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Tracking Spots During Pattern Formation On A Surface

The beautiful spotted coats of leopards and cheetahs pose an interesting question: how do such patterns form in nature? Many researchers use mathematical models based on reaction-diffusion differential equations to study these sorts of problems.

Our project involves tracking moving spots in a pattern as they evolve on a sphere. The spots are the result of numerical simulations of the Brusselator reaction-diffusion system. We use clustering algorithms from machine learning to extract the location of the spots from a large point cloud of time-dependent data. We then create traces showing the paths taken by the spots as they evolve.

Eventually, we hope to use our algorithm to help study the dynamics of splitting spots on a growing domain where spots are competing for space.