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Hunting for Neighboring Open Clusters with Gaia DR3: 101 New Open Clusters within 500 pc (poster pitch)

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We systematically searched for open clusters in the solar neighborhood within 500 pc using pyUPMASK and HDBSCAN clustering algorithms based on Gaia DR3. Taking into consideration that the physical size for most open clusters is less than 50 pc, we adopted a slicing approach for different distance shells and identified 324 neighboring open clusters, including 223 reported open clusters and 101 newly discovered open clusters (named as OCSN, Open Cluster of Solar Neighborhood). Our discovery has increased the number of open clusters in the solar neighborhood by about 45%. In this work, larger spatial extents and more member stars were attained for our cluster sample. We performed membership determination with the pyUPMASK algorithm and then derived the mean position, proper motion, radial velocity, parallax and structural parameters for each cluster. Through isochrone fitting we obtained ages, distance modulus and reddening parameters for the clusters. The cluster catalog and the list of member stars with membership probabilities greater than 0.5 have been made publicly available. For our hunted OC samples, more detailed analyses are needed to further investigate their properties, such as the mass function and the dynamical states. Especially more spectroscopic data for the member stars will be of prime importance to determine the dynamical and chemical evolution of these clusters.

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