

■ 연구논문 요약문

논문제목	Mining the relationship between production and customer service data for failure analysis of industrial products
게재정보	Computers and Industrial Engineering, 106, 2017, 137-146
개요	<p>-Analyzing the causal relationships for failures of industrial products is necessary for manufacturers to prevent the occurrence of failures and enhance customer satisfaction. The data collected from each of the production and customer divisions can be a fruitful source for failure analysis. In this paper, we present a data mining process for efficient failure analysis of industrial products by a mashup of data collected from both divisions. The process consists of four main steps: problem definition, preprocessing, modeling, and visualization. Each step is designed to satisfy two constraints in order to be practically applied to industrial products. First, it has to be quick and incremental because the life cycle of most industrial products is not sufficiently long. Second, the insight derived from the process has to be easy to understand for domain experts since they are generally not familiar with data mining methodologies. A case study is conducted to demonstrate the effectiveness of the data mining process by using realworld data collected from a manufacturer in Korea.</p>
연구결과	<p>The process consists of four main steps: problem definition, preprocessing, modeling, and visualization. Each step is designed to satisfy two constraints in order to be practically applied to industrial products. First, it has to be quick and incremental because the life cycle of most industrial products is not sufficiently long. Second, the insight derived from the process has to be easy to understand for domain experts since they are generally not familiar with data mining methodologies.</p>
활용분야 및 기대효과	<p>The main contribution of this study is four fold. First, we exploited both the production and customer service data by a data mashup to understand causal relationships of failures. Analyzing and coping with the defect factors during the production helps to prevent the occurrence of failures, which results in enhanced customer satisfaction. Second, we enabled quick and incremental failure analysis on the data by defining a data mining process as a unified framework where most components can be automated in means that some instances are incorrectly labeled. There are cases of non-failure instances where a failure has occurred in a product but did not receive an after-sales service or a product has high potential to fail but the failure has not occurred yet. The failure instances that are not caused by the factors in production, such as misuse, waterlogging, and physical damage, should be excluded because of their insignificance, but this is difficult for some of these instances. In addition, failure types with rare occurrences are difficult to be analyzed, which is the limitation of a data-driven approach</p>