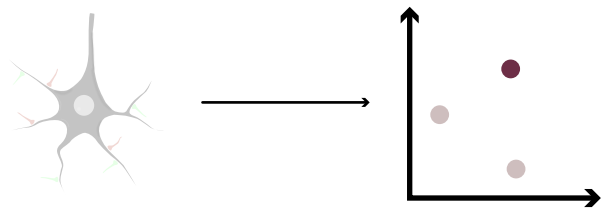


$$[R_B^t]_i = \begin{cases} -1 & \max(\vec{x}_i) = 1 \\ 0 & \text{else} \end{cases}, \quad [R_V^t]_i = -\|\vec{v}_i^t\|^2, \quad [R_A^t]_i = -\|\Delta \vec{v}_i^t\|^2$$

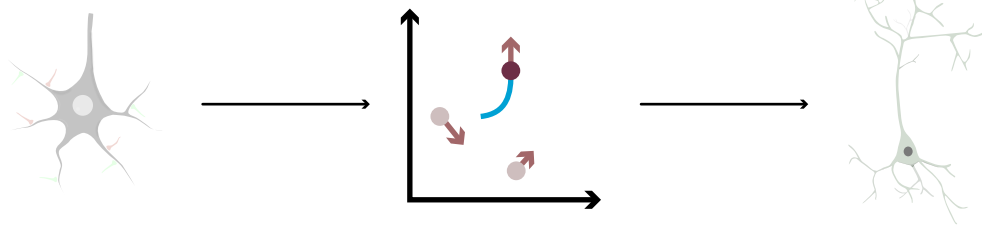
$$[R_D^{t+1}]_i = \delta_i^{t+1} - \delta_i^t, \quad \delta_i^t = \sum_{k=1}^{n_m} \sum_{j=1 \neq i}^{n_c} (D_{ij}^{(k)} - D_{ij}^t)^2$$

$$R^t = R_D^t + R_B^t + R_V^t + R_A^t$$

Multimodal Integration



Development and Disease Trajectory Reconstruction



Perturbation Analysis and Feature Prioritization

