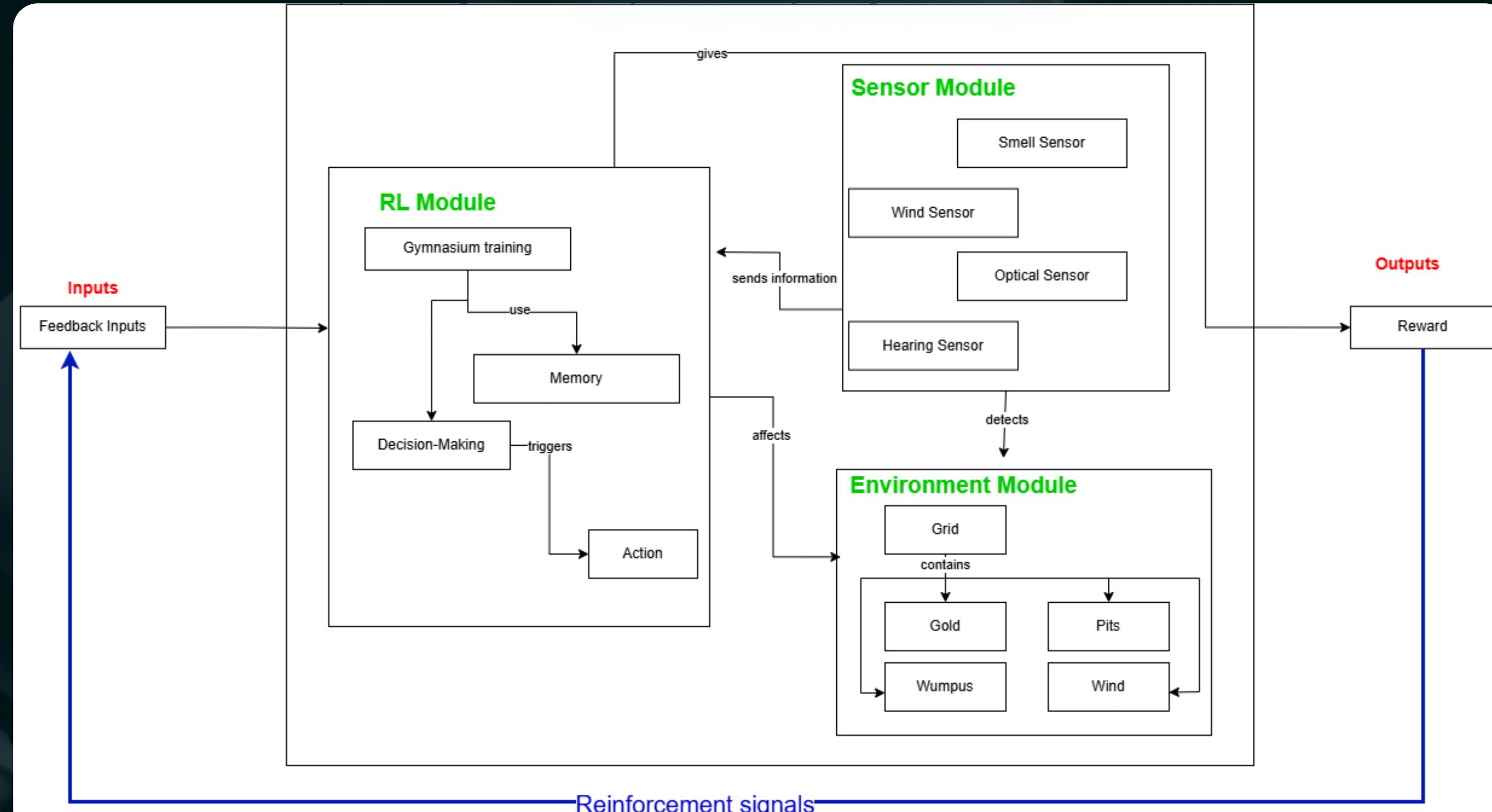
Gold

# AGENT'S MISSION

- SURVIVE AND RETRIEVE GOLD
- PREDICTIVE ANALYTICS
- AVOID PITS AND THE WUMPUS
- MAXIMIZE CUMULATIVE REWARD
- OPERATE UNDER UNCERTAINTY

