Our brain is very powerful at recognizing objects and features in what we observe. The recognition is based on the experience we have, and the more we train on recognizing a certain feature, the quicker and accurate we become. In the same way, a trained eye would be able to immediately recognize the presence of certain phases in a diffraction pattern without the need to explicitly search for them. This approach can be implemented on a computer using machine learning and neural networks. Nowadays, machine learning is widely employed and the applications in several fields are still growing, pushed by the availability of massively parallel GPUs and clusters. Some ideas and some solutions are proposed to tackle diffraction and crystallography-related problems.