

CSE 461 Mid

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Section: 08

Ans: to the Q. No 1

The roles of robotics in A.I.R -

- i) Robotics can improve ~~part~~ productivity: Based on current scenario, AI is expected to have ability to increase labour productivity by up to 40% by 2035.
- ii) Automation can lower overhead costs: Although the initial cost of automated software or robots may be significant. Many business owners might find that some roles in his/her business are no longer required once AI being utilized, saving costs immediately.
- iii) Smart technology can reduce human error: Human error is a factor that every business must plan for. Automation can handle those

errors and minimize also.

Mainly, those are the roles of robotics in 4th industrial revolution.

Ans: to the Q. No 2

In Hierarchical / deliberative paradigm,  
The robot operates in a top-down fashion,  
heavy on planning. The robot senses the  
world, plans the next action, acts at  
each step the robot explicitly plans the  
next move. All the sensing data trends  
to be gathered into one global world  
model.

There are three types of paradigm in robotics

- i) Hierarchical/ deliberative
- ii) Reactive
- iii) Hybrid

Ans: to the Q. No 3

(1)

For taking photos of animals we can use LIDAR sensor which is also to drone. It need to high resolution mapping technique which can identify animals. For nocturnal animal we can use infrared technology. Using GPS it can trace the position of animal.

Camera: We ~~will~~ can use MIPI CSI-2 camera which has high performance ability.

Shutter: We will use global shutter because it capture moving object without blur picture.

Focus: We will choose manual focus because it helps to take image easily.

(2)

To map we can use sensor like wheel  
odometers and ~~inter~~ inertial measurement units  
(IMUs), aka interoceptive sensors, that measure  
values internal to the robot are used for  
these calculations.

Ans: to the Q. No 4

Forward Kinematics: Forward kinematics means it is the process of gain position of x axis, y axis and z axis where we know the joint angles. It measures the end-effector from specified values for the joint parameters.

Inverse kinematics: In this process we have to obtain ~~angul~~ angle of each joint where we know the value of x axis, y axis and z axis. Also it is the mathematical process of calculating the variable joint parameters needed to place the end of a kinematic chain, such as a robot manipulator.

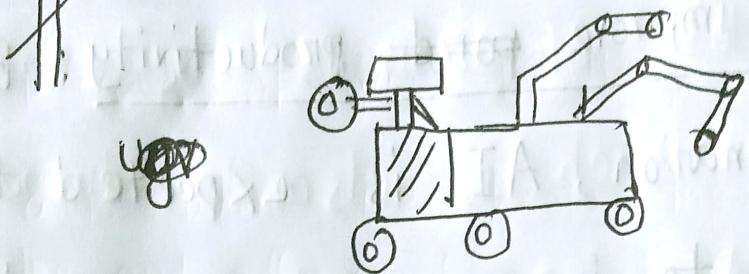
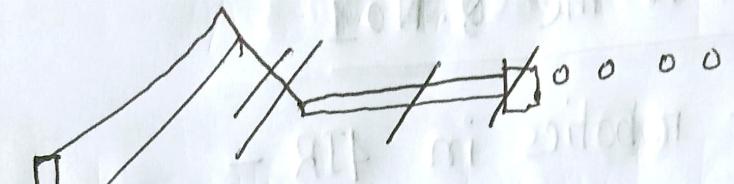
Ans: to the Q. No 5

They need UGV, unmanned ground vehicle.

The various sensors need to use in this unmanned ground vehicle to do that certain task. For example, Lidar, Monocular, Camera, etc. GPS, Ultrasonic sensor, GPS sensor, Radiation detector etc. Features of UGV are base, arms etc.

The vehicle uses its sensors to develop some limited understanding of the environment, which is then used by control algorithms to determine the next action to take in the context of a human provided mission goal. This fully eliminates the need for any human to watch over the menial tasks.

sketch:



ugv