

# Catch Up 1<sup>st</sup> July

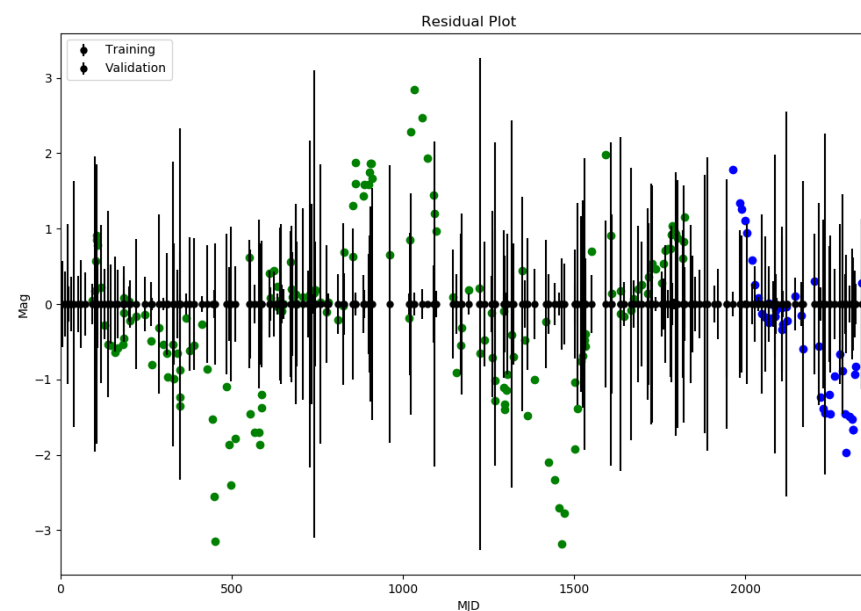
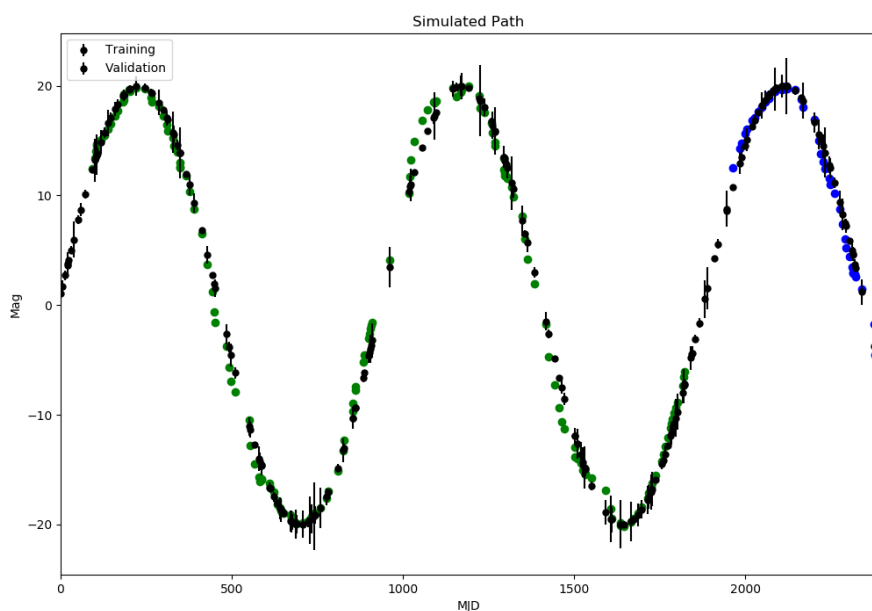
Topic: The performance of LSTM on a dataset of sinusoidally varying time series

# 200 Data Points per Cycle

Model: Attention LSTM (look back = 10 steps)

