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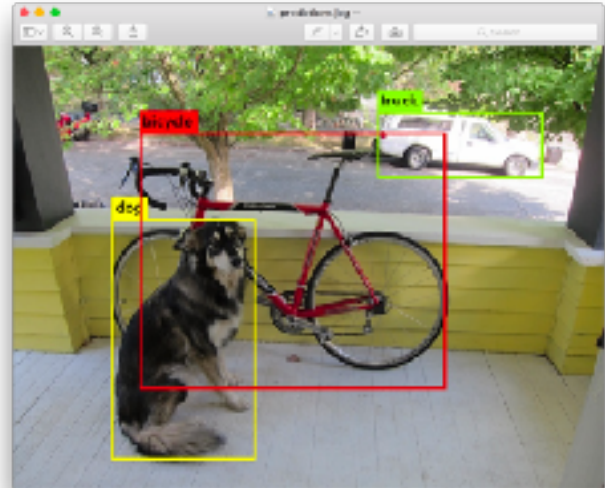
Course: Artificial Intelligence
Assignment #1

Question 1 :

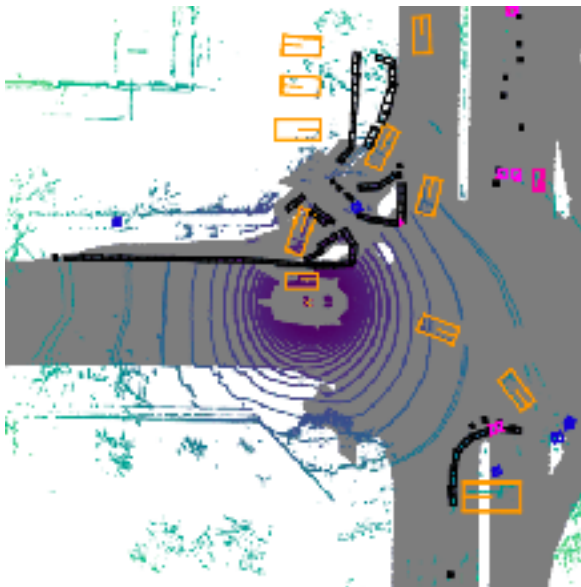
Write a problem that can be solved by using AI ?

Answer: There are multiple problems that can be addressed using AI .

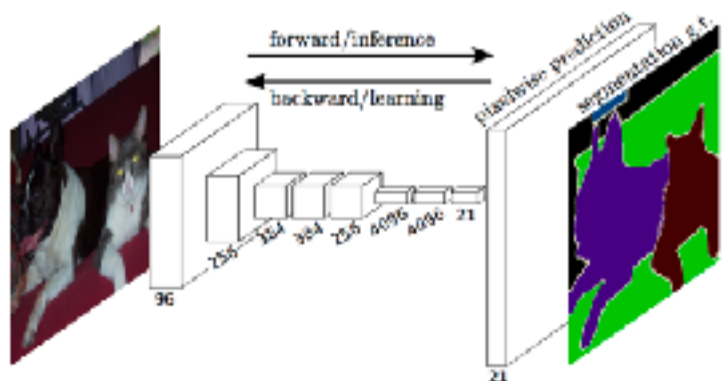
I work in the field of Robotics & ADAS . From my experience , I have seen a lot of potential in using Deep Learning for Object classification . An example project of **image classification** which is based on a **CNN method** .
<https://pjreddie.com/darknet/yolo/>

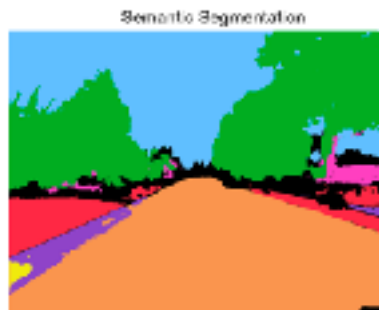


Similar kind of object detection and classification of **3D point cloud data** is also something I am greatly interested in pursuing . <https://github.com/open-mmlab/mmdetection3d>



