ISSN 2515-8260 Volume 07, Issue 09, 2020

MEDICINAL PLANT IDENTIFICATION USING ANDROID APPLICATION BASED ON LEAF IMAGE

K. Priya[1], S. Ranjana[2], R. Manimegala[3]

[1,2,3,]*Assistant Professor, Faculties of Humanities Science, Meenakashi Academy of Higher Education Research Chennai, TamilNadu, India*

E-mail: priyak@maherfhs.ac.in[1], ranjanas@maherfhs.ac.in[2], manimegalar@maherfhs.ac.in[3]

Abstract:

MedPlant provides this work as a modern smartphone leaf picture recognition tool for medicinal plants. The software operates on the operating system Android. MedPlant has two key functions, i.e. recognition of medicinal plants and quest data for medicinal plants. To identify the picture, we have used local binary patterns to extract texture and probabilistic neural network. In this study, 30 Indonesian species of medicinal plants were used and there are 48 digital pictures of growing species.We used a questionnaire focused on heuristic assessment to assess user feedback for the program. The findings of the assessment indicate that MedPlant is effective in distinguishing medicinal plants. MedPlant can help to classify medicinal plants, explore new plant varieties and plant taxonomy in the botanic garden or in the maintenance of natural parks. This also lets individuals, organizations and societies discover their capacity to maximize the value of health plants without usage and without growth. The results would improve MedPlant's wealth, capital and economic richness.

***Keywords:**medicinal plant, identification, Local Binary Patterns, Probabilistic Neural Network.*

1 Introduction:

Many species are at danger of loss. Biodiversity is at crisis. A critical problem in environmental science is to understand the causes that trigger the decline as a consequence of expected depletion in genetic and species diversity as large as in previous mass extinctions.India is a mega-biodiversity area.In the analysis of plant nutrition, plant competitiveness, soil-water planting ties, defensive measures for plants, crop ecology, breathing rate, transpiration rate and photosynthesis, leaf has an significant parameter. Their recognition is the first move to conserve plant organisms. Of this purpose, an object detection program is particularly essential in order to recognise and prevent specific animals from becoming endangered. For this reason, advances in computer vision may be used.

Computer vision made it possible to reproduce human perception by recording an picture electronically.Scientists, students and practitioners have recorded many medicinal

ISSN 2515-8260 Volume 07, Issue 09, 2020

plants in Indonesia, through surveys of possible plant variety and ethno-botany studies, through exploration of different areas.Nevertheless, it is still not feasible to disseminate knowledge, recognise and use medicinal plants to the public. The most pressing condition is that Indonesia has no full medicinal plant inventory and only a few of these data have been systematically registered. This is one of our main tasks to safeguard plants from numerous risks and to preserve the richness and equilibrium of the plant population.In this report, we suggest an automatic leaf-based mobile application to classify medicinal plant. A significant range of methodologies were proposed for automatic analysis of plant leaves.This thesis creates a smartphone application for recognition of medicinal plants focused on photographs of leaves on Ios. The Local Binary Pattern Variance (LBPV) is exploited for leaf texture extraction, with classification by using the Probabilistic Neural Network (PNN).

2 Related work:

We will then recognize them and replace them in order to utilize potential generations as a matter of urgency.Mechanical recognition of the surface also contributes to inaccurate recognition. In order to cope with the bulk of data and avoid malpractices, an efficient and secure detection and classifying system is required, owing to growing illicit trade and abuse in the crude product industry on the one side, and the shortage of appropriate expertise on the other[1].The findings of the assessment indicate that MedLeaf is promising for the identification of medicinal plants. MedLeaf can help to classify medicinal plants,[2] discover new plant types, plant taxonomies, and so on in botanical gardens or natural reserve management. This would also allow people, organisations and organizations to discover an opportunity to leverage the value of healthcare plants unused and undeveloped.Second, we have an updated description of the kernel. Secondly, we give a complete automated identification of the plant on ground, consisting of the detection of petioles, the normalization of the orientation of the plant leaf,[3] and an identification of plant root. Ultimately, on Android devices we launch a new plant identification app: Vietnamese medicinal plant quest.We also checked the network quality with different picture tools. The check results of 63 photos indicate that 94.4 percent with a minimum of 8 input features of this methodology are correct. [4]For leaf recognition systems which are less data and need fewer computation cycles, the solution is more profitable.

For this study the leaf pictures were evaluated using feature equations. textures.The features include grey textures, GTSDM, and Local Binary Pattern(LBP) operators.[5] The statistical meaning produces a vector function of each image. The testing dataset contains 70 percent of the photos and the rest are included in the study collection.This paper suggests an automated classification technique focused on medicinal plant leaf photos in order to overcome the limitation of the manual system of classification for identification of medicinal plants.First, our method must preprocess the leaf pictures of the medicinal plants; after that, the 10 type characteristics (SF) and the 5 texture characteristics (TF) will be determined; eventually, the medicinal plant leaves classified by means of support[6] vector machine (SVM). The classificator was added to 12 separate photos of medicinal plant leaf and a positive average score of 93.3 percent was obtained. The outcome reveals that it is possible to identify medicinal plants automatically through multifunctionality.

