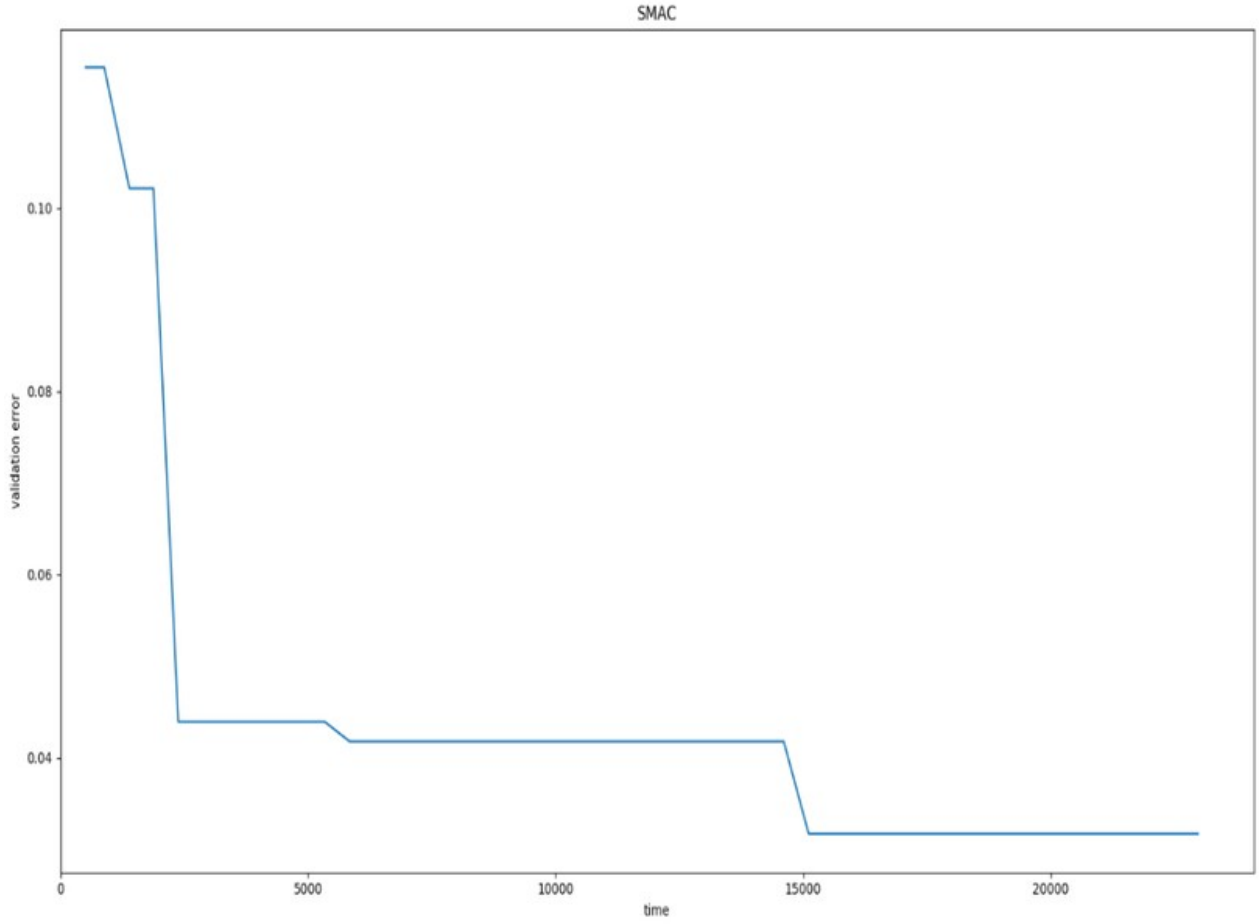
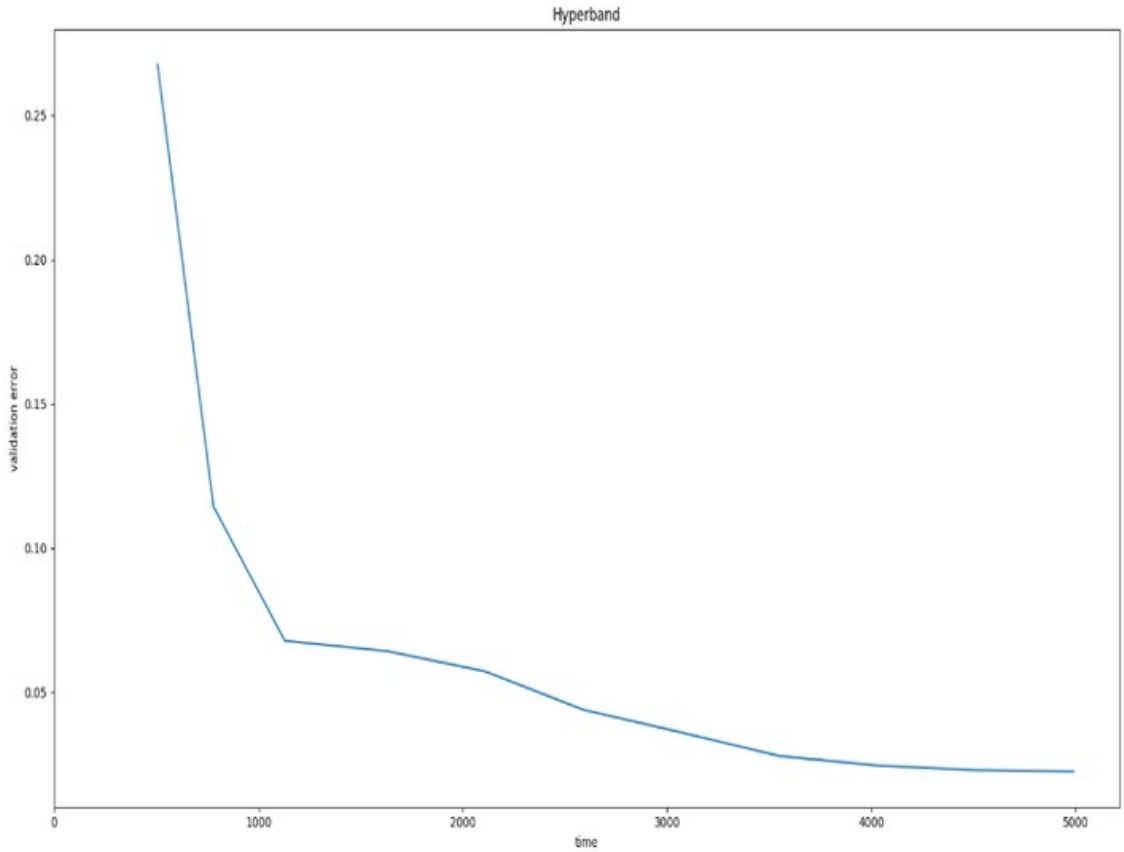
Usman Ahmed
Deep Learning Lab
Exercise-6 Report

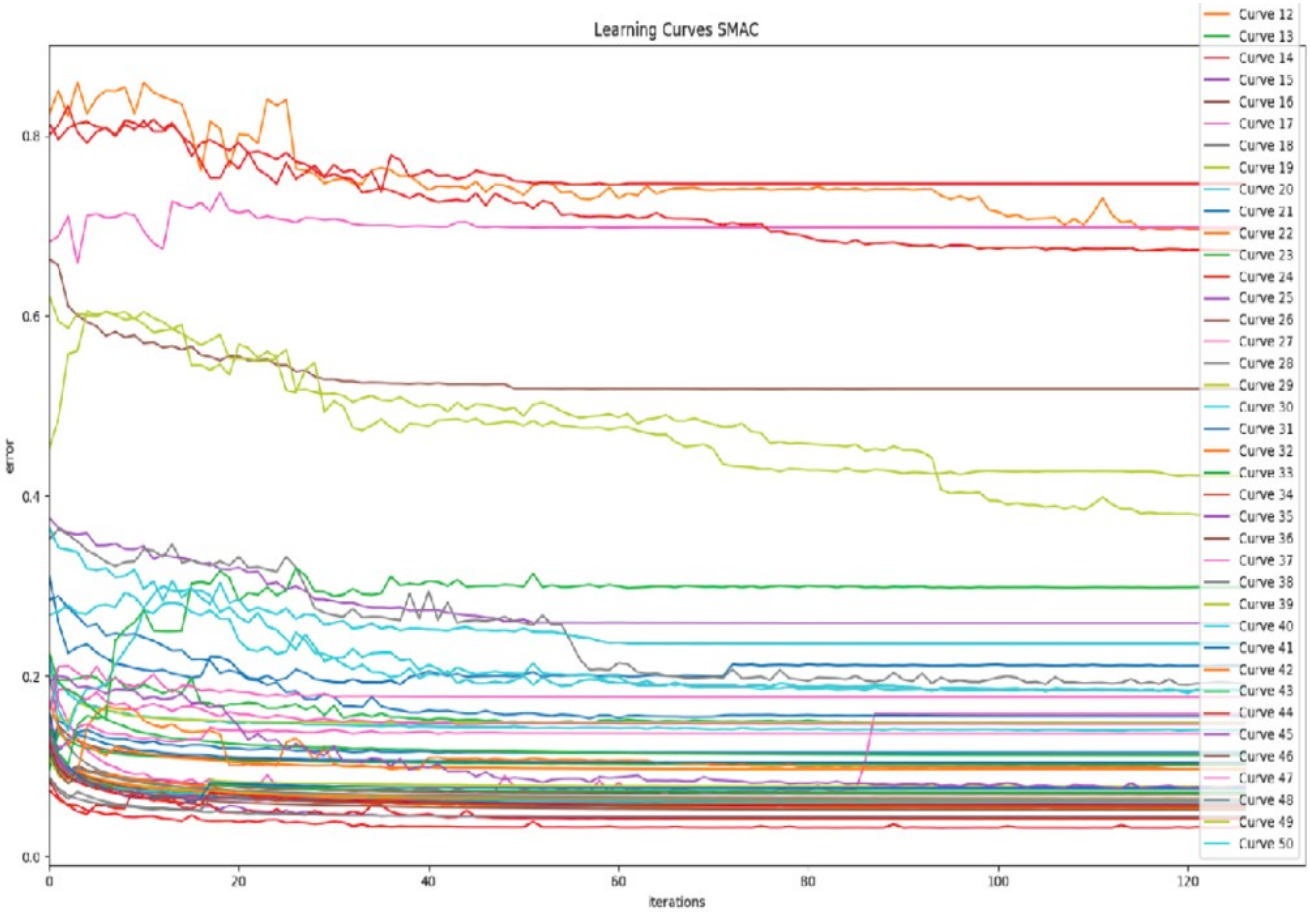
This was an interesting exercise where the goal was to optimize hyperparameters in a configuration space. This exercise is is the second part of the previous exercise. The configuration space was provided in the exercise. The configuration space was created using python ConfigSpace package. Surrogates were also provided along with the exercise. Most of the code for this exercise was also provided.
The hyperparameters were optimized using SMAC and Hyperband. The following plots contain validation error of both against wall clock time.