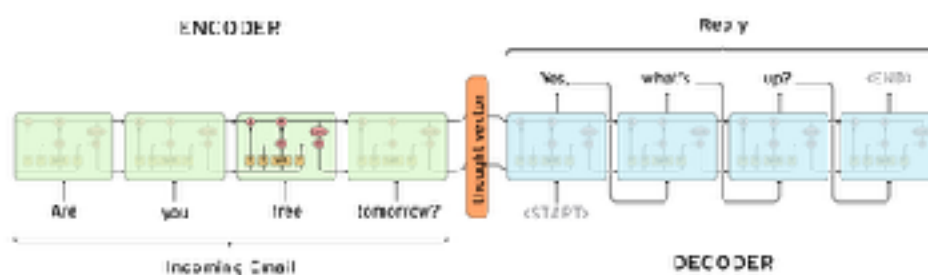
Related to perception , **semantic segmentation** is also a very good use case for AI <https://github.com/divamgupta/image-segmentation-keras>





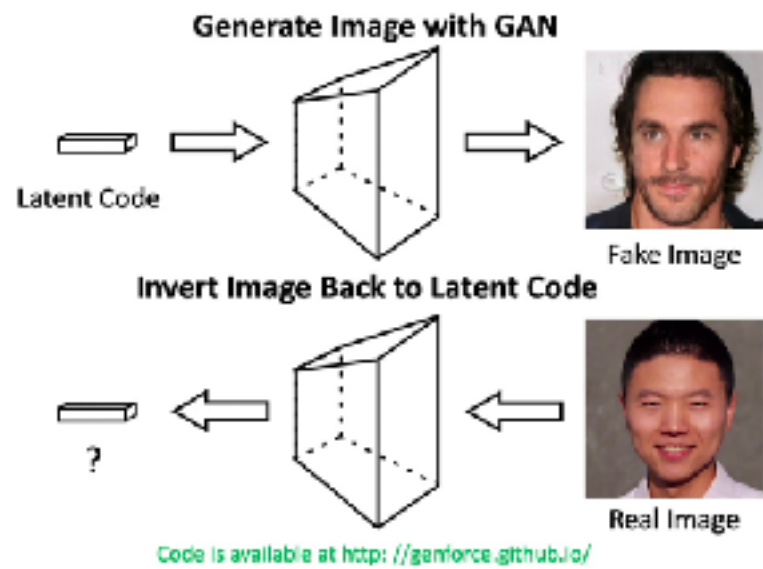
Apart from perception related problems , I have seen the use of **Reinforcement Learning** in the use of controls using **Lane Detection** .

<https://medium.com/computer-car/udacity-self-driving-car-nanodegree-project-1-finding-lane-lines-9cd6a846c58c>



LSTM networks are used in the case of Chat bots

Source <https://research.googleblog.com/2015/11/computer-respond-to-this-email.html>

