ESTE CURSO ES PARTE DE UNA ESPECIALIZACION DE

"Aprendizaje automático avanzado"

1-Introduction to Deep Learning
2-How to Win a Data Science Competition: Learn from Top Kagglers
3-Bayesian Methods for Machine Learning
4-Practical Reinforcement Learning
5-Deep Learning in Computer Vision
6-Procesamiento de lenguajes naturales
7-Addressing Large Hadron Collider Challenges by Machine

2-How to Win a Data Science Competition: Learn from Top Kagglers

(SEMANA 1)

CONCEPTOS PRINCIPALES EN UNA COMPETENCIA

1-DATA
2-MODEL
3-SUBMISSION
4-EVALUATION
5-LEADERBOARD

4-EVALUATION FUNCTION
ACCURACY
LOGISTIC LOSS
AUC
RMSE
MAE

5.1 PUBLIC TEST USING DURING COMPETITION
5.2 PRIVATE TEST USED FOR FINAL RANK.

OTROS SITIOS DE COMPETENCIAS

KAGGLE
DRIVENDATA
CROWDANALITYX
CODALAB
DATASCIENCECHALLANGE.NET
SINGLE-COMPETITION SITIES (LIKE KDD, VIZDOOM)

OTRO CURSO IMPORTANTE
COMPETITIVE DATA SCIENCE - COURSERA

INGRESANDO A KAGGLE

COMO CREAR UNA CUENTA CARACTERISTICAS PRINCIPALES DEPENDE DE CADA CONCURSO

EJEMPLOS

COMO ESTÁ ORGANIZADO EL SITIO OPCIONES.
OVERVIEW, FORO, CODE ,ETC

ALGUNOS DATOS CLAVES
5 PERSONAS POR EQUIPO
NO SE PERMITEN DATOS EXTERNOS
ENTORNO KAGGLE COMO FUNCIONA
COMO COMPARTIR Y SUBIR UN ARCHIVO
DISPONIBILIDAD DE DATOS
TIEMPOS DE USOS.

INGRESANDO A KAGGLE

COMO CREAR UNA CUENTA CARACTERISTICAS PRINCIPALES DEPENDE DE CADA CONCURSO

REAL WORLD VS. COMPETITIONS

REAL WORLD

It's a complicated process included:

- Understanding of business problem
- Problem formalization
- Data collecting
- Data preprocessing
- Modelling
- Way to evaluate model in real life
- Way to deploy model

Aspect	Real Life	Competition
Problem formalization	Y	N
Choice of target metric	Y	N
Deployment issues	Y	N
Inference speed	Y	N
Data collecting	Y	N/Y
Model complexity	Y	N/Y
Target metric value	Y	Y

FAMILIES OF ML ALGORITH

LINEAR MODEL
EXAMPLES LOGISTIC REGRESSION / SUPPORT VECTOR MACHINE
TREE-BASED: DECISION TREE, RANDOM FOREST, GBDT
KNN
NEURONAL NETWORKS

HARDWARE / SOFTWARDE

Most of competitions (expect image-based) can be solved on:
- High-level laptop
- 16+ gb ram
- 4+ cores

Quite good setup:
- Tower PC
- 32+ gb ram
- 6+ cores

EQUIPO

RAM 64G O 128G
32 CORES
SSD

CLOUD RESOURCES

AMAZON AWS (*) / MICROSOFT AZURE /   GOOGLE CLOUD

LENGUAJES

PYTHON / R.

RESOURCES


Most of competitors use Python data science software stack.
NumPy
pandas
scikit learn
matplotlib


IP[y]:
IPython
jupyter


dmlc
XGBoost
Microsoft / LightGBM
Keras
danielfrg / tsne
forked from osdf/py_bh_tsne


VOWPAL WABBIT
srendle / libfm
guestwalk / libffm
baidu / fast_rgf

Conclusion

1. Numeric feature preprocessing is different for tree and non-tree models:
   a. Tree-based models doesn't depend on scaling
   b. Non-tree-based models hugely depend on scaling
2. Most often used preprocessings are:
   a. MinMaxScaler - to [0,1]
   b. StandardScaler - to mean==0, std==1
   c. Rank - sets spaces between sorted values to be equal
   d. np.log(1+x) and np.sqrt(1+x)

1. Scaling and Rank for numeric features:
    a. Tree-based models doesn't depend on them
    b. Non-tree-based models hugely depend on them
2. Most often used preprocessings are:
    a. MinMaxScaler - to [0,1]
    b. StandardScaler - to mean==0, std==1
    c. Rank - sets spaces between sorted values to be equal
    d. np.log(1+x) and np.sqrt(1+x)
3. Feature generation is powered by:
    a. Prior knowledge
    b. Exploratory data analysis

1. Values in ordinal features are sorted in some meaningful order
2. Label encoding maps categories to numbers
3. Frequency encoding maps categories to their frequencies
4. Label and Frequency encodings are often used for tree-based models
5. One-hot encoding is often used for non-tree-based models
6. Interactions of categorical features can help linear models and KNN

- Datetime
  a. Periodicity
  b. Time since row-independent/dependent event
  c. Difference between dates
- Coordinates
  a. Interesting places from train/test data or additional data
  b. Centers of clusters
  c. Aggregated statistics

Treating values which do not present in train data

1. The choice of method to fill NaN depends on the situation
2. Usual way to deal with missing values is to replace them with -999, mean or median
3. Missing values already can be replaced with something by organizers
4. Binary feature "isnull" can be beneficial
5. In general, avoid filling nans before feature generation
6. Xgboost can handle NaN

