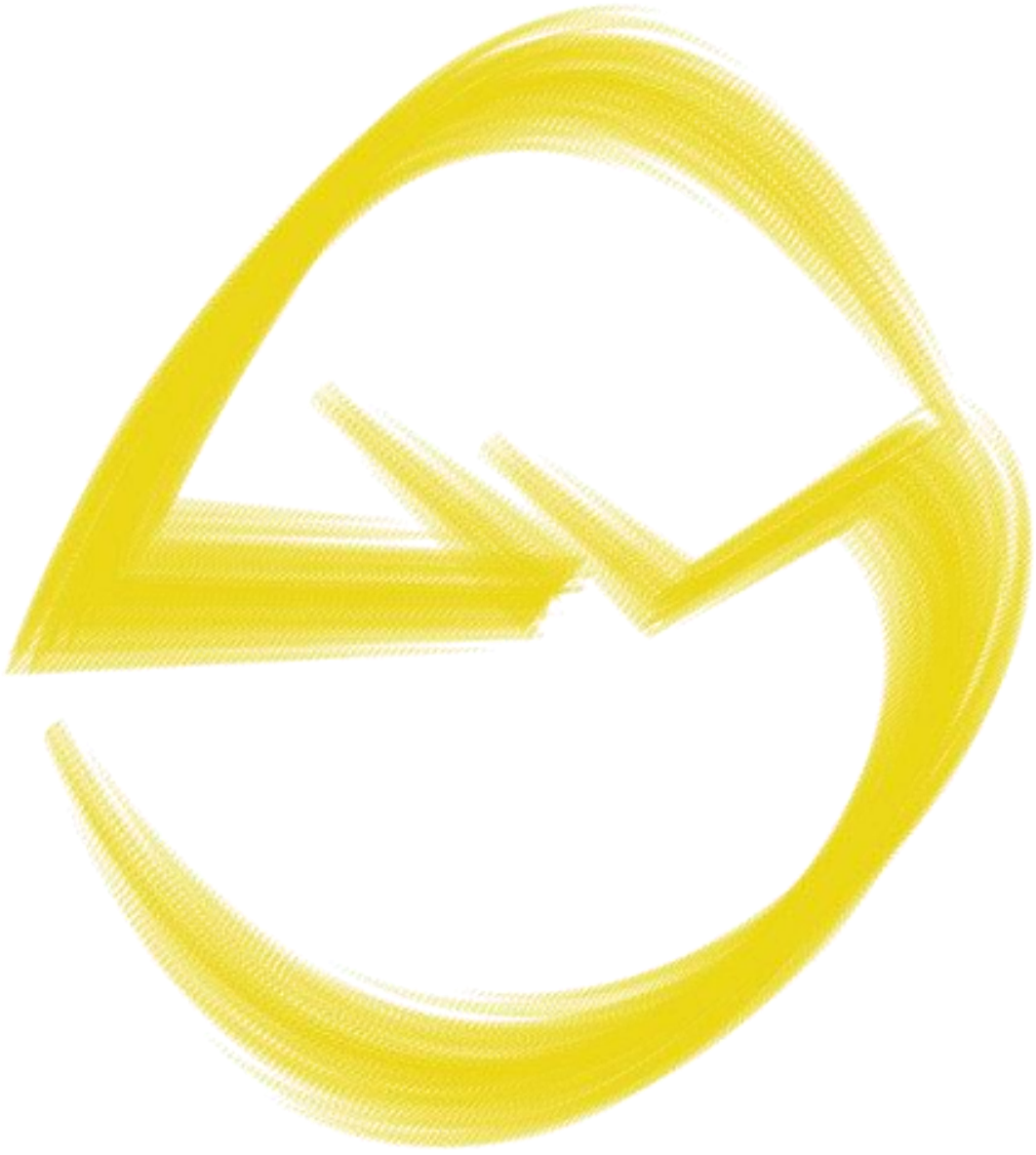


In the name of God



Tensorflow in Action

By

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In general in this course, we have covered the following topics.

Python

Variables, types, functions and their parameters, lambda expressions, modules, conditional expressions, different kinds of loops, enumerate, operators, indexing, dealing with different data types, list and some of its methods, tuples, dictionaries and the corresponding methods, different kinds of strings, sets and set operators, args and key word args, default arguments, zip, mathematical operators, use of underscore in integers, generators, file operations, classes, methods, static methods, inheritance, explaining os, importing concepts, dealing with path and directories with os, accessing attributes with different methods, accessing source code and documentation with different methods, callable instances, dealing with pip, list comprehension and related concepts, dealing with time, dealing with different attributes of the functions, debugging solutions, is and isinstance, json, csv, sav and other data formats, dealing with utf8 encoding, data cleaning, iterators and iterables, shutil, scandir.

Numpy

Numpy arrays, fancy indexing, shape interpretation, type interpretation, complex indexing, dummy dimension, partitioning dataset, reshaping, gathering data statistics, clipping, different methods of random, concatenation, logical operations, permutation, arrays for NLP tasks, expanding dimension, explaining apply_along_axis, and other concepts.

