SECJ3553 ARTIFICIAL INTELLIGENCE
SEMESTER 1 2024/2025

ASSIGNMENT 3
(ROUTESMART - AI-DRIVEN ROAD NAVIGATION APPLICATION)

SECTION: 02
LECTURER: ASSOCIATE PROF. DR. MOHD ADHAM ISA

GROUP NAME: LogiCode

NO.	NAME	MATRIC NO.
1.	KOH LI HUI	A22EC0059
2.	KOH SU XUAN	A22EC0060
3.	MAISARAH BINTI RIZAL (LEADER)	A22EC0192
4.	TANG YAN QING	A22EC0109

TABLE OF CONTENT

CHECKLIST: ACTIVITY, PIC & TIMELINE

Proposal			
Task	**Description**	**PIC**	**Deadline**
The Overview of Problem Background	Summarize the problem, its significance, and why it needs addressing.	Maisarah binti Rizal	6/11/2024
The Stakeholders and the Empathy Map	Identify stakeholders and create an empathy map for their perspectives.	Tang Yan Qing	6/11/2024
System Architecture with Knowledge Base and Inference System	Design the system's architecture and explain its components, workflow, and benefits.	Koh Li Hui, Koh Su Xuan	6/11/2024

Assignment 1			
Task	**Description**	**PIC**	**Deadline**
Knowledge Representation	Define and describe the knowledge representation for the AI solution	Koh Li Hui, Koh Su Xuan, Maisarah binti Rizal, Tang Yan Qing	14/11/2024

Assignment 2			
Task	**Description**	**PIC**	**Deadline**
State Space Search	Describe the state space search and its relevance.	Koh Li Hui, Koh Su Xuan	25/11/2024
Sequence of Actions	Define the sequence of actions for the application.	Koh Li Hui	26/11/2024
Problem Formulation in State Space Search Graph	Formulate the problem as a state space search graph.	Tang Yan Qing	27/11/2024

Formulated Problem that Supports the Proposed Knowledge Representation	Describe a problem to validate the knowledge representation method.	Maisarah binti Rizal	27/11/2024

Assignment 3			
Task	**Description**	**PIC**	**Deadline**
Peas Model Description	Provide the detailed property of the PEAS (Performance, Environment, Actuators, Sensors) model.	Maisarah Binti Rizal, Tang Yan Qing	24/12/2024
Relations Between Each Property	Illustrate how each property in the PEAS model relates to others and their dependencies.	Maisarah Binti Rizal, Tang Yan Qing	24/12/2024
Representation of properties in the proof of concept(POC)	Explain how properties in the PEAS model are represented in the Proof of Concept (POC).	Koh Li Hui, Koh Su Xuan	25/12/2024
Behavior of AI Agents in the Proposed Application	Describe the behavior and actions of AI agents in the proposed system or application.	Koh Li Hui, Koh Su Xuan	29/12/2024

1.0   INTELLIGENT AGENT

1.1.0   PEAS MODEL REPRESENTATION

Table 1: PEAS Model

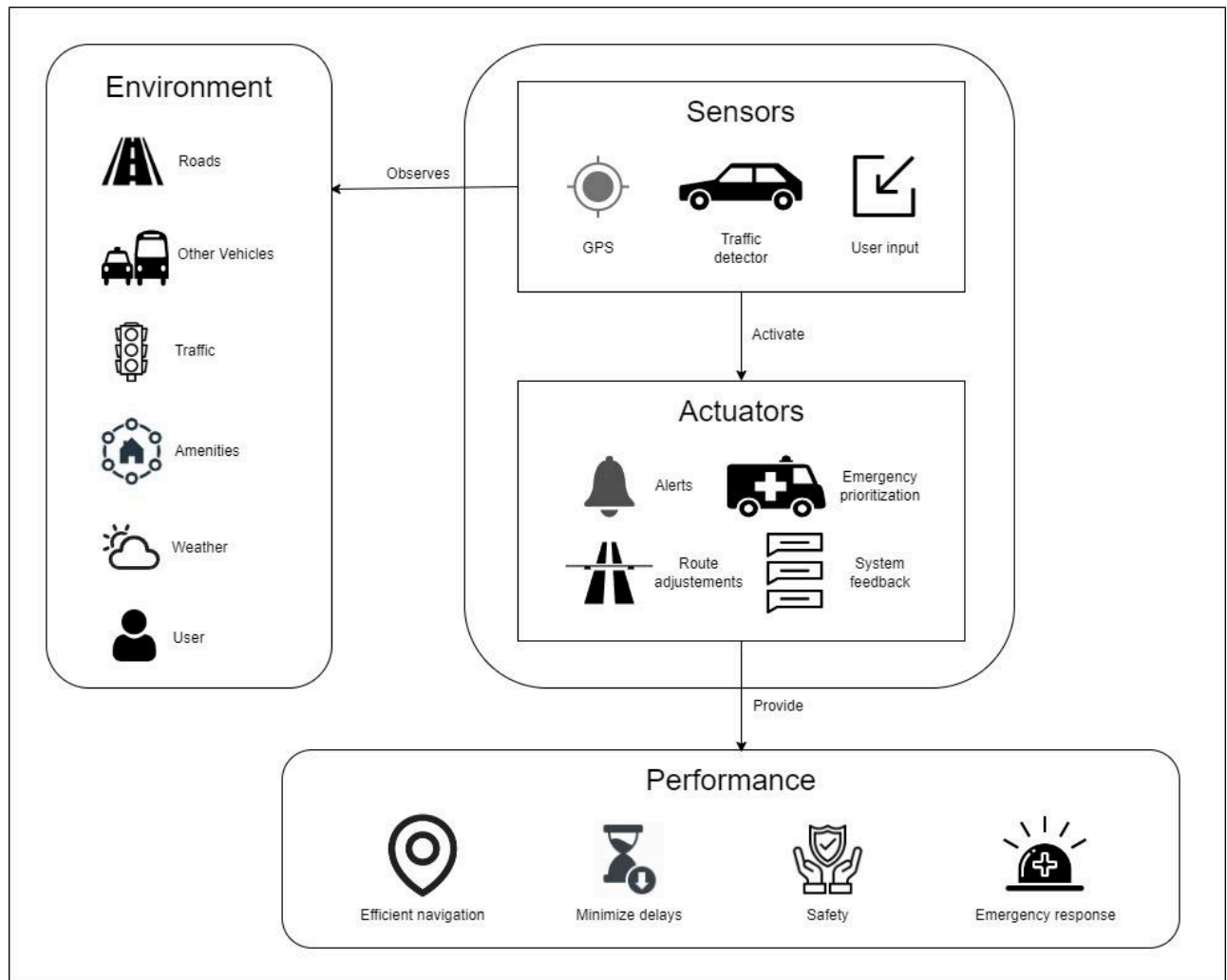| Performance	- Efficient navigation - Minimize delays - Safety - Emergency response
Environment	- Roads - Other vehicles - Traffic - Amenities - Weather - User
Actuators	- Route adjustment - Alerts - Emergency prioritization - User feedback
Sensors	- Traffic detectors - GPS - User input