CONCLUSION **Bag of words**

Pipeline of applying BOW

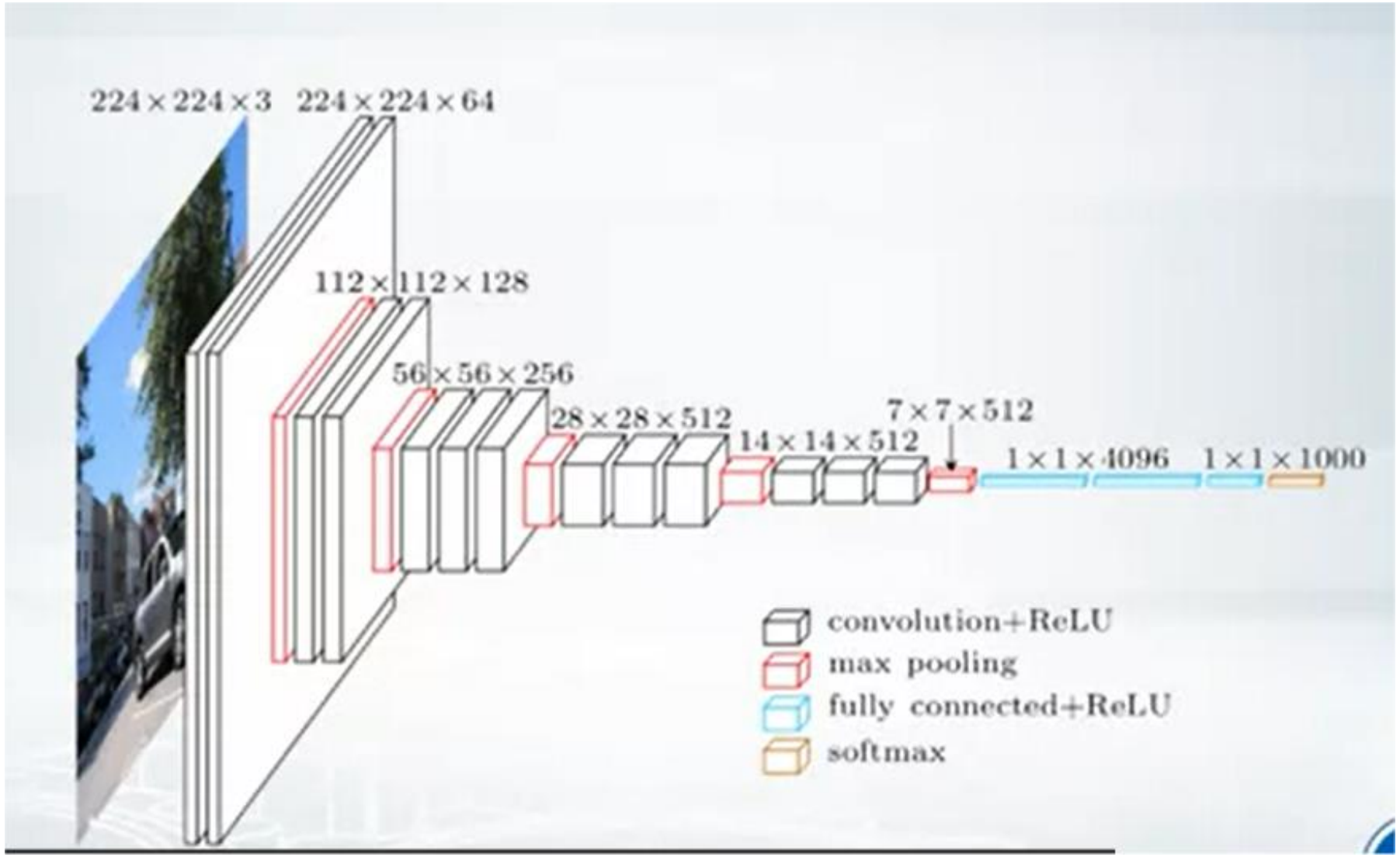
1. Preprocessing:

   Lowercase, stemming, lemmatization, stopwords

2. Ngrams can help to use local context
3. Postprocessing: TFiDF

CONCLUSION **Word2vec, CNN**

1. Bag of words
    a. Very large vectors
    b. Meaning of each value in vector is known
2. Word2vec
    a. Relatively small vectors
    b. Values in vector can be interpreted only in some cases
    c. The words with similar meaning often have similar embeddings


224 × 224 × 3
224 × 224 × 64
112 × 112 × 128
56 × 56 × 256
28 × 28 × 512
14 × 14 × 512
7 × 7 × 512
1 × 1 × 4096
1 × 1 × 1000
convolution+ReLU
max pooling
fully connected+ReLU
softmax

1. Texts

a. Preprocessing
   i. Lowercase, stemming, lemmarization, stopwords

b. Bag of words
   i. Huge vectors
   ii. Ngrams can help to use local context
   iii. TFiDF can be of use as postprocessing

c. Word2vec
   i. Relatively small vectors
   ii. Pretrained models

2. Images

a. Features can be extracted from different layers
b. Careful choosing of pretrained network can help
c. Finetuning allows to refine pretrained models
d. Data augmentation can improve the model

AL FINAL HAY UNA PARTICIIPACION A UNA COMPETENCIA EN KAGGLE
PERO PARA EL CURSO, PARECE INTERESANTE ES PARA APROBAR LA ESPECIALIZACIÓN