Pandas

Dataframe, plotting dataframes, different methods of dataframes, dealing with csv files, mapping for dataframes, Series, getting dummies, sampling, index resetting, changing type, changing columns, filling NAs, converting to Numpy.

Matplotlib and Seaborn

Showing images, plotting charts, figure, subplot, grid, ticks, subplots, adjusting subplots, setting text, bar chart, simple charts, accessing axes, inline and other specifications, heatmap.

Sklearn

Splitting the dataset with model selection, preprocessing for standard scalar, data shuffling, confusion matrix.

Test

Assertion, pdb library, setting trace, pdb commands for debugging.

Deep learning basic ideas

Normalization and standardization, cost function, well-condition, truncated weights, conv layers, the concept of a neuron, linearity and non-linearity, weights and intercept terms, visual interpretation of learning for regression and classification, dense connections and MLPs, dealing with weights and activations, dealing with the shape of the weights in the layers, explaining the customary jargons utilized in deep learning such as hyperparameter and more, batch normalization, layer normalization, weight initialization logics and methods, the interpretation of the cost function, methods of learning, concept of optimizer, interpretation of the metrics used in deep learning, approaches to feed data, the idea of shuffling, the concept of threshold, discrimination between fitting and learning, overfitting, generalization and data splits, regularization methods, jargons for conv layers, the idea of using conv layers, interpretation of the different learning plots, interpretation of the evolved activations, sequence data, word analogy, word similarity, tokenization, transformer, LSTM, GRU, Bidirectional, embedding, contextual word embeddings, self-attention, BERT, different sequence data.

Tensorflow

Sequential API, functional API, subclassing API, flatten, dense, interpretation of different parameters of the available layers, different attributes of the layers and models, compile, fit, optimizers, metrics, losses, variables and constants, different callbacks, dealing with Keras backend, dealing with different activations, summary interpretations, one hot vs sparse, elaborating prediction and evaluation, dealing with different kinds of convolutions, different kinds of pooling layers, dealing with different data formats, using different methods for initialization, dealing with input shapes and weight creation concept, shape interpretation of different layers, explaining different kind of parameters, freezing parameters, transfer learning, the concept of keeping dimension, dealing with structured and unstructured datasets, dealing with different layer regularizer methods, specifying customized metrics in Tensorflow, using Keras utils and its methods, preparing random data, squeezing, creating general purpose methods for training and plotting, specifying different topologies for deep learning models, specifying different types of model creation, extending the Callback class from scratch and explaining the available methods, implementing multiple callbacks for distinct purposes, using available callbacks such as CSVLogger, LambdaCallback, LearningRateScheduler, EarlyStopping and more, using different kinds of checkpoints to store models, saving models and their parameters with different combinations, the concept of concatenation, data shuffling, using built-in methods to deal with image, text and other datasets, different methods of plotting the models, retrieving layers and their attributes, freezing specific items, combining different models, using intermediate activation for plotting and making new ways for new models, nested plotting and summarizing, upsampling, implementing autoencoder network, generating new samples with a decoder network, implementing networks with different input sizes, dealing with the input layer and its parameters, Implementing models with inputs of different types, implementing models with different output types, specifying weight for losses, mixed cost functions, applying linear and non-linear transformations to the datasets, reshaping layer, finding top-k, different methods for tensor creation, transposing method, where method, different methods for multiplication, methods in tf.math, clarifying tf.Variable, setting and getting values for variables, tiling, broadcasting, dropout and its specification, implementing schedulers for learning rate, dealing with devices to train on CPU and GPU, creating appropriate vocabularies for NLP tasks, general challenges for NLP tasks, text

processing, padding, truncating, customizing text, masking, the embedding layer and its related concepts, conv layers for text datasets, Tensorboard for plotting, Tensorboard for projecting the embeddings, Tensorboard for finding word similarity, tokenization, different recurrent layers, dealing with different output types of the recurrent layers, stateful recurrent layers, spatial padding, image data for LSTM, text data for LSTM, stacked RNNs, loading ready-to-use networks such as Mobilenet and BERT, casting, Keras data augmentation and data preprocessing, Tensorflow data pipeline, tf.data, mapping and filtering data, shuffling, repeating, batching, caching in data pipeline, getting and using model config, using tensorflow_hub, using tensorflow_text, tf.nn, dealing with states of the recurrent layers, dealing with the shapes of the inputs and outputs of the layers such as recurrent ones, Keras data generators, cyclic generators, loading data from files, element specification for Tensorflow datasets, Dataset.zip, numpy_iterator, text line dataset, implementing optimizers from scratch, implementing cost functions with regularization, implementing cyclic generators, Tensorflow datasets and its methods, exploring experimental sections of Tensorflow, customizing data pipelines, model and layer subclassing and the challenges, gradient tape, the concept of the build method, customizing training loop, interpreting built-in cost functions, finding gradient, applying gradient, instantiating and using metrics, tf.function, referring to autograph and some graph concepts, implementing the Transformer network from scratch, implementing a small ResNet and its main concepts.

Datasets

Cifar10, Cifar100, MNIST, FashionMNIST, Boston Housing, Iris dataset, GTSRB, IMDB, Reuters, tensorflow_datasets.

IDEs

Jupyter notebook, Google Colab, VS Code.