AI(->ml->dl)----------

1)symbolic learning

-robotics

-computer vision/CNN(convolutional)

-image processing/object recon

statestical learning

-speech recon

-nlp

2)machine learining(data driven)

Arificial neural network(ANN)->Deep Learning

Recurrent neural network(RNN)->Rememberence capability

-according based on data availibity

1)Supervised(classification label data ,diff class)

2)Unsupervised(only having data with characteristics, diff clusters, non-label(only one label) data-clustering ex.identify roses characteristics, same class)

3)Reinforcement(optimal-shortest path,reward based learning)

=TASKS

mundane(nlp,daytoday,perception)

formal(games,mathematical tasks)

expert(Medical Diagonisis sys,scintific-business analysis,automated cars)

=Applications

-prediction/classification

-chatbots

-selfdriving cars

-eye doctor(diabitic retinopathy detection)

-ML(supervised/unsupervised/semisuper/reinforcement)----------

-object prespecified categories

=Applications

-face detection

obj-image patches

class-face/not-face

-character recog

obj-image patches

class-digits 0-9

-medical image proc

obj-pixels

class-different tissue types,storma,lument

SUPERVISED(Target variable available)

continuous data->Regression->Housing price prediction

categorical data->classification->Cat/dog classification

UNSUPERVISED(Target variable not avial)

clustering->similar characterstics->customer segmentation/good roses bad roses

Association->analysis of data,patterns available in that data->market bucket analysis

SEMI-SUPERVISED(Categorical Target variable)

Classificagion->TExt classificaiton

clustering->lane-finfing

REINFORCEMENT(catergorical:true/target:false)

Categorical->Classification->Optimized marketing

Target var not available->Control->Driverless cars

=Challenges in computer vision

//-Localiazation->where is object with bounding box

//-Object detection->multiple bounding box

-segmentation->finding what to see(Region of interest-ROI)

-Object representation->what things look like->(State,behaviour)

-visual learning->of what and how

-interface to cognition->reasoning about what is seen

DL----------

->complex artificial neural network,multistage approach

-----Difference(ML/DL)

-data dependency

-hardware dependency

-problem solving approach

-feature engineering

-Execution time

-Interpretability

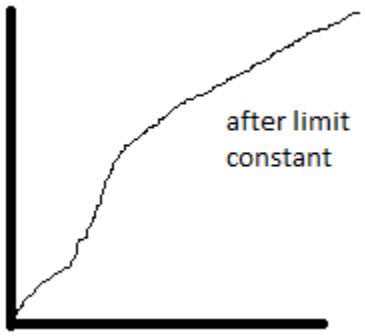
FEATURE ENGINEERING:

In ML: patches, will not take raw image,hand crafted features should be given,STEPS:feature extractor->trained classifier->output

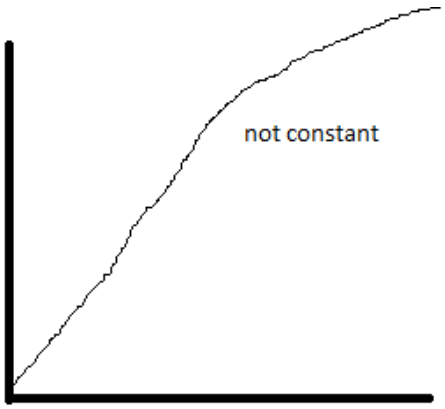
In DL:direct raw image,STEPS: Low level features->mid level->high level->classifier->OUTPUT

DATA DEPENDENCY:

-graph of data vs performance for ML



-graph of data vs performance for DL



reason: because of importing raw image so there features will be more

HARDWARE DEPENDENCY

in ML:higher CPU

in DL: higher GPU

PROBLEM SOLVING APPROACH

-->for Object detection

in ML: step 1)object detection. step 2) recognition Step 3)OUTPUT

in DL: Step 1)pass raw image. Step 2) OUTPUT(both bounding box and recognition)----------example:YOLO

EXECUTION TIME

steps: machine training data(obj,class,label) -> testing data(Testing data set)

In ML:training faster, execution time after training: slower

in DL: training slower, execution time after training: faster (because better trained model)

INTERPRETABILITY

in ML: White box approach (transparent process)

in DL: Black Box approach (not transparent)