We present a new method for calculating arrival distribution of Ultra-High Energy Cosmic Rays (UHECRs) including modifications by the galactic magnetic field. We perform numerical simulations of UHE anti-protons, which are injected isotropically at the earth, in the Galaxy and record the directions of velocities at the earth and outside the Galaxy for all of the trajectories. We then select some of them so that the resultant mapping of the velocity directions outside the Galaxy of the selected trajectories corresponds to a given source location scenario, applying Liouville’s theorem. We also consider energy loss processes of UHE protons in the intergalactic space. Applying this method to our source location scenario which is adopted in our recent study and can explain the AGASA observation above $4 \times 10^{19}$ eV, we calculate the arrival distribution of UHECRs including lower energy ($E > 10^{19}$eV) ones. We find that our source model can reproduce the large-scale isotropy and the small-scale anisotropy on UHECR arrival distribution above $10^{19}$ eV observed by the AGASA. We also demonstrate the UHECR arrival distribution above $10^{19}$ eV with the event number expected by future experiments in the next few years. The interesting feature of the resultant arrival distribution is the arrangement of the clustered events in the order of their energies, reflecting the directions of the galactic magnetic field. This is also pointed out by stanev02. This feature will allow us to obtain some kind of information about the composition of UHECRs and the magnetic field with increasing amount of data.