CLAIMS

1. A method (100) for classifying properties of an oil palm fresh fruit bunch comprising the steps of:

predefining, by a user, a plurality of categories of features related to the properties of the oil palm fresh fruit bunch;

acquiring, via an image acquisition module, a plurality of images (101) with different wavelength bands of the oil palm fresh fruit bunch;

processing, via a plurality of feature extraction modules, the acquired images (103) to extract features from different categories of the properties related to the oil palm fresh fruit bunch in a parallel operation, and wherein each of the feature extraction modules applies a bidirectional feature extraction algorithm having a top-down feature extraction algorithm and a bottom-up feature extraction algorithm to extract the features, wherein the top-down feature extraction algorithm prioritizes the extraction of the features that are more relevant to the categories of the properties whereas the bottom-up feature extraction algorithm prioritizes the extraction of the features that are less relevant to the categories of the properties, wherein the features with a higher priority are set for prioritized processing whereas the features with a lower priority are set for later processing;

merging, via a category awareness feature module, the extracted features (104) related to the properties of the oil palm fresh fruit bunch to generate a feature map for each of the extracted features; and

classifying, via a categorical classification module, the properties of the oil palm fresh fruit bunch based on the generated feature maps (105).

2. The method (100) according to claim 1, wherein the bidirectional feature extraction algorithm comprises a top-down feature extraction algorithm and a bottom-up feature extraction algorithm to extract the features based on relevance with respect to each of the categories.

3. The method (100) according to claim 1, wherein the category awareness feature module applies a global average pooling algorithm to merge the extracted features.

4. The method (100) according to claim 1, wherein the categorical classification module applies a multi-cross entropy loss function that classifies the properties of the oil palm fresh fruit bunch based on a predicted integer value.

5. The method (100) according to claim 1, further comprising the step of normalizing, by a pre-processing module, the acquired images (102) based on the respective wavelength bands to improve qualities of the acquired image.

6. A system for classifying properties of an oil palm fresh fruit bunch comprising:

an image acquisition module for acquiring a plurality of images (101) with different wavelength bands of the oil palm fresh fruit bunch;

a plurality of feature extraction modules in communication with the image acquisition module for processing the acquired images (103) to extract features from different categories of the properties related to the oil palm fresh fruit bunch as predefined by a user in a parallel operation, wherein each of the feature extraction modules applies a bidirectional feature extraction algorithm having a top-down feature extraction algorithm and a bottom-up feature extraction algorithm to extract the features, wherein the top-down feature extraction algorithm prioritizes the extraction of the features that are more relevant to the categories of the properties whereas the bottom-up feature extraction algorithm prioritizes the extraction of the features that are less relevant to the categories of the properties, and wherein the features with a higher priority are set for prioritized processing whereas the features with a lower priority are set for later processing;

a category awareness feature module in communication with the plurality of feature extraction modules for merging the extracted features (104) related to the properties

of the oil palm fresh fruit bunch to generate a feature map for each of the extracted features; and

a categorical classification module in communication with the category awareness feature module for classifying the properties of the oil palm fresh fruit bunch based on the generated feature maps (105).

7. The system according to claim 6, wherein the category awareness feature module applies a global average pooling algorithm to merge the extracted features.

8. The system according to claim 6, wherein the categorical classification module applies a multi-cross entropy loss function that classifies the oil palm fresh fruit bunch based on a predicted integer value.

9. The system according to claim 6, further comprising a pre-processing module for normalizing the acquired images (102) based on the respective wavelength bands to improve qualities of the acquired image.