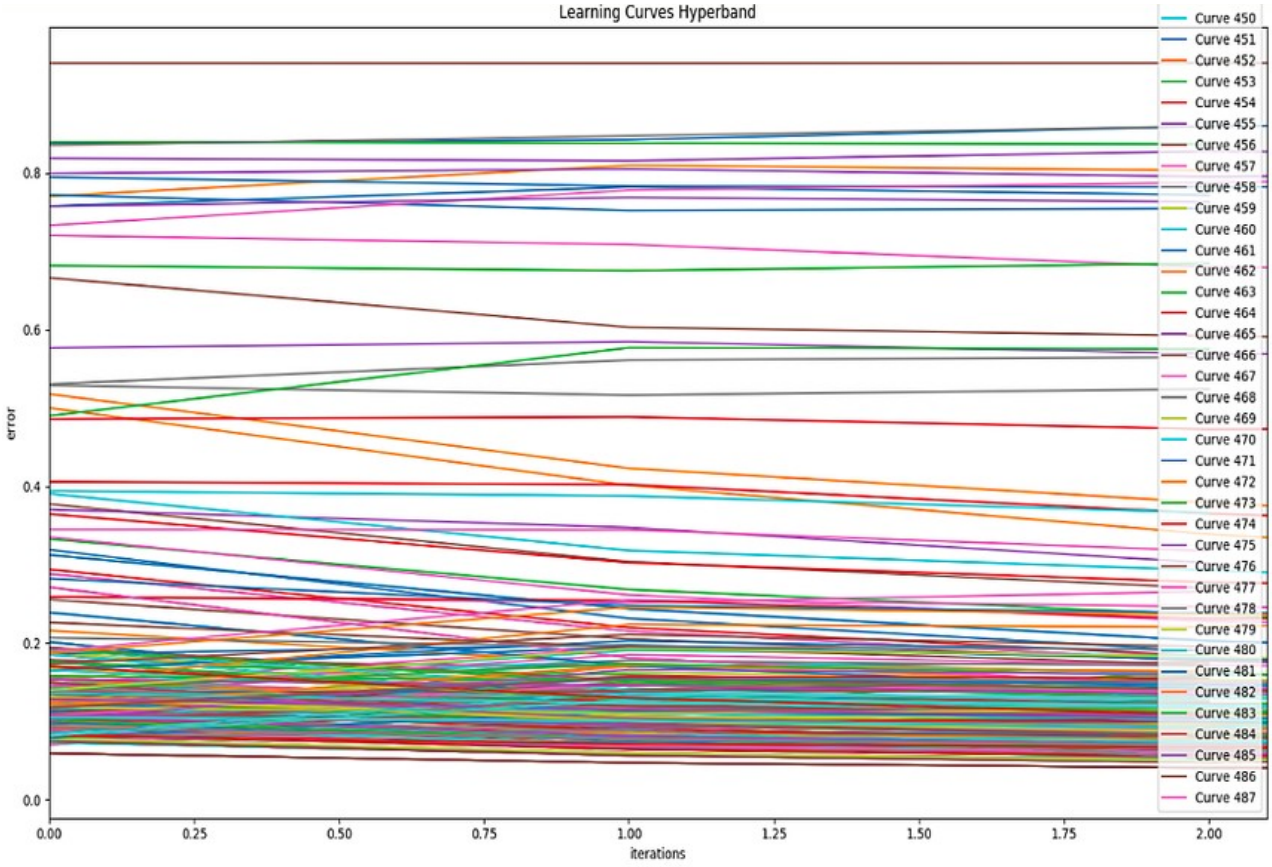




These plots show that Hyperband takes less amount of time as compared to SMAC to get to to lowest value of error. This happens because hyperband takes into account that if the hyperparameter configuration is best after a large number of iterations it is more likely than not to perform in the top half of configurations after a small number of iterations. That is, even if performance after a small number of iterations is very unrepresentative of the configurations absolute performance, its relative performance compared with many alternatives trained with the same number of iterations is roughly maintained.

Following are the learning curves of SMAC and Hyperband.





It is noticeable that Hyperband has much more learning curves as compared to SMAC. It can also be seen that next curve starts at lower value of error for both, hyperband and SMAC.