1.2.0 RELATIONS BETWEEN EACH PROPERTY

Figure 1: PEAS Model

1.3.0 REPRESENTATION OF PROPERTIES IN THE PROOF OF CONCEPT (POC)

Performance (P):

The RouteSmart system aims to provide the best user experience by performing at the highest standard of performance which begins with the goal of **efficient navigation**, seeking the most optimal routes based on current road conditions and user preferences and it is measured by time taken to travel between points and the distance travelled. By constantly collecting the road information in real-time, the system can **minimize delays** by avoiding congested and incident areas and offering adjusted and alternative routes. The system also puts the **safety** of the user as the highest priority by providing hands-free mode. RouteSmart also gives special attention to situations that require **emergency response** by providing the emergency route for emergency vehicles and alerting the nearby users. Overall, RouteSmart is built to make navigation as easy, fast and safe as possible for everyone.

Environment (E):

The RouteSmart system is an AI-driven Road Navigation Application, the environment is roads, other vehicles, traffic, amenities and weather. **Roads** is the user's environment when using the application. **Other vehicles** are the other road users which determines the level of traffic. Meanwhile, the **traffic** indicates the traffic conditions on the roads while the **amenities** are the amenities such as petrol stations and restaurants that were included in route planning by the users. The environmental factor which is the **weather** conditions are also considered in which weather can affect the traffic condition. For example, rainy days are often accompanied by traffic congestion. Lastly, the **user** interacts with the RouteSmart application, requesting the best navigation route to their destination based on real-time data, adapting to the conditions encountered during their journey.

Actuators (A):

Based on the information collected from the sensors, the RouteSmart system can initiate various actions by using actuators, these include sending out **alerts** to users when traffic incidents or congestion was detected in their route. The system also responds to **emergency** route requests by **prioritizing** it by activating specific pathways and notifying nearby users. This ensures a clear route for emergency responders while minimizing disruption for other road users. The system can also perform **route adjustments** to avoid traffic congestion or incidents and including nearby amenities as requested by the users. It also is an ongoing system, as the system responds to the user inputs and gives real-time **feedback** to the user to navigate the user to their destination while adapting to changing conditions effectively.

Sensors (S):

The system's perception of the environment begins with sensors that gather and process input, using **GPS** to determine the location of users and **traffic detectors** are used to get the real-time traffic data. The system also takes in data from **user input** through voice commands and typed requests. This data is sent to the actuators to ensure the system is providing up-to-date information for the best user experience.

2.0 BEHAVIOR OF AI AGENTS IN THE PROPOSED APPLICATION

In the proposed RouteSmart - AI-Driven Road Navigation Application, the AI agent functions as an intelligent system that adapts to user needs and dynamic conditions. It gathers real-time data from traffic monitoring systems and user inputs like destination and preferences. This information enables the agent to assess road conditions and knows the occurrence of any congestion or incidents. The agent processes the collected data using inference rules to provide optimized route suggestions. It considers user preferences, such as including nearby amenities and prioritizes emergency routes when necessary. Through voice commands and an intuitive interface, the system ensures hands-free and safe user interaction. The AI agent's goal is to deliver efficient and adaptive navigation by minimizing delays, enhancing safety and improving user convenience. Its proactive and responsive behavior ensures a smarter and more reliable road navigation experience for all users.