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(54) Title: PARALLEL CANCER SOURCE OF ORIGIN CLASSIFICATION FOR ORGAN TYPE AND TUMOR BIOLOGY TYPE

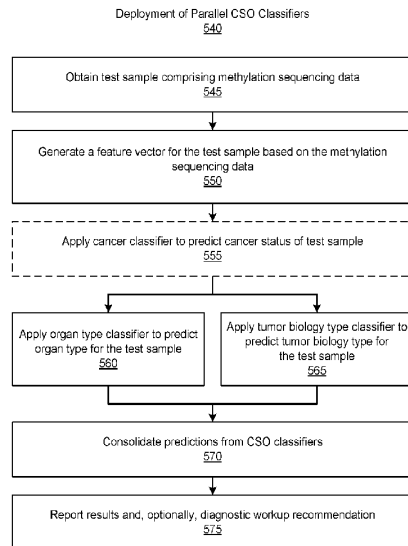


FIG. 5B

(57) Abstract: Methods for cancer source of origin (CSO) prediction are disclosed to predict CSO characteristics. The CSO prediction may include the affected organ or organ group and tumor biology. The method for training parallel CSO classifiers includes obtaining training samples derived from subjects with known cancer diagnosis, each training sample comprising methylation sequence reads corresponding to nucleic acid fragments in a biological sample collected from each subject and each known cancer signal origin including a known affected organ or organ group a plurality of organs or organ groups and a known tumor biology from a plurality of tumor biology classes. The method includes generating, for each training sample, a feature vector based on the methylation sequence reads. The method includes generating a first training data set comprising the feature vectors for the training samples and the known organs or organ groups, and training an organ or organ group classifier with the first training data set to predict organ or organ group from the plurality of organs or organ groups based on an input feature vector. The method includes generating a second training data set comprising the feature vectors for the training samples and the known tumor biology classes, and training a tumor biology classifier with the second training data set to predict tumor biology from the plurality of tumor biology classes based on input feature vector.

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