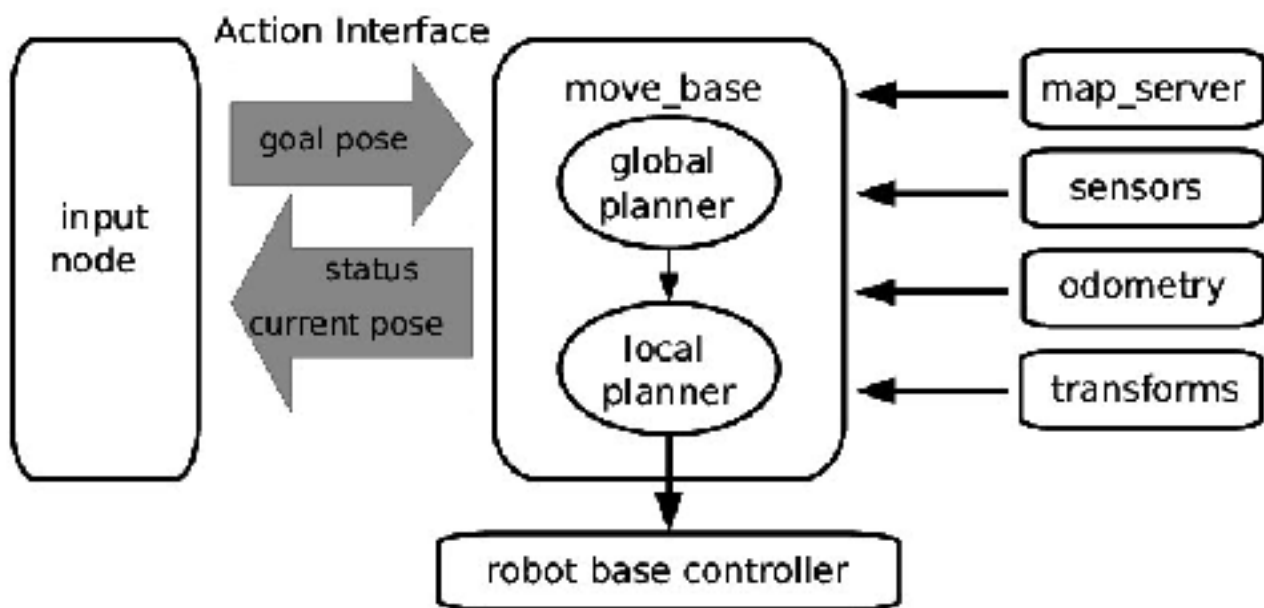


GAN (Generative Adversarial network) for the use of image morphing and AI enabled actors .

Question 2: *Design a delivery robot , to different Geo Locations in a City .*
The robot must

- > navigate through different terrains
- > Interact with human beings
- > Design basic AI agent , that can control robots behaviour
- > Take into account sensors and actuators
- > Specify the environment , actuators and performance metrics

Answer:

