

NumPy programs can be hard to debug. Due to the dynamic nature of Python, a bug can manifest itself after a long time of run time. This causes the computation to crash, ditching all the progress. Existing static analysis tools can't detect NumPy-specific errors. We propose a solution that uses data-flow analysis combined with symbolic execution to detect `ndarray` shape mismatch errors. With a dynamic set of symbols, our method tracks `ndarray` dimensions and constraints between them throughout the program. It uses an SMT solver to solve the constraints and locate the bug. Our implementation understands core NumPy constructs and detects some shape mismatch errors for 1D and 2D `ndarrays`.