

CLAIMS

1. A method for determining defect type pair score comprising:
 - acquiring one or more images including a plurality of defect types, the plurality of defect types including a first defect type and at least a second defect type;
 - generating a first ensemble learning classifier for the first defect type and the at least a second defect type;
 - calculating, with the first ensemble learning classifier, a mean decrease in an accuracy index for each of a plurality of attributes associated with the first defect type and the at least a second defect type;
 - identifying a selected number of attributes having the largest mean decrease in accuracy index;
 - generating a second ensemble learning classifier with the identified selected number of attributes having the largest mean decrease in accuracy index;
 - determining a training error associated with the second generated ensemble learning classifier; and
 - calculating a defect type pair score associated with the first defect type and the second defect type based on the determined training error.
2. The method of claim 1, wherein at least one of the first ensemble learning classifier or the second ensemble learning classifier comprises:
 - a random forest classifier.
3. The method of claim 1, wherein the determining a training error associated with the second generated ensemble learning classifier comprises:
 - determining an out-of-bag error associated with the second generated ensemble learning classifier.
4. An apparatus for determining defect type pair scores comprising:
 - an inspection tool, the inspection tool including one or more detectors configured to acquire one or more images of at least a portion of a specimen;
 - a user interface device;
 - a controller, the controller including one or more processors communicatively coupled to the one or more detectors of the inspection tool, wherein the one or more processors are configured to execute a set of program instructions stored in memory, the set of program instructions configured to cause the one or more processors to:

receive the one or more images from the inspection tool, the one or more images including a plurality of defect types, the plurality of defect types including a first defect type and at least a second defect type;

generate a first ensemble learning classifier for the first defect type and the at least a second defect type;

calculate, with the first ensemble learning classifier, a mean decrease in an accuracy index for each of a plurality of attributes associated with the first defect type and the at least a second defect type;

identify a selected number of attributes having the largest mean decrease in accuracy index;

generate a second ensemble learning classifier with the identified selected number of attributes having the largest mean decrease in accuracy index;

determine a training error associated with the second generated ensemble learning classifier; and

calculate a defect type pair score associated with the first defect type and the second defect type based on the determined training error.

5. The apparatus of claim 4, wherein at least one of the first ensemble learning classifier or the second ensemble learning classifier comprises:
 - a random forest classifier.
6. The apparatus of claim 4, wherein the inspection tool comprises:
 - an electron beam defect review tool.
7. The apparatus of claim 4, wherein the inspection tool comprises:
 - a darkfield inspection tool.
8. The apparatus of claim 4, wherein the inspection tool comprises:
 - a brightfield inspection tool.