ABSTRACT

**INCREMENTAL ACTIVE LEARNING TO ENHANCE GENOSE C19
ADAPTABILITY IN COVID-19 DETECTION**

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Electronic nose (GeNose C19) built by a TGS sensor array and machine learning (ML) is used for screening COVID-19 using breath samples. During the implementation of GeNose C19, it was found that there was a change in the sample breath pattern. This might be caused by the mutation of SARS-COV-2 virus. Where this condition can cause a reduction in the GeNose C19 performance if the ML model is not updated with the new pattern. In this study, incremental active learning method is employed to increase adaptability of the classification model. This algorithm shows the ability to choose which data need to be adopted and increase the model performance by learning the chosen data. This research shows that incremental active learning is able to reduce up to 40-50% of total data, which needs to be labeled from all the sampled data. Incremental active learning also showed the ability to adapt to new data with an increase in sensitivity and specificity up to 80% by using only 60-70% of data that the models were already choose. The ability to choose and learn from the data in the fields makes incremental active learning show a promising performance to increase the adaptability of GeNose to detect COVID-19.

Keywords: COVID-19, GeNose C19, Incremental Active Learning, ML