

My recent experience in data analysis was a group project about the welding quality analysis of a fuselage demonstrator. The assembled automatic equipment collected the displacement of the robot arm, the pressure of the clamps and the power provided by the energy director. My contribution is building up an outlier detection machine learning tool and applying it to 1600 welding and their data(see [Figure 1](#)). First, I used Autoencoder to reduce the dimension of data and obtain five feature points representing one welding. Later, I adapted the Local Outlier Factor algorithm to high-dimensional data and used it to give scores to each welding. Based upon these scores, I found out that welding quality varied with its position, as well as a certain performance pattern of the robot arm.

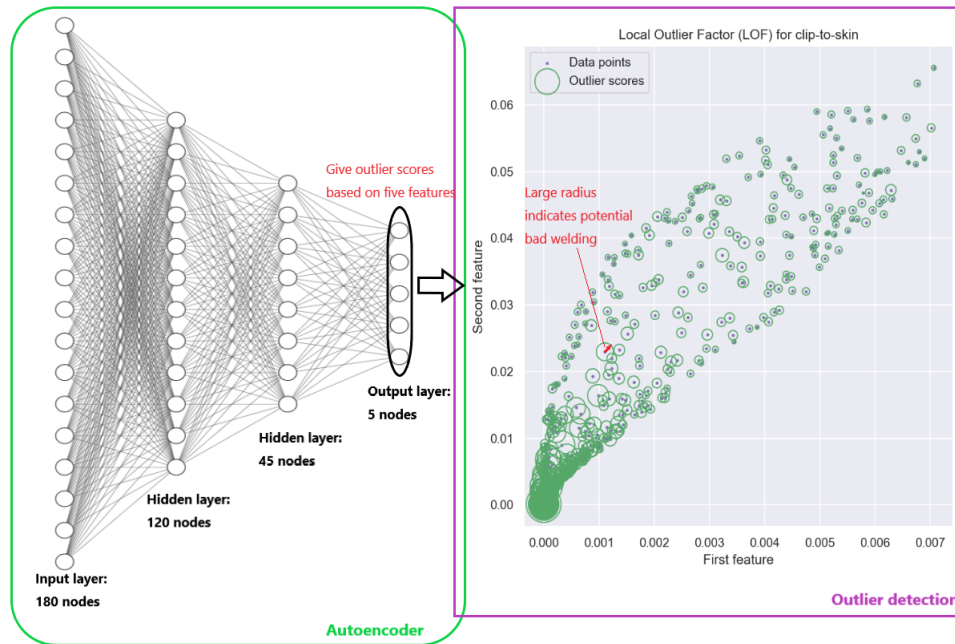


Figure 1: Illustration of outlier detection model. Autoencoder (left) reduces the data dimension. The first two features are plotted on the right. Outlier detection gives scores to the density deviation of five features of a welding, represented by circles' radius. Larger radius shows higher degree of outlier. (Own work)