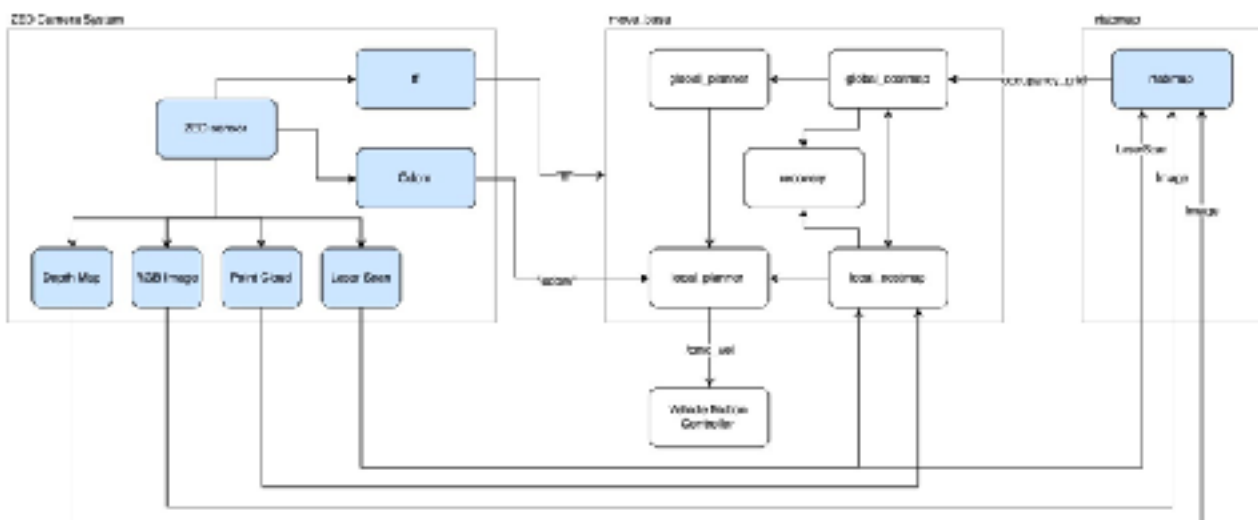


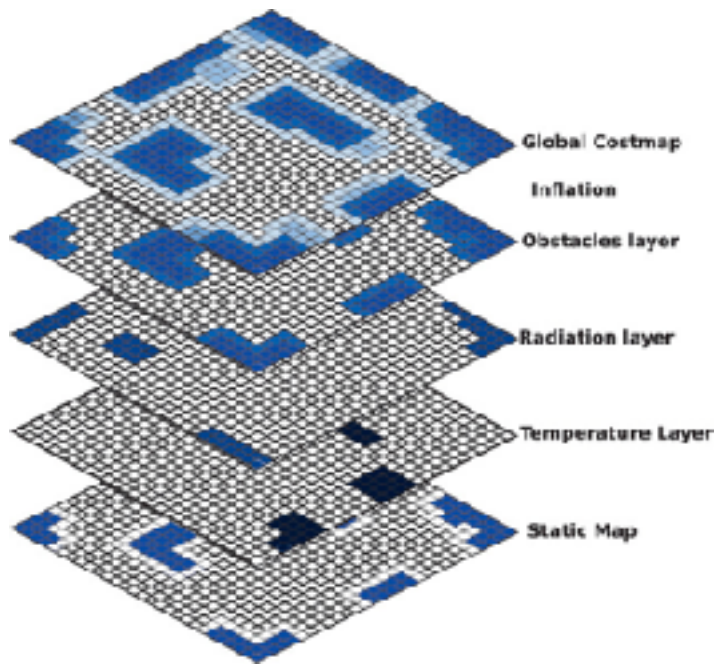
http://wiki.ros.org/move_base

I have used this package extensively while working on Autonomous Robots .

Navigation Stack

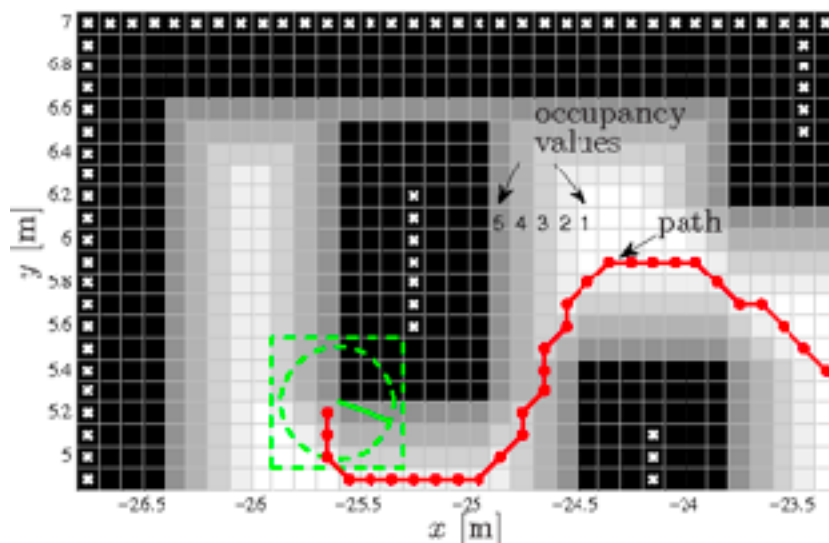
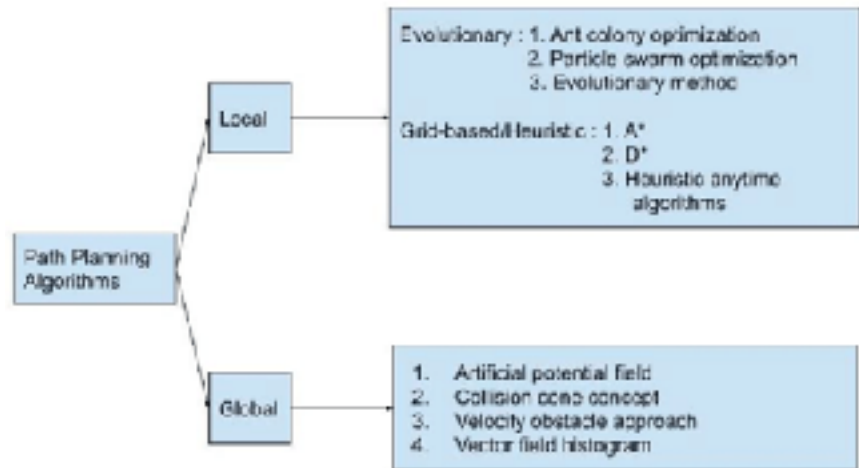
This figure illustrates the navigation stack of the self-driving car. This stack assumes that a global map of the environment has already been created using **rtab**. For more details about mapping, please visit the mapping section of the documentation.





Using onboard sensors, the robot makes multiple layers of maps like the following. Using the Odometry data and Mapping sensors like (Lidar, Depth camera, Ultrasonic sensors). This is used to make something called an **occupancy grid**.

Then use a **Path planning algorithm** like this to navigate around objects and obstacles.



Finally Robot interacting with HUMAN

For this we need a NLP system where the robot can interact with the human .

