Over the past four years, the High Energy Diffraction Microscopy (HEDM) technique has reached a milestone in maturity: several dedicated instruments exist and several analysis software packages are available for the general user community. The application space of the technique is quite broad across materials science disciplines, ranging from structural metals, to nuclear fuels, and more recently to high pressure/temperature crystallography using diamond anvil cells. High brilliance X-ray sources and large, fast panel detectors also allow for HEDM measurements to be executed during in situ processing. The attendant data acquisition rates, however, put a premium on expedited data analysis online. This in turn requires a streamlined workflow, simple user interfaces, parallel processing and data compression. The HEXRD software package is multi-platform, open source, and has been used successfully during experiments at the APS and CHESS beamlines. HEXRD is based on a shared memory parallelism model, and as such is currently designed to be deployed on a single workstation rather than a cluster. The basic structure of the code is presented in the context of the data analysis workflow for a typical HEDM measurement. Several examples are provided to give context for performance, uncertainties, and limits of application. Lastly, several areas for improvement and extension to problematic datasets are discussed.