

Particle
angle : float cellRange : int k_neighbors : NoneType, list x : float y : float

Perceptron
lambda_reg : float weights : list
forward(input_vec: ArrayLike) update_weights(input_vec: ArrayLike, error: float, learning_rate: float)

PerceptronModel
learning_mode : dict learning_rate : int modes : dict particles : list perceptron
compute_error(particle: Particle, neighbors: list[Particle], input_vec: list) get_prediction(input_vec: list) get_target(neighbors: list[Particle]) learn() neighbors_to_input_vec(neighbors: list[Particle], distances: list[float]) update()

VicsekModel
modes : dict
get_new_particle_vicsek(particle: Particle, neighbors: list[Particle]) update()

RunningAverage
total : float
add(value: float) average(count: int)

Timer
end_time : NoneType name : str start_time : NoneType
end() show() start()

SwarmModel
L : float N : int cellSpan : int cells density k_neighbors : int mode : int mode1_cells : list modes : dict noise : float num_cells : int particles r : float v : float
get_density_hist() get_dynamic_radius() get_fluctuations() get_neighbors(particle: Particle, index: int) update() update_cells() va(): float