Abnormal diagnosis of the engineering diagram using sequence data learning

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Oil refineries and petrochemical plants are designed and managed by engineering drawings which are written according to certain rules to facilitate design, construction, operation and maintenance/repair of the plant. Accurate drawings are very important in terms of cost and safety, as detailed design work is carried out based on them, which has a significant impact on the purchase of equipment and construction. Previously, errors in engineering drawings were manually checked includings the QC(Quality Control) phase, which takes a lot of time and may cause human errors. In this work, based on the fact that there is a typical process structure for each unit process, we propose a methodology for learning the process structure by dataizing the existed drawings to perform drawing abnormality diagnosis. Specifically, it consists of a step of extracting drawing symbol data, a step of creating a process structure by giving sequence between the detected symbols, and a step of classifying process anomalies for a given drawing. Finally, abnormal diagnosis is performed on the P&ID(Piping and Instrumentation Diagram) drawings and the spended time and diagnosis results are shown.