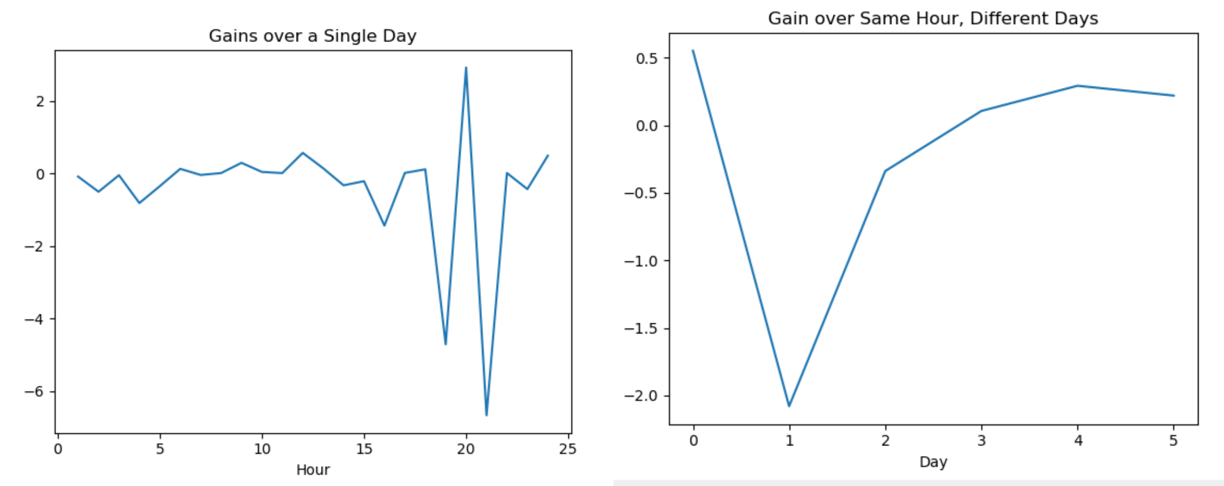
1 Ongoing Discussions

Originally, the relationship

$$\texttt{B:IMINER} = \gamma \ [\texttt{B\_VIMIN} - \texttt{B:VIMIN}], \tag{1}$$

where $\gamma \in \mathbb{R}$ is some fixed constant (the "gain"). With that in mind, we experimented with a one-hour dataset and found $\gamma \approx 0.055$. Then, we tested 24 one-hour datasets over a single day and six one-hour data sets over multiple days. We obtained conflicting, oscillatory results; a plot of the two are shown in Figure 1

Figure 1: Hourly-binned Gain Plots for Function (1)



(a) Same Day

(b) Multiple Days, Same Hour

After discussions with Bill Pellico, who controls this part of the process, we found the following. First, let $\vec{p}_t$ refer to independent parameters that are set and $\vec{q}_t$ refer to the parameters that are observations at time t. The settings `B_VIMIN` and `B_VIMAX` are stored in $\vec{p}$, and likewise `B:VIMIN` and `B:VIMAX` are stored in $\vec{q}$. The multipler γ in (1) is dependent on the events in the Time Line Generator (TLG). In particular, at time t, γ is dependent on the instantaneous cost at some time t:

$$C_t^0(\vec{p}_t, \vec{q}_t) = \texttt{B\_VIMIN}_t - \texttt{B:VIMIN}_t, \tag{2}$$

and a longer-term cost:

$$C_t^1(\vec{p}_t, \vec{p}_{t-1}, \ldots, \vec{p}_{t-T}, \vec{q}_t, \vec{q}_{t-1}, \ldots, \vec{q}_{t-T}) = \sum_{\tau=t}^{t-T} \left[\frac{\texttt{B\_VIMIN}_\tau - \texttt{B:VIMIN}_\tau}{2} + \frac{\texttt{B\_VIMAX}_\tau - \texttt{B:VIMAX}_\tau}{2} \right] \tag{3}$$

i.e.

$$\gamma \equiv \gamma_t^T(\vec{p}_t, \vec{p}_{t-1}, \ldots, \vec{p}_{t-T}, \vec{q}_t, \vec{q}_{t-1}, \ldots, \vec{q}_{t-T}),$$

where the dependence of the parameters is some function of the instantaneous cost (2) and a long-term cost 3. Can we learn this relationship using neural networks? Currently, the T in (3) is unknown, but Bill could check the code for it. Once it is known, we can perhaps learn the relationship between the costs and `B:IMINER` by learning γ as a function of the parameters (both the settings and the observations over time).