A Pattern-Based Approach for Detecting Pneumatic Failures on Temporary Immersion Bioreactors

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Abstract

Temporary Immersion Bioreactors (TIBs) are used for increasing plant quality and plant multiplication rates. These TIBs are actioned by mean of a pneumatic system. A failure in the pneumatic system could produce severe damages into the TIB. Consequently, the whole biological process would be aborted, increasing the production cost. Therefore, an important task is to detect failures on a temporary immersion bioreactor system. In this paper, we propose to approach this task using a contrast pattern based classifier. We show that our proposal, for detecting pneumatic failures in a TIB, outperforms other approaches reported in the literature. In addition, we introduce a feature representation based on the differences among feature values. Additionally, we collected a new pineapple micropropagation database for detecting four new types of pneumatic failures on TIBs. Finally, we provide an analysis of our experimental results together with experts in both biotechnology and pneumatic devices.