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(54) **Title:** SYSTEMS AND METHODS FOR IDENTIFYING SUBCOMPONENT FAILURE IN SEQUENCING INSTRUMENTS

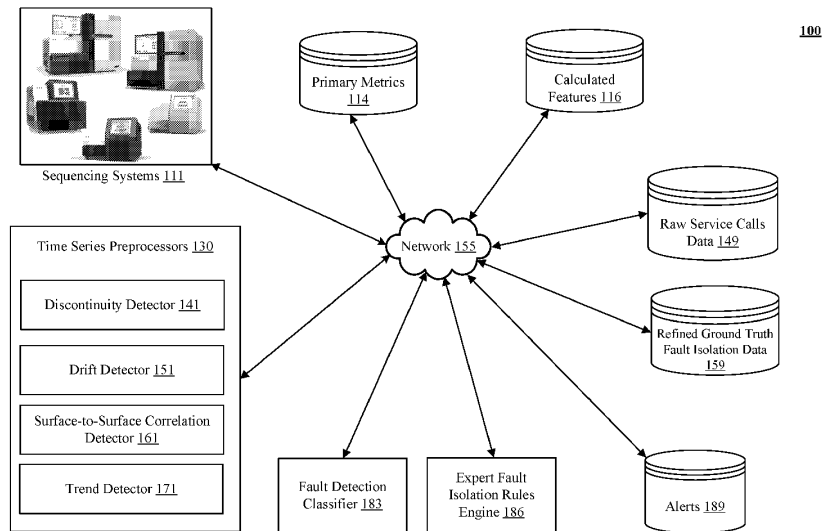


FIG. 1

(57) **Abstract:** The technology disclosed relates to systems and methods for diagnosing system malfunction and isolating a cause of system malfunction. The method includes applying preprocessors to time series data. The preprocessors detect time series discontinuities, drift, lack of expected correlation, and trends. The method includes feeding, for at least one image channel in one sequencing run, at least part of the output of the preprocessors to a trained tree-based classifier and receiving a classification of the particular sequencing run as abnormal. The abnormal classification can indicate a system malfunction. The method includes feeding at least part of the output of the preprocessors for the abnormal sequencing run to an expert rule system. The expert rule system can isolate a root cause of the system malfunction to a particular subcomponent in need of adjustment or replacement. The method can generate a notification of the particular subcomponent causing the system malfunction.

[Continued on next page]

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- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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