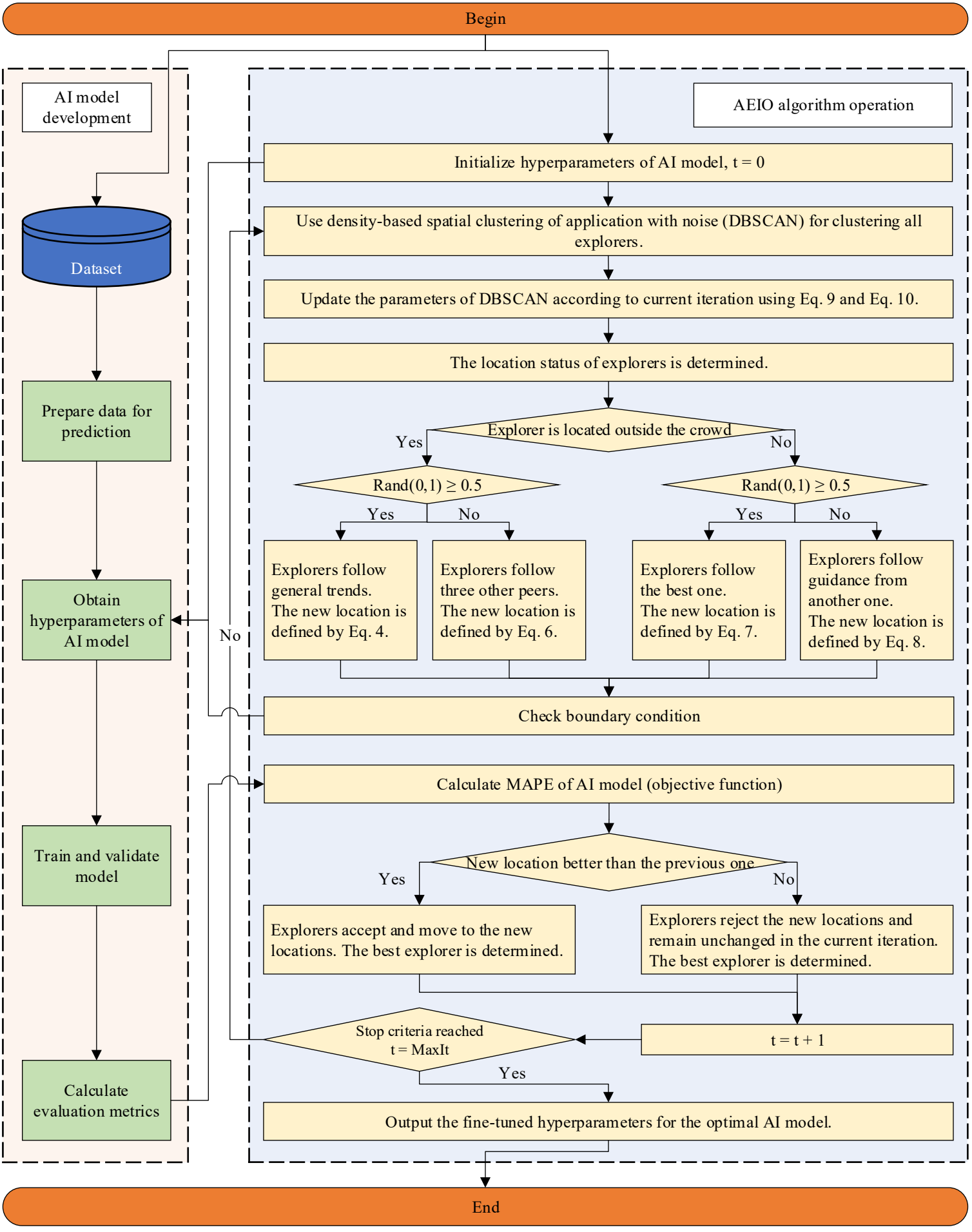
Begin
AI model development
AEIO algorithm operation
Dataset
Prepare data for prediction
Obtain hyperparameters of AI model
Train and validate model
Calculate evaluation metrics
No
Initialize hyperparameters of AI model, t = 0
Use density-based spatial clustering of application with noise (DBSCAN) for clustering all explorers.
Update the parameters of DBSCAN according to current iteration using Eq. 9 and Eq. 10.
The location status of explorers is determined.
Explorer is located outside the crowd
Yes
No
Rand(0,1) ≥ 0.5
Yes
No
Rand(0,1) ≥ 0.5
Yes
No
Explorers follow general trends. The new location is defined by Eq. 4.
Explorers follow three other peers. The new location is defined by Eq. 6.
Explorers follow the best one. The new location is defined by Eq. 7.
Explorers follow guidance from another one. The new location is defined by Eq. 8.
Check boundary condition
Calculate MAPE of AI model (objective function)
New location better than the previous one
Yes
No
Explorers accept and move to the new locations. The best explorer is determined.
Explorers reject the new locations and remain unchanged in the current iteration. The best explorer is determined.
Stop criteria reached t = MaxIt
t = t + 1
Yes
Output the fine-tuned hyperparameters for the optimal AI model.
End