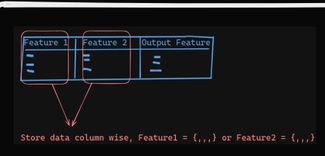
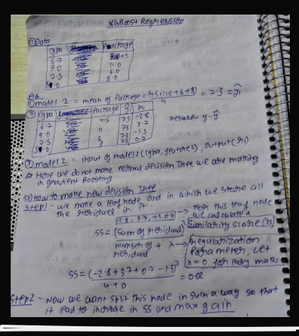
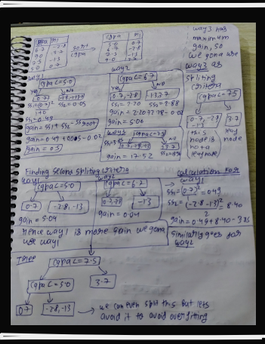
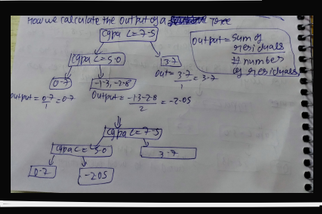
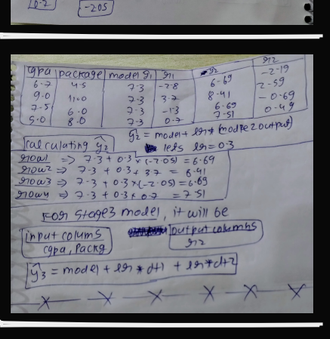
XGBoost
Extreme Gradient Boosting

- Introduction
  - video
  - Features
    - Performance
      - Regularized learning objective
        - have in build regualrization term in built
      - Handling missing values
      - Sparsity aware split finding
      - Tree pruning
      - Efficient split finding(weight quantile sketch + approximate tree learning)
    - speed
      - parallel processing
        - (Boosting is a sequential process) so how they implemented parallel processing in it??
        - Ans -> all models are trained sequentially but parallel processing is implemented while building a model
        - Example ->
        - 1 model is made using parallel processing, then 1 model mistakes pass on to another 2 model, then
        - 2 model is made using parallel processing,
        - same goes on
      - optimized data structure
        - other algos store data row wise
        - 

        - new data type used -> Column block
      - Cache awareness
      - out of core computing
        - For a data set which is bigger then your computer ram -> we need to divide the data set into chunks to implement ML algo on it -> this process is in build in XGboost we only need to adjust the hyper parameter
        - Hyper parameter
          - tree_method ='hist'
      - Distributed computing
      - Gpu support
        - Hyper parameter
          - tree_method ='gpu_hist'
    - Flexibility
      - cross platform (Now most of algo are also cross platform)
      - Support multiple programming languages
      - Integration with other libraries and tools
      - Support all kinds of ML problems
- Regression
  - 
  - 
  - 
  - 
- Classification
  - Theory
- MAths behind xgboost