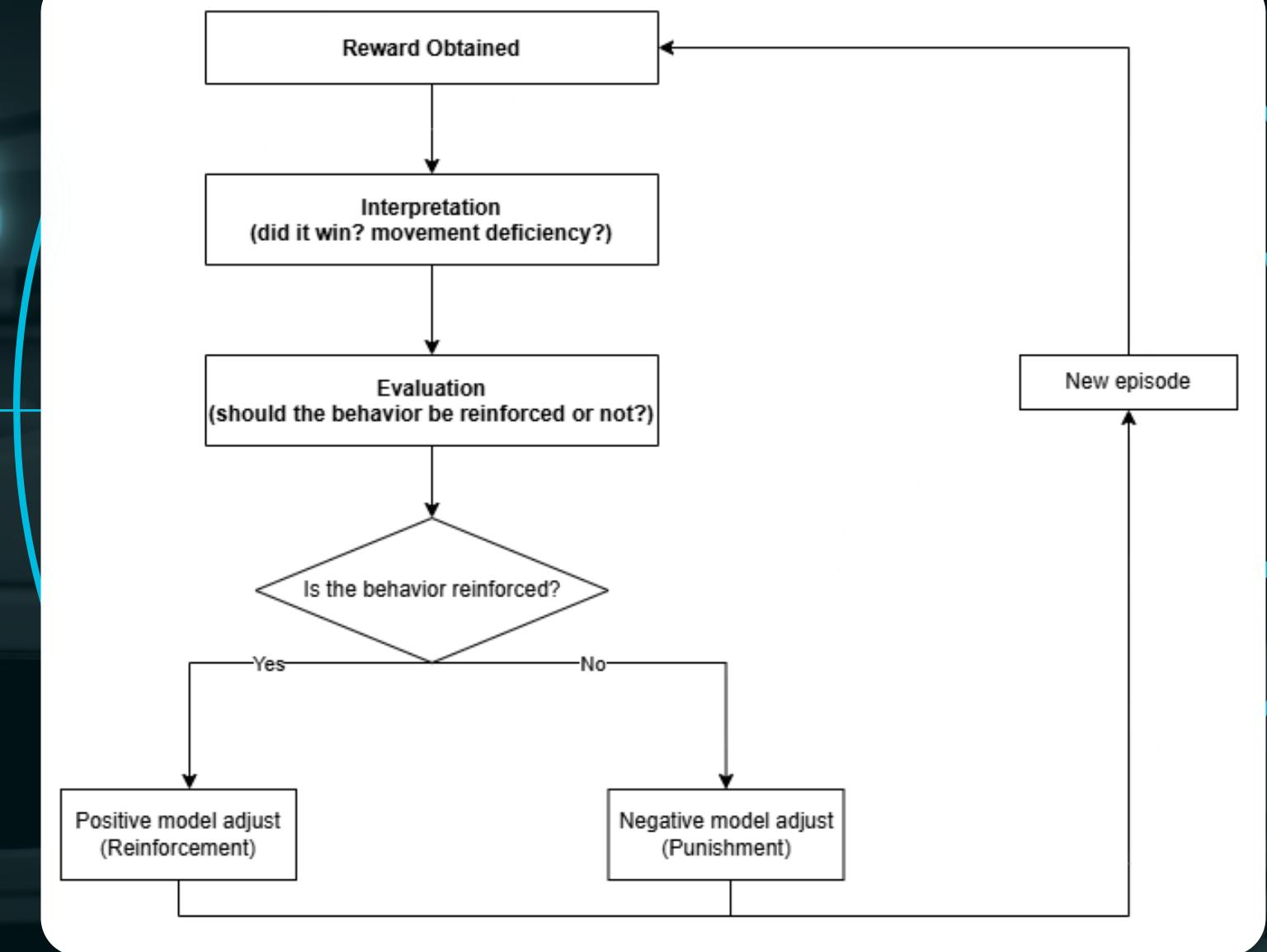


# COMPONENT DIAGRAM

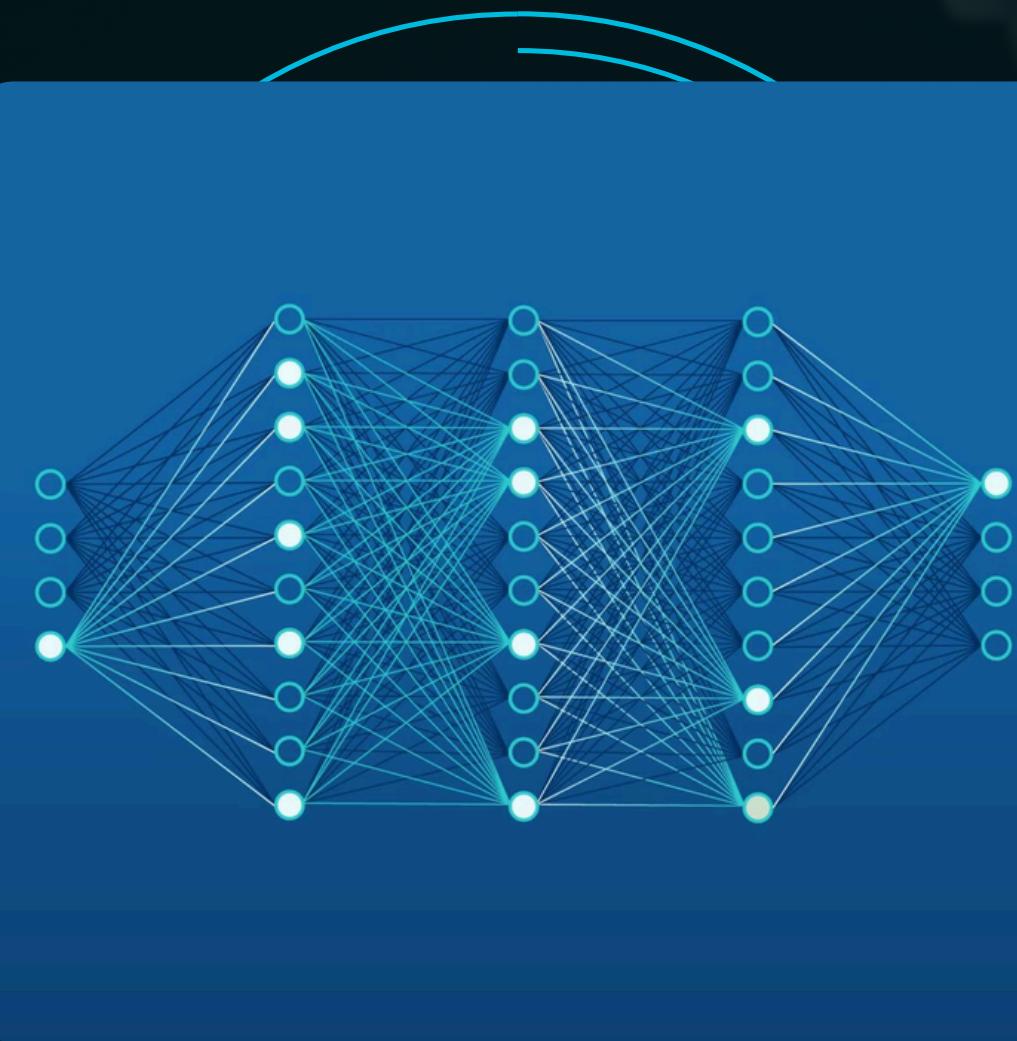


# CYBERNETIC FOUNDATIONS

-  CLOSED-LOOP SYSTEM
