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| **Practical Number:** | **1** | **Date of Practical:** |  |
| **Title:** | Design of Intelligent System Using PEAS. | | |

Practical grading using Rubrics

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| **Indicator** | **Very Poor** | **Poor** | **Average** | **Good** | **Excellent** |
| **Timeline** (2) | More than a  session late (0) | NA (0.5) | NA(1) | NA (1.5) | Early or on  time (2) |
| **Completeness**  (3) | N/A | N/A | Not Com-  pleted (1) | Partially  Completed (2) | Completed(3) |
| **Legibility** (3) | N/A | N/A | poor(1) | Good(2) | Very Good  (3) |
| **Postlab** (2) | N/A | N/A | N/A | Partially  Correct(1) | All correct  answers (2) |

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| **Total Marks (10)** | **Sign of instructor** |
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**Experiment No: 1**

Problem Statement: To understand the concept of PEAS

Theory:

PEAS: PEAS stands for performance environment actuators sensors.

a. Automated Taxi Driver

In designing an agent, the first step must always be to specify the task environment as fully  observable. To understand PEAS in a better way, let us try to analyse the complex problem of  automatic taxi driver which is currently beyond the capabilities of existing technology. We would  consider characteristics of PEAS for description of taxi's task environment.

Performance measure:It is the first to which we would like an automatic driver to Aspire. Desirable measures  include getting correct destination, minimising fuel consumption, no wear and tear, minimising trip time and cost, minimising violation of traffic laws and disturbance to other  drivers, minimising safety and passenger comfort and maximizing profit. But in this scenario, some of the goals may conflict, so there will be some trade off involved.

Environment: The basic question that comes in the mind is what is the driving environment that  a taxi will face? A taxi driver will face with a variety of roads, ruler lines and urban Valley to 12 Lane Freeway. The roads contain other traffic, pedestrians, stray animal, roads work, police potholes and cars. A taxi must also interact with potential and actual passengers. There might be some restriction on driving, such as left-hand side driving as in India, Japan, etc., or right-hand  side driving. Otherwise the roads may be soaring temperature, desert areas and all snowfall  regions like Kashmir. Thus, more restricted the environment, easier the design problem.

Actuators: The actuators available to an automated taxi will be more or less same as those  available to human driver(i.e., control over engine through the accelerator and control over  steering and breaking). In addition, it will output to a display screen or voice synthesizer talk  back to passengers and perhaps some way to communicate with other drivers or vehicle politely  or otherwise.

Sensors: The sensors will play a crucial role in determining where the taxi actually is, what else  is on the road and how fast it is going. The basic sensors should therefore include one or more TV  cameras, the tachometer and the odometer. To control the vehicle properly, especially on curves,  it will also need to know the mechanical state of vehicle so it will need the usual array of engine  and electrical system sensors. It might have instruments that are not available to average human  driver, a satellite global positioning system (GPS) to give accurate position information with  respect to an electronic map and infrared solar sensors to detect distance to other cars and  obstacles. Finally, it will require keyboard or microphone for passenger to request a destination.

* Performance measure: safe fast legal comfortable trip maximize profit
* Environment: roads are the traffic pedestrian customers
* Activators: steering accelerator break horn display
* Sensors: camera, sonar speedometer, odometer, GPS, etc.

b. Vacuum Cleaner Agent

* Performance: Cleanness, efficiency: distance travelled to clean, battery life, security.  Environment: Room, table, wood floor, carpet, different obstacles.
* Actuators: Wheels, different brushes, vacuum extractor.
* Sensors: Camera, dirt detection sensor, cliff sensor, bump sensors, infrared wall sensors.

c. Music Composer

* Performance Measures - number of measures composed per unit time, number of instruments  considered, ease of play by a human, range of frequencies within human audible zone, melodic,  harmonic and rhythmic criteria, Environment Software
* Actuator: None required, this can be a pure softbot
* Sensors: Code that reads in basic parameters

d. Aircraft Autolander

* Performance:Lack of damage to plane, other aircraft or ground structures, lack of  injuries to passengers or ground crew or other innocent observers, cargo remains intact, fuel  economy, lands at correct airport on correct runway, doesn't take too long
* Environment: Lower atmosphere and surface of planet Earth.
* Actuators: Throttle, landing gear, rudders, ailerons, flaps ...
* Sensors: Cameras, Altimeter, Speedometer, other meters, .

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Approach:

Write PEAS for the following Agents:

* An Essay Evaluator
* A Robotic Sentry Gun for the Keck Lab
* Medical Diagnosis System

**Postlab:**

For each of the following activities, give a PEAS description of the task environment and characterize it in terms of the properties. Identify suitable Agent Architecture for the problem

• Playing soccer.

• Exploring the subsurface oceans of Titan.

• Shopping for used AI books on the Internet.

• Playing a tennis match.

• Practicing tennis against a wall.

• Performing a high jump.

• Knitting a sweater.