CLML

Cosmology with Large scale structure using Machine Learning

2022.03.11

outline

- I’m preparing for the KAS

In this work we consider analysing the large scale structure wihtin astronomical data with Machine Learning techniques. We use 3-dimension Convolutional Neural Networks (CNN) to estimating cosmological parameters, specifically Ω_m, σ_8, from the morphology of the large scale structure. Training and test data are generated by the simulation code PINOCCHIO, which is based on a Lagrangian Perturbation Theory approach. We generate the dark matter halos catalogues with position, mass and velocity. **We then use these properties (number density, mass density, velocity), in various combinations to extract cosmological information**.

In the PINOCCHIO halo's catalog..

- I have x,y,z position, mass, vx, vy, vz

Numpy.histogramdd ← **weight**

bins_nhalo bins_mass bins_speed

$\sqrt{v_x^2 + v_y^2 + v_z^2)}$

→ I changed normalization method:
Divided by global maximum

- In the previous week..

bins_nhalo bins_mass bins_speed bins_nhalo + bins_mass bins_nhalo + bins_mass + bins_speed

Result : the pred-truth and std are almost similar

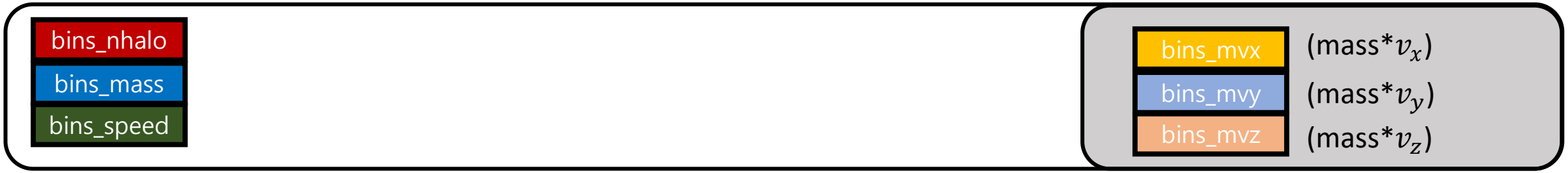
DATA

- Shape = (32,32,32,1)

- Shape = (32,32,32,2)

NEW

- Shape = (32,32,32,3)



- Shape = (32,32,32,4)

To be continued…