-  SYSTEM STABILITY AND ADAPTIVE CONTROL
-  FEEDBACK LOOPS



# DEEP Q-NETWORK [DQN]



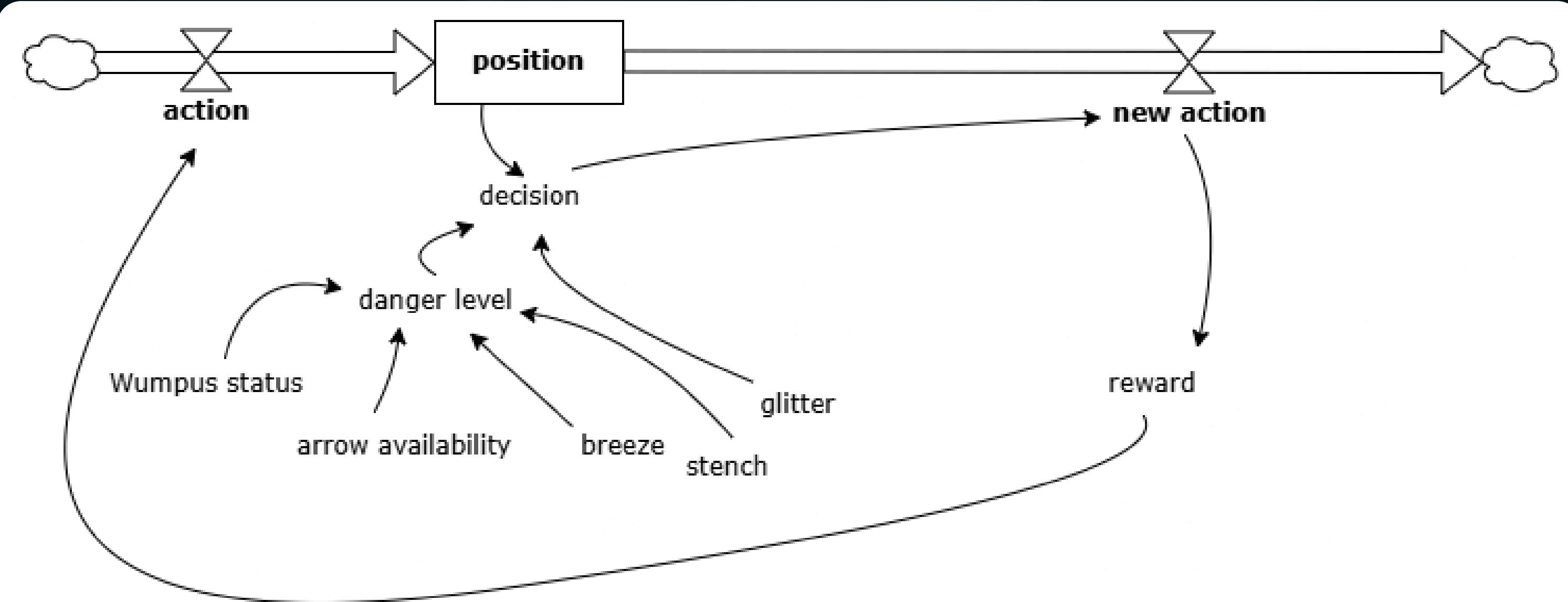
- Approximates Q-values with neural network
- Uses experience replay & target networks
- Learns from feedback over time
- PyTorch framework

