In this study we use the material elastic properties as a base, a tow dimensional cracked plate under traction is modelled by finite element method (FEM) than a reduced model is built using the proper orthogonal decomposition method (POD), the crack length is estimated as an inverse identification problem, basing on the deformation obtained from the boundary nodes of the structure considered as sensor points. A genetic algorithm (GA) is used for the minimization of the error function which is expressed as the difference between displacement field of the boundaries caused by the crack size proposed randomly by GA and the field measured at the actual identity. The approach presented accurate results and could guess the real crack size in a precession less that 10-6 of the cost function, proving its effectiveness even with a very low number of 4 sensors, and shows that the boundary displacement measurements are practical. The use of the reduced model provides tangible benefits mainly the very low computational cost