

Development of flaw detection machine learning programing code using multinomial logistics regression - Detection of stress cracking in stainless steel welds-

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The government has indicated a policy of positively utilizing light water reactors whose safety has been confirmed. However, there is a concern that there will be a shortage of the test engineer of ultrasonic testing (UT) under the influence of the long-term suspend after the Great East Japan Earthquake. In particular, UT detection of stress corrosion cracking (SCC) in stainless steel pipe welds, which has been damaged, requires a high level of skill and experience. Therefore, there is an idea to use machine learning as a tool to help even unskilled test engineers to maintain the reliability of test results. If machine learning program code can extract the presence or absence of flaws and areas with questionable soundness, it will be useful auxiliary information for making judgments, and it may be possible to secure and improve reliability. We have developed a program code to determine the presence or absence of flaws from B-scan images using logistic regression, which is a basic classification method of machine learning. By executing machine learning using UT data for SCC in the developed program code and providing a sufficient amount of training data, it is possible to obtain sufficient judgment accuracy as an alarm device that prevents test engineers from overlooking. The judgment accuracy for each B-scan is over 90%, and when used to judge the presence or absence of cracks, 100% judgment accuracy has been achieved.