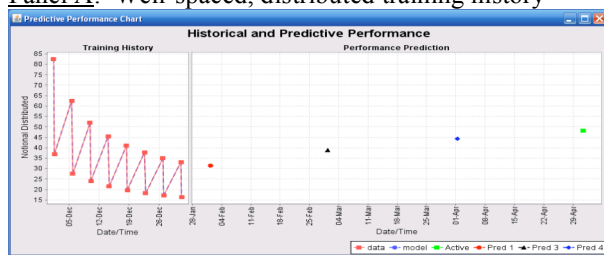




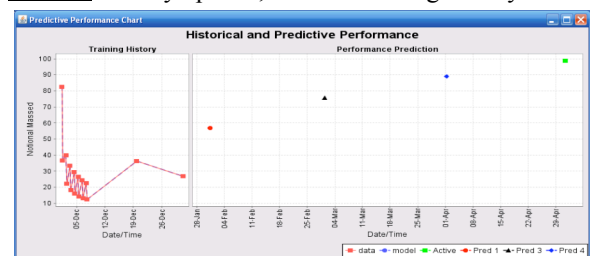
In Figure 1.1 above, PPO tracks the performance of a team of F-16 fighter pilots flying simulators at the Air Force Research Laboratory over the course of a week. They return three months later to complete three additional training events. PPO accurately predicted future performance of these pilots very well, achieving a correlation of 0.98 to human data ( $RMSD = 0.009$ ).

Of critical importance, PPO's underlying mathematical representation of human memory captures the *spacing effect*. This phenomenon reveals that practice occurring more slowly over time becomes more durable, and therefore more stable – thus, thoughtful consideration of initial spacing of training produces less decay at future times (see Figure 1.2).

**Panel A:** Well-spaced, distributed training history



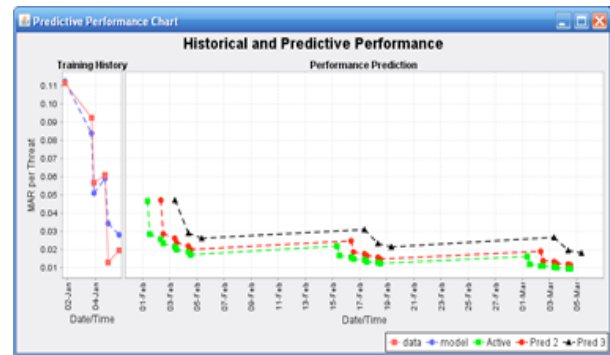
**Panel B:** Poorly-spaced, massed training history



**Figure 1.2.** Retention implications for massed and distributed training at 1, 2, 3, and 4 month lags.

The accurate ability to capture the spacing effect leads to PPO's third major functionality – the capability to *prescribe* training regimens. PPO extrapolates from the learning signatures using known historical data to schedule the timing and frequency of future training events on the basis of maximizing performance around user-specified training goals. PPO then automatically generates graphical depictions of future performance to allow the user to assess and compare performance implications of training plans, and provides the user with optimal training prescriptions associated with training goals (see Figure 1.3).

We assert that PPO may also be used to help instructors and trainers answer relevant questions regarding trainee readiness. For example, in the case of a warfighter being deployed in one month, this tool allows a training manager to assess how much training that individual must receive to perform at a specified level of effectiveness, and additionally helps determine whether or not deployment timetables are feasible.



**Figure 1.3.** PPO allows users to compare performance implications across various training regimens.

## 2. Summary

In conclusion, PPO is a new technology option based on state-of-the-art applied cognitive science developed to aid instructors and trainees with performance predictions and optimization of future training prescriptions around specified goals.

## 3. References

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## Author Biographies

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