

# Stellar age determination using deep neural networks

The age of a star is not an observable quantity, and as such has to be derived from observables, under some physical assumptions. Numerous methods of stellar age estimations have been developed over the years, such as using the decay of certain elements, the position of stars in the Hertzsprung-Russell Diagram (*e.g. isochrone fitting*) or surface brightness oscillations (*i.e. asteroseismology*). Each method has its drawbacks, in terms of domain of applicability, range of uncertainty or computational time. Here we introduce a novel way to estimate stellar ages using machine learning and Deep Neural Networks. We train a Neural Network on stellar evolution models, thus predicting stellar age from magnitude, color and metallicity. We show how our technique produces similar results as other techniques, while being generally much faster and less computationally intense (preliminary results, Boin et al. in prep). We highlight how we can leverage the speed of machine learning techniques by applying our Neural Network to large spectroscopic catalogs, producing reliable age estimates for large sets of stars.