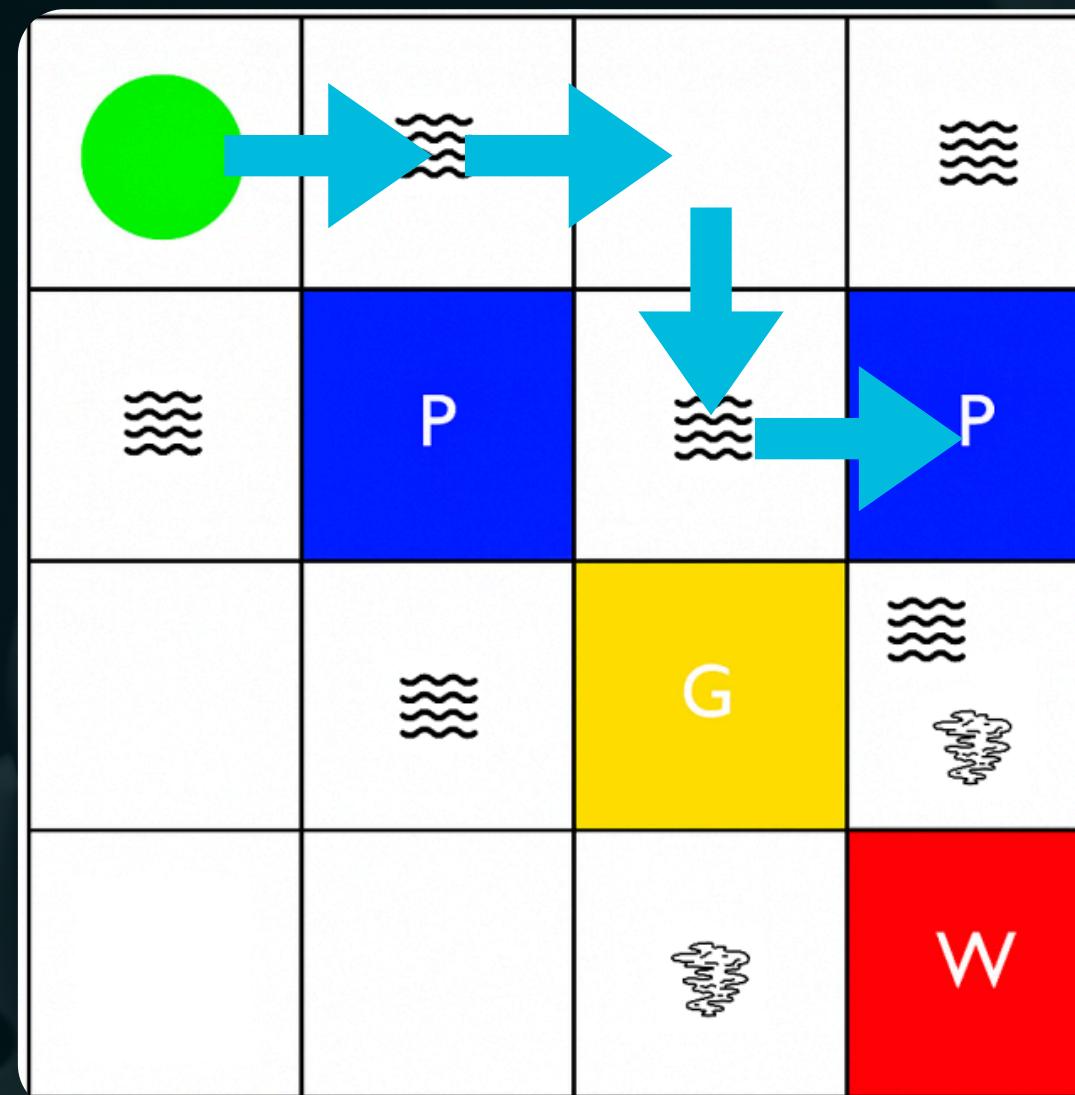


# REWARD SYSTEM

EVENT	REWARD	EVENT	REWARD
Falling into a pit	-1000	Visiting a new safe cell	+5
Being caught by Wumpus	-1000	Passing near danger and survive	+10
Unsuccessful shooting	-25	Collecting gold	+1000
Step	-5	Winning the episode	+2000
Revisiting safe cell	-0.5		

# SYSTEM DYNAMICS





# USE CASE

Initial position

Detects breeze. Step (-1)

