Course: INF8808
Summer 2022

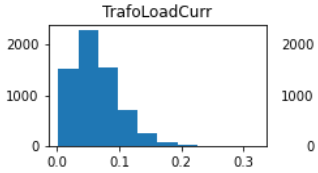
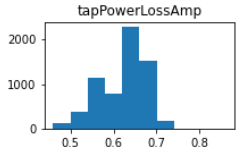
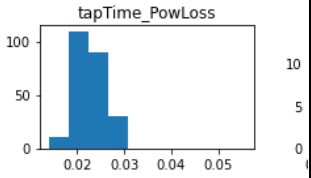
HITACHI ENERGY PROJECT

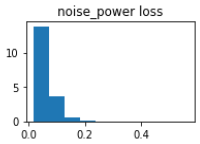
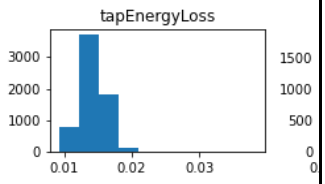
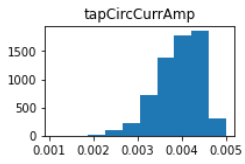
Dataset Description

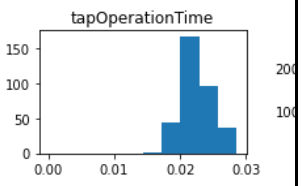
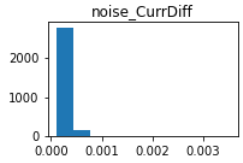
The dataset of interest is transmitted by the client, Hitachi Energy Research. It consists of equipment performance indicators from the on-load tap changer of a high voltage power grid transformer, summarizing more than six thousand operations over the years 2015 to 2020. The dataset is in a CSV format, accessible through a shared link by the client.

The following table summarizes different variables of the dataset in terms of typical values and type, and a short description for each variable is presented.

Variable	Description	Typical range (Unit)	Type
fileNr	Arbitrary number, stand in for count of tap change operations	[0, 4868]	Ordinal
Date	Date of file, When the tap was changed.	[2015-05-18, 2020-10-06]	Date (YYYYMMDD)
Time	Time of file, When the tap was changed.	[1:0:0 , 12:59:59][AM:PM]	Time (hh:mm:ss)
tapBefore	The tap setting before the tap change	[4, 11]	Nominal
tapAfter	The tap setting after the tap change	[4, 11]	Nominal

Variable	Description	Typical range (Unit)	Type
TraoLoadCurr	Load on the transformer, measured through high voltage side	[0, 0.32] (KA) Mean: 0.06 	Numerical (continuous)
tapPowerLossAmp	How much of the circulating current is lost as heat?	[0.45, 0.86] Mean: 0.62 	Numerical (continuous)
tapTime_PowLoss	Tap Change Operation Time	[0.01, 0.05] Mean: 0.02 	Numerical (continuous)

Variable	Description	Typical range (Unit)	Type
noise_power loss	Noise in power loss: Measure the uncertainty in power loss estimate	[0.01, 0.56] Mean: 0.06 	Numerical (continuous)
tapEnergyLoss	Energy Loss Quantity = Power loss * Taptime	[0, 0.04] (KJ) Mean: 0.014 	Numerical (continuous)
tapCircCurrAmp	Current that the tap changer withstands during tap time	[0.001, 0.005] (KA) Mean: 0.004 	Numerical (continuous)

tapOperationTime	Commutation time estimated from current	[0.00, 0.028] Mean: 0.02 	Numerical (continuous)
noise_CurrDiff	Noise in current differential	[0.00, 0.0035]	Numerical (continuous)
Variable	**Description**	**Typical range (Unit)**	**Type**
		Mean: 0.0003 	
TapSteps	tapBefore - tapAfter	+1 or -1	Boolean

Graphic Description

Tap switching pattern visualization:

This visualization shows the tap changes for the past 7 days (with a selector we can change it to 14 days, 21 days and 30 days). Each time a tap change (e.g.: 9 to 10 or 9 to 8) we display it.

At first we wanted to display it hours by hours, however our dataset doesn't include such datas and some days are missing datas. Therefore, we decided to display it day by day.

E.g.: for Oct 1st, the tap was in positions 8, 9 and 10 during the day, however we can't say when those changes occurred.