Detecting Concept drift

BCs project

Janusz Wilczek

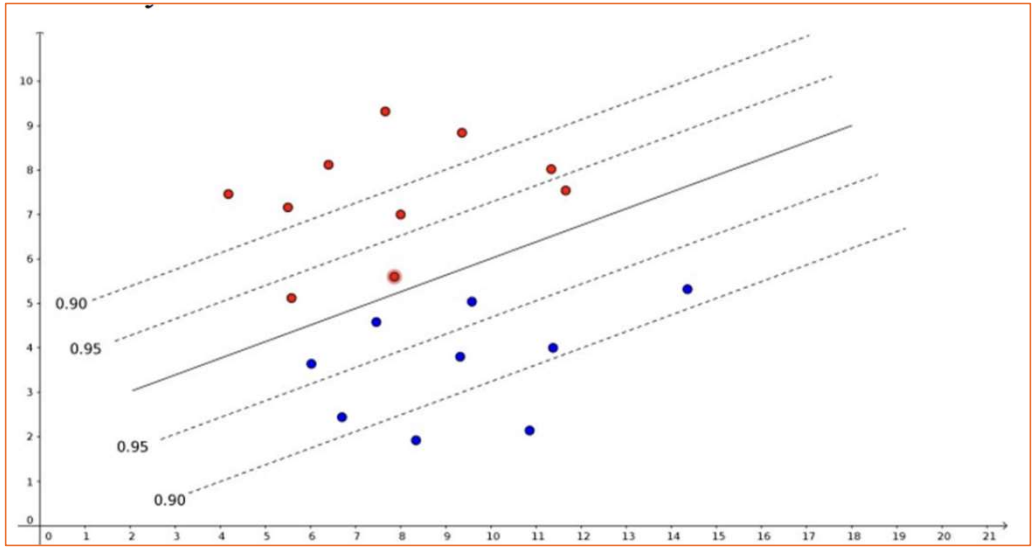
Supervisors:

Pınar Tözün and Robert Bayer

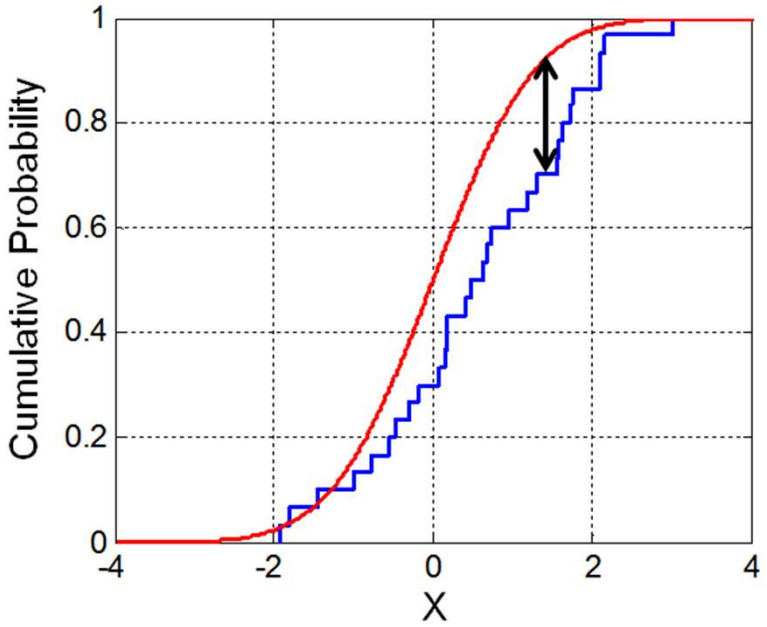
Concept drift

Detection methods

DDAL



Incremental Kolmogorov - Smirnov



Experiments

- Mnist and CIFAR
- Rotation and withhold class
- Abrupt and gradual drift

Finetuning DDAL

	dataset	experiment_setup	drift started at	drift detected	average_drift	drift_distance
7486	mnist	clean_test	NaN	[]	999.0	NaN
7487	mnist	clean_test	NaN	[]	999.0	NaN
7488	mnist	clean_test	NaN	[]	999.0	NaN
7489	mnist	clean_test	NaN	[]	999.0	NaN
7491	mnist	clean_test	NaN	[]	999.0	NaN

	dataset	experiment_setup	lambda	theta	batch_size	drift started at	drift detected
201	cifar	clean_test	0.850	0.750	288	NaN	[5, 13, 20, 28]
203	cifar	clean_test	0.850	0.750	320	NaN	[5, 12, 19, 26]
211	cifar	clean_test	0.850	0.775	288	NaN	[5, 13, 20, 28]
213	cifar	clean_test	0.850	0.775	320	NaN	[5, 12, 19, 26]
228	cifar	clean_test	0.850	0.800	288	NaN	[5, 13, 21, 28]
230	cifar	clean_test	0.850	0.800	320	NaN	[5, 12, 19, 26]
240	cifar	clean_test	0.925	0.925	320	NaN	[4, 11, 18, 25]
248	cifar	clean_test	0.925	0.950	288	NaN	[4, 12, 20, 28]
250	cifar	clean_test	0.925	0.950	320	NaN	[4, 11, 18, 25]
260	cifar	clean_test	0.925	0.975	320	NaN	[4, 11, 18, 25]
270	cifar	clean_test	0.925	0.900	320	NaN	[4, 11, 18, 25]
278	cifar	clean_test	0.950	0.925	288	NaN	[4, 12, 20, 27]
280	cifar	clean_test	0.950	0.925	320	NaN	[4, 11, 18, 25]

Baseline – only CNN model

Max CPU %	MAX Memory %	Avg CPU %	Avg MEM %	Time [s]
574	5.90	93.70	4.50	312

DDAL

Max CPU %	MAX Memory %	Avg CPU %	Avg MEM %	Time [s]
550	5.3	70	4.36	312

Results

#	Dataset	Drift Case	Drift Started At	Drift Detected
0	cifar	abrupt_w-0	31.0	[3, 16, 28, 44, 61]
1	cifar	gradual_w-0	35.0	[3]
2	cifar	rotate_abrupt	31.0	[3, 16, 29, 39, 49, 59]
3	cifar	rotate_gradual	35.0	[3, 15, 27, 41, 51, 59]
4	mnist	abrupt_w-0	156.0	[140]
5	mnist	clean_test	NaN	[149]
6	mnist	gradual_w-0	160.0	[]
7	mnist	rotate_abrupt	156.0	[118]
8	mnist	rotate_gradual	160.0	[]

Conclusions