Iterations: 2000 until convergence

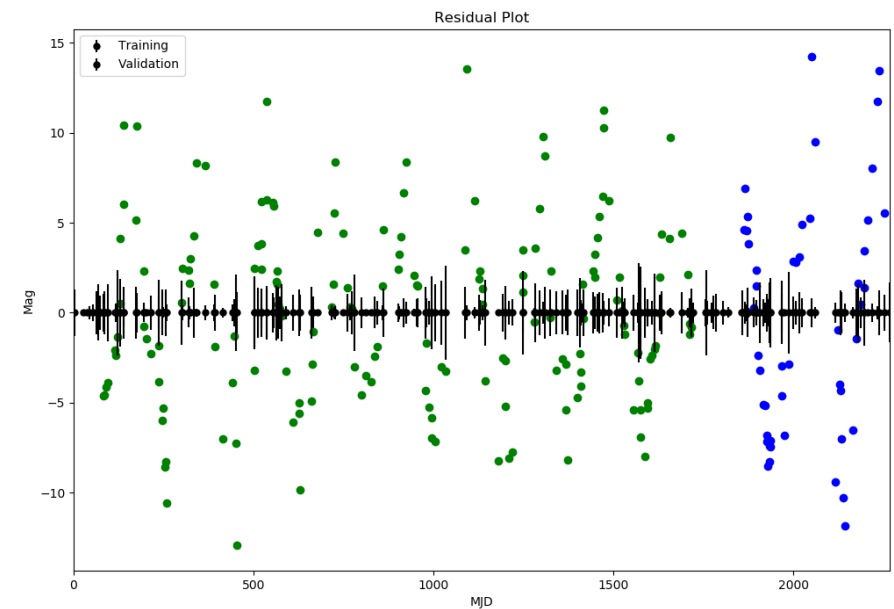
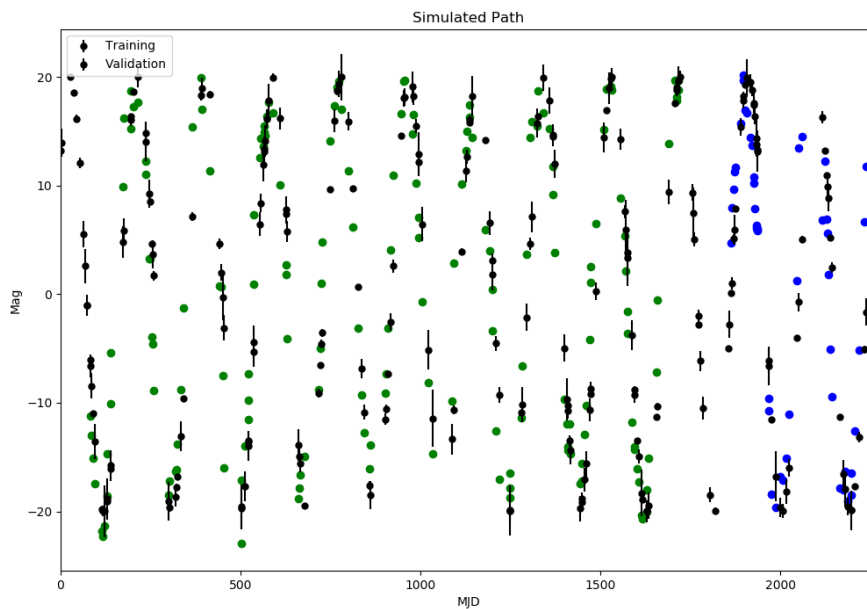
Average loss:  $0.73\sigma$



# 30 Data Points per Cycle

Average loss:  $5.11 \sigma$

In case that the periodic variation of the time series is higher than the Nyquist frequency (half of the sampling frequency), the original signal cannot be reconstructed from sampling. The sampling frequency of CSS and MLS telescope varies, but generally 2-10 days per set of 4 consecutive observations.



## Next Step

- Can we get better data: In Catalina sky survey, we have well-sampled lightcurve for several **Cepheids** and **RR Lyraes** (but only a few for demo purposed). Better QSOs datasets that we can work with?
- What types of models to implement in addition to GP, CARMA, Vanilla & Attention LSMT: VAE LSTM + new time series models being developed this year, any other ideas?
- Review and clean up the code: My coding skills is much improved compared to last year, thank to a project-based course and practical.