

Statistical physics has been widely used to extract macroscopic properties of a wide range of systems from their microscopic interaction models, yet it has not been employed to medical diagnostics. Given an initial subset of observed signs (symptoms, clinical and laboratory findings) with some prior knowledge about the patient (or a complex system like a biological cell), a diagnosis problem simply asks for the most probable diseases (or macrostates with specific phenotypes). An efficient and accurate diagnostic procedure is important specially in the early stages of diseases, where the number and quality of medical evidences are often insufficient to reach a definite diagnosis. Here, we use approximate inference and optimization algorithms of statistical physics to show that a simulation (extrapolation) of the diagnostic process (without doing any real observation) could be helpful as a heuristic strategy in the study of diagnosis problems.