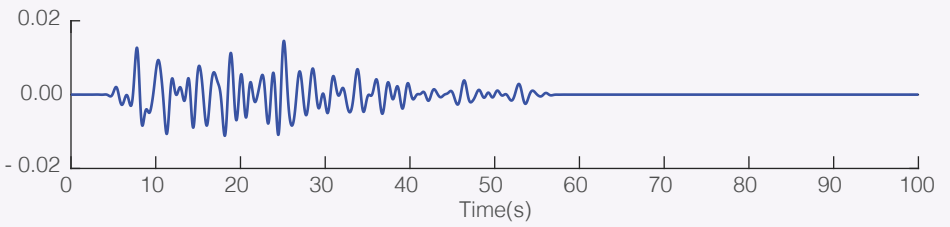
Pick a station → Retrieve all training data and test data → Compute signal characteristics



- PGV
- PGA
- Env
- SA_1

Use synthetics for training porcess and observation in the cost function

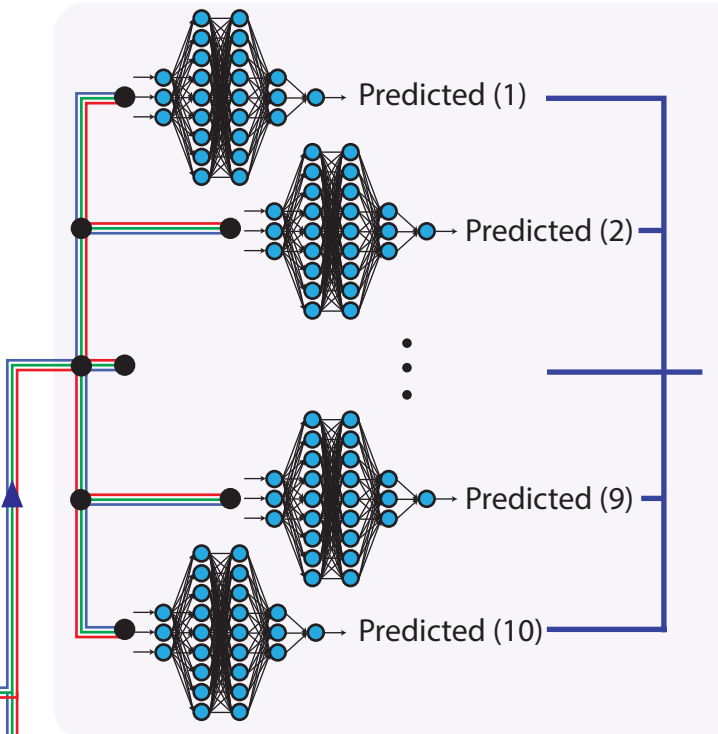
Initial Population Preprocessing

α_1 β_1 c_1
α_2 β_2 c_2
α_3 β_3 c_3
⋮

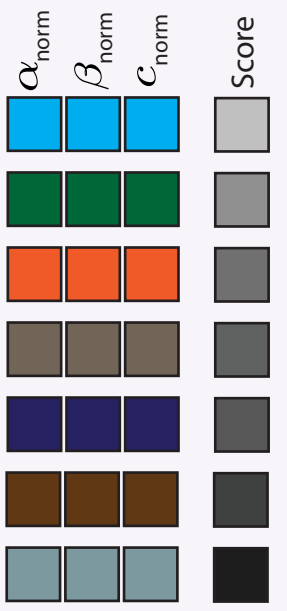
$$X_{norm} = \frac{2 * (X - X_{min})}{(X_{max} - X_{min})} - 1$$

α_{norm} β_{norm} c_{norm}

Predict the value for set of Prameters Subtract from Observaition



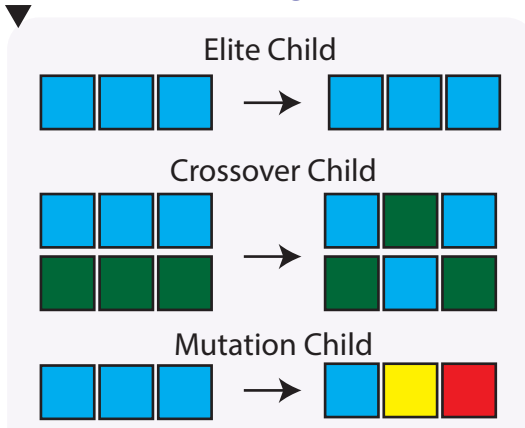
Sort the population based on score



Control the termination criteria

- Max number of iteration
- Alghorithm reach the fitness limit.
- Alghorithm can not improve the results in specific amount of iteration.

Generate the next generation



No

Yes

Terminate the iteration
Report the parameters

Estimate the mean value of the Q values for observation and find the closest data in the training set

Repeat the process with substituiting the observation with the test data and compute the dominant/effective shear wave velocity range

Extract the related Q values for dominant effective Vs from results of observation optimization

Add those data into final dataset

Go to the next station