18301041

Mid-Section: 01

Answer to the question no-1

As we enter the fourth Industrial Revolution, we see more technologies having a positive impact on people and society. The fourth Industrial revolution will bring about significant change in the everyday lives of humans. Some of the technologies include Artificial Intelligence, Robotics, IOT, Quantum computing, Virtual Reality (VR), Augmented Reality (AR), Unmanned Aerial Vehicle (UAVs), 3D printing and Blakchain. However, Robotics and artificial Intelligence generally, are the epicenter of the fourth Industrial Revolution.

A majority of early robotics were pre-programmed to produce a pre-determined physical series of movements for manufacturing or transportation. An intelligent machines are

energy saving, it gives more accuracy, convenient, more efficient, has adaptability in dynamic environment moreover, it can also perform dull, dirty, difficult and dangerous job. Regardless of the drawbacks, AI and Robotics will lead the Fourth Industrial Revolution which will open up whole new era.

Answer to the question no- 24

Forward kinematics and Inverse kinematics are methods to calculate co-ordinates of end effector and joint angles ~~respectfully~~ respectively. Forward and Inverse like a function and its inverse. In

robotics, this normally refers to calculate the relations between end-effectors and joint angles. For forward kinematics, the joint angles are the inputs, the outputs would be the co-ordinates of the end-effectors. On the other hand, inverse kinematics, the given inputs are the co-ordinates of the end-effectors, the outputs to calculate are the joint angles.

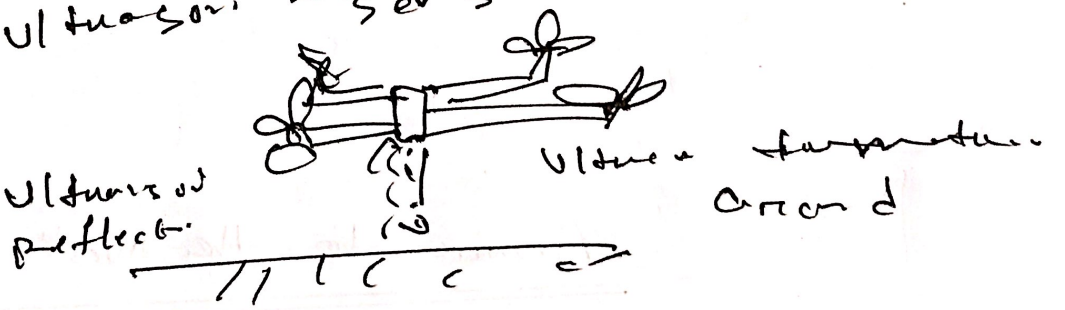
Answers to the question no-5

Farmer wants to remove insects from his land and has a very big area of farming land which needs 15 liters

of insecticides and needs to do it very fast.

In this scenario, the sensor that will be used is Ultrasonic sensor, which convert electronic energy into acoustic wave that is an ultrasonic wave travelling at above 18 kHz frequency.

A microcontroller is used for communication for Ultrasonic sensor



A drone will be used to solve this problem. Ultrasonic sensor measuring height drones needed for this.

Answer to the question no - 3

1. For taking photos of animals living in that area, Monochrome sensors with global shutter imaging sensor and cameras should be used.

It is a global shutter camera that expose all pixel at the same time. the shutter opens and closes within a short period of time. Thus, it can take better picture of fast moving objects like living animals without blurring the details. That is why rolling shutter color cameras are better.

2. To map the uncharted areas LIDAR sensor should be used.

LiDAR stands for Light Detection And Ranging which is similar to Radar and Sonar and uses laser instead of radio wave or sound wave. For above scenario CMOS sensors should be used.

CMOS sensors are built with fabrication tech similar to ICs. its circuit complexity is compact and power supply is low moreover, its processing speed is high and photon sensitivity is low. the pixels are read row by row using pixels

Comparing to CCD, the charge to voltage conversion and amplification is performed inside the pixels. Thus the processing speed of the CMOS sensors are higher than CCD.

Ans to the qus — 2

Main problem of DC Motor it response quickly and also controlling on & power and it can be solve using gearbox.