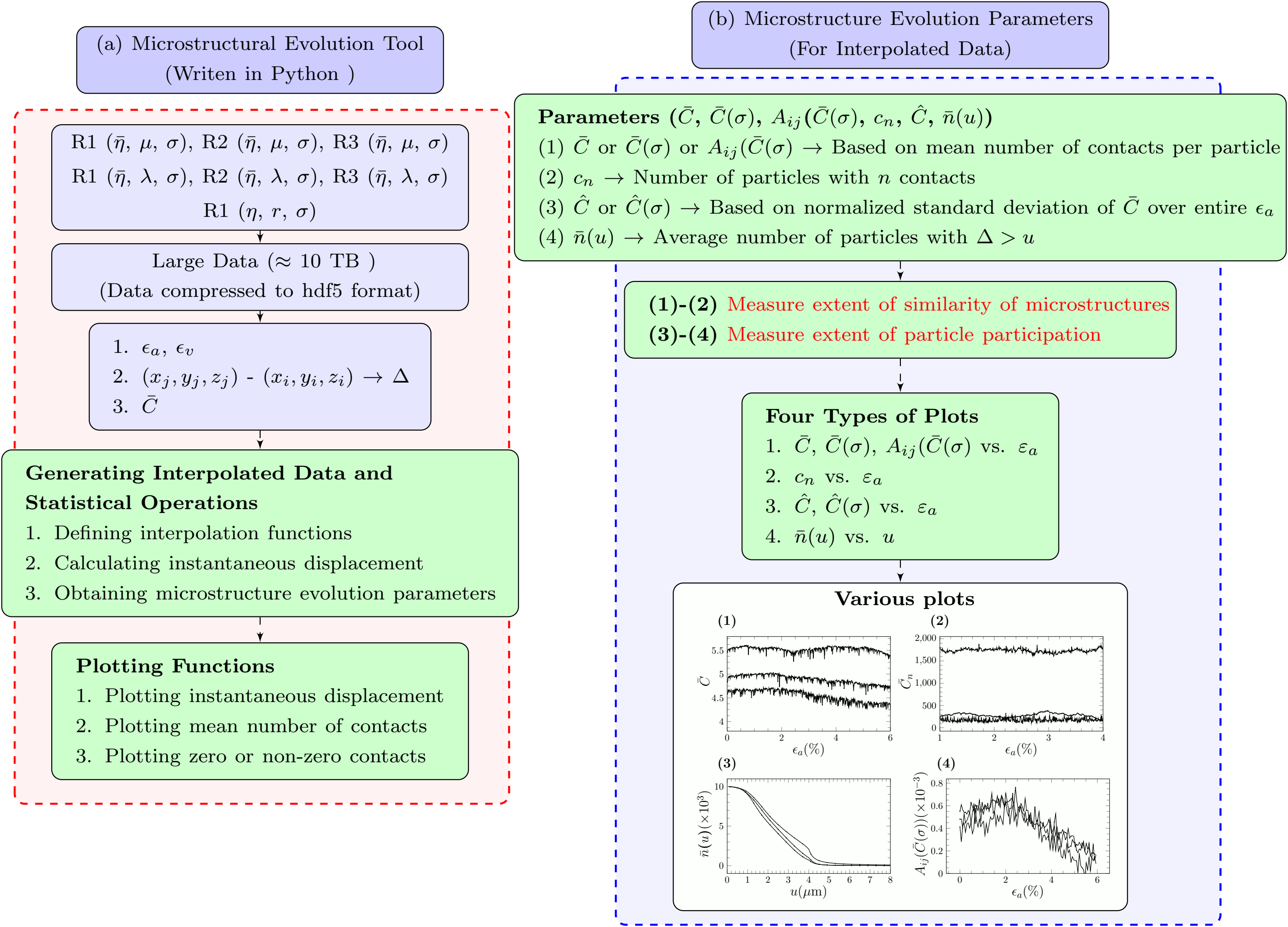
(a) Microstructural Evolution Tool
(Writen in Python)
R1 ($\bar{\eta}$, μ, σ), R2 ($\bar{\eta}$, μ, σ), R3 ($\bar{\eta}$, μ, σ)
R1 ($\bar{\eta}$, λ, σ), R2 ($\bar{\eta}$, λ, σ), R3 ($\bar{\eta}$, λ, σ)
R1 (η, r, σ)
Large Data ($\approx$ 10 TB)
(Data compressed to hdf5 format)
1. ϵ_a, ϵ_v
2. (x_j, y_j, z_j) - $(x_i, y_i, z_i) \rightarrow \Delta$
3. $\bar{C}$
Generating Interpolated Data and Statistical Operations
1. Defining interpolation functions
2. Calculating instantaneous displacement
3. Obtaining microstructure evolution parameters
Plotting Functions
1. Plotting instantaneous displacement
2. Plotting mean number of contacts
3. Plotting zero or non-zero contacts
(b) Microstructure Evolution Parameters
(For Interpolated Data)
Parameters ($\bar{C}$, $\bar{C}(\sigma)$, $A_{ij}(\bar{C}(\sigma)$, c_n, $\hat{C}$, $\bar{n}(u)$)
(1) $\bar{C}$ or $\bar{C}(\sigma)$ or $A_{ij}(\bar{C}(\sigma)$ $\rightarrow$ Based on mean number of contacts per particle
(2) c_n $\rightarrow$ Number of particles with n contacts
(3) $\hat{C}$ or $\hat{C}(\sigma)$ $\rightarrow$ Based on normalized standard deviation of $\bar{C}$ over entire ϵ_a
(4) $\bar{n}(u)$ $\rightarrow$ Average number of particles with $\Delta > u$
(1)-(2) Measure extent of similarity of microstructures
(3)-(4) Measure extent of particle participation
Four Types of Plots
1. $\bar{C}$, $\bar{C}(\sigma)$, $A_{ij}(\bar{C}(\sigma)$ vs. ε_a
2. c_n vs. ε_a
3. $\hat{C}$, $\hat{C}(\sigma)$ vs. ε_a
4. $\bar{n}(u)$ vs. u
Various plots
(1)
$\bar{C}$
$\epsilon_a(\%)$
(2)
$\bar{C}_n$
$\epsilon_a(\%)$
(3)
$\bar{n}(u)(\times 10^3)$
$u(\mu\text{m})$
(4)
$A_{ij}(\bar{C}(\sigma))(\times 10^{-3})$
$\epsilon_a(\%)$