Test

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1 Feedback Loop Refinement

1.1 Enhanced Control Mechanisms

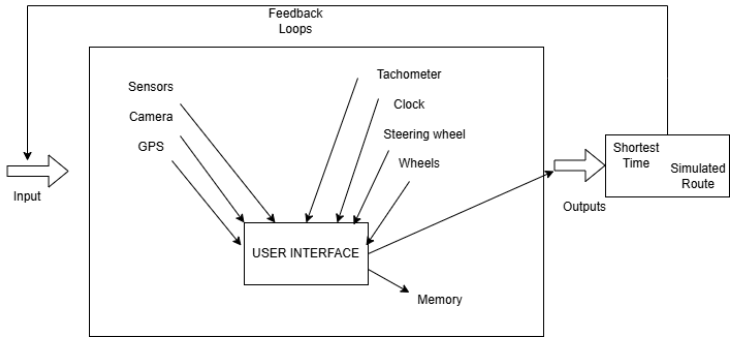

Figure 1: Diagram of the intelligent agent system

As shown in the image, the goal is to implement improved control mechanisms in the system so that it can optimally perceive the environment and react more precisely and efficiently to possible changes:

- A GPS is intended to be implemented, which could provide more accurate and real-time information about the agent's location.
- To improve the granularity of incoming signals, it is proposed that instead of receiving general data such as "obstacles," the system should be able to process exact distances and other environmental conditions (such as visibility, elements on the road, etc.) that may affect the optimal route and, therefore, the agent's behavior.

For this purpose, the agent is expected to adapt its behavior based on the data obtained, using adaptive control algorithms or reinforcement learning.

1.2 Stability and Convergence

To ensure that the system behaves reliably and improves over time, the following is proposed:

- The agent should exhibit bounded behavior, meaning it must not make illogical decisions such as turning in circles or repeating inefficient routes.
- Through feedback loops, the system should be able to improve future decisions based on past experiences.
- To verify stability, specific metrics could be used, such as:
  - The average time to complete a route.
  - The number of corrections made along the path.
  - Navigation errors detected during the simulation.

2 Iterative Design Outline

- The project plan will be updated to include new data structures and algorithms that optimize the agent's route planning in environments with changing conditions. Additionally, reinforcement learning frameworks will be integrated to enable the agent to learn from the environment and adjust its decision-making strategies, prioritizing the shortest travel time and the selection of the most optimal route.
- The system is intended to be evaluated through simulations, varying some parameters (such as route complexity, weather conditions, etc.) in order to assess efficiency and correct system performance, as well as its ability to adapt to changing conditions, using metrics such as decision-making, problem-solving, and response time.