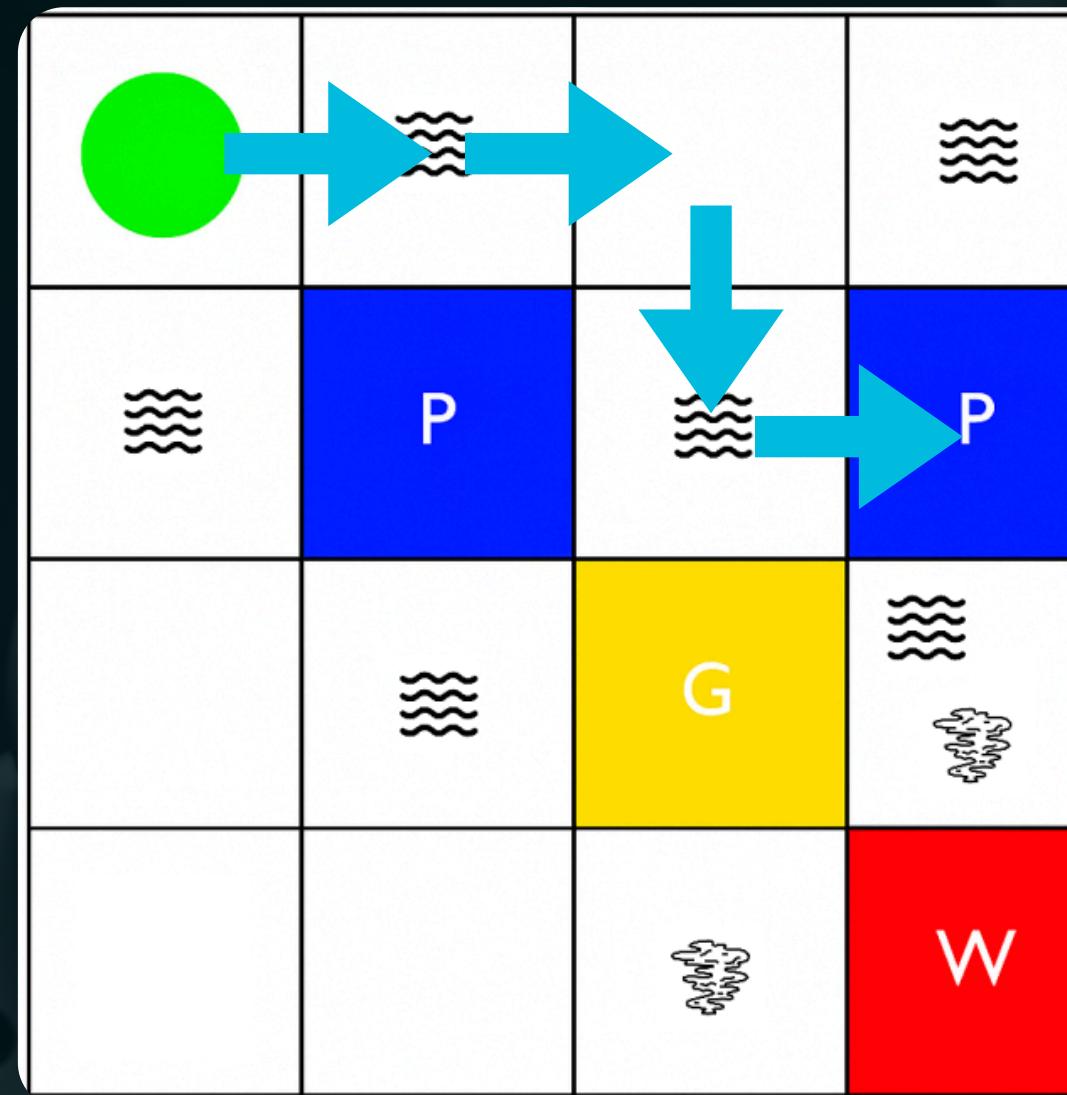
No percepts. Step (-1), New safe cell (+5)

Detects breeze. Step (-1)

Falls into a pit (-1000)

Lost

# EVALUATION SYSTEM



 Average danger level

 Average reward

 Win percentage

 Testing across random seeds

# THANK YOU!

*Thank you for your attention*