The research suggests a system in which tropical plants can be categorized and graded in Malaysia based on the patterns taken from the leaves. The derived patterns are based on multiple angle features from the medicinal plant root. A comparison of their output accuracies with such data would be used to evaluate five classifications, originating from WEKA and an ensemble classifier, the Central Ensemble Classifier for Imbalanced Multiclass Learning[7] (DECIML). This experiment distinguishes and classifies five species of Malaysian medicinal plants in which each species can be represented with 65 images.This program is built to support taxonomists automatically classify leaf medicines with the aid of a computer device. This method uses three elements of the herb, namely morphology, form and texture, to classify medicinal[8] plants. In this scheme, leaf is used to classify as it is simple to spot. We used the Probabilistic Neural Network to identify medicinal plants. The features will be combined using Product Decision Rule (PDR).The automated recognition and classification of plant plants is beneficial in ecology, forestry and agriculture for studying and discovering new varieties of plants of botanical gardens. Here, 300 leaf characteristics are drawn from a single 624 leaf dataset to[9] identify 23 specific plants with an average precision of 95%. The suggested method is less time-complex in contrast to other methods and simpler to execute with greater precision.

Therefore a new paradigm for the identification and classification in Malaysia of tropical medicinal plants based on the patterns derived from the leaf is proposed in this preliminary report. The extracted patterns from medicinal plant leaf are obtained on the basis of multiple angles.[10] The extracted features establish, however,[16] a very large number of attributes (properties). A function collection is thus used to test if a classifier's output can be enhanced and to use leaf info.We narrow the output of the leaf vein to do more. We have carried out morphological picture analysis to repair damaged ribs or unconnected leaf veins. Four venous[11] 80 optical leaf forms have been evaluated. Experimental tests show that our suggested approach has strong efficiency to isolate the main, secondary and tertiary veins. This tests in 53.750/0 in pictures with a 2% score and 42.5% scoring 1.There are three steps of the current approach: preprocessing, selection of features and classification. Pre-processing is the method used to enhance digital files before machine operation. [15]The characteristics extraction process extracts characteristics dependent on leaf picture color and shape. Such features were used in order to characterize and check the results[12,17] for Artificial Neural Network (ANN) and Euclidean (KNN) classifiers. It is the description data of the classifier. The 1907 sample leaves of 33 separate plant species type Flavia dataset were educated in the network.

This paper addresses the usage of leaf picture recognition and classification to introduce visual resources for Malaysian medicinal plants. Late on specialists have been rare of western medicine and plants and the younger generation are mostly acquainted with the therapeutic and herbal features of plants. This research would therefore be essential in helping the population (urban and rural) to recognise Malaysian medicinal plants and likely share them with the generation to come.Classification of plants based on leaf photographs is a foundational work on the botanical and farming sectors. Because of the high complexity of the picture data in the field, calculated reducing algorithms are required and useful for such data analysis, since[14] fast classification of plants and comprehension and management of plant leavy characteristics can be made possible. Locally linear (LLE) guided embedding is a powerful feature extraction approach that provides promising results in recognition when paired with other basic classifiers.

3 Proposed method:

II. Local Binary Pattern

Local Binary Patterns (LBP) suggested by for invariant classification of rotational texture. The LBP value can be calculated by multiplying the limits by binary weighting on the circular pixels of the region using the center pixel.

LBP is formulated by:

$$LBP_{P,R}(x_c, y_c) = \sum_{p=0}^{P-1} s(g_p - g_c)2^P \quad (1)$$

$$s(x) = \begin{cases} 1 & x \geq 0 \\ 0 & x < 0 \end{cases} \quad (2)$$

Where xc and yc are central pixel coordinate, p are circular sampling points, P is the quantity of sampling points or pixels in the vicinity, g! The meaning of p, g's gray scale! It is pixel center, the threshold feature is s or symbol. LBP values are shown as a histogram for classification purposes.

III. Rotation Invariant Uniform Patterns

Uniform patterns are denoted LBP in invariant rotation is an inching and standardized rotation operator. A standardized LBP value senses important texture properties such as side, bottom, point and corner.

$$U(LBP_{P,R}) = |s(g_{P-1} - g_c) - s(g_0 - g_c)| + \sum_{p=1}^{P-1} |s(g_p - g_c) - s(g_{p-1} - g_c)| \quad (3)$$

The meaning of U LBPis below 2 is defined by consistent patterns. The wording for LBP is:

$$LBP_{P,R}^{riu2} = \begin{cases} \sum_{p=0}^{P-1} s(g_p - g_c), & if\ U(LBP_{P,R}) \leq 2 \\ P+1, & otherwise \end{cases} \quad (4)$$

Unless the patterns are standard patterned, the importance of the patterns that decide the position of the bin is calculated by counting the number of bits. When P or eight rows, the LBP values are in the range of zero to nine. Uniform LBP trends are known as bin 9.

IV. Local Binary Patterns Variance (LBPV)

VAR describes local contrast characteristics, and the LBP describes texture pattern characteristics, so that all operators are complements. A mutual distribution of local contrast patterns by LBP as a texture descriptor called LBPV takes place by Ojala et al. The LBPV was to be a descriptor of texture that would inform local texture and contrast patterns. The histogram of LBPV is defined as:

$$LBPV_{P,R}(k) = \sum_{i=1}^{N}\sum_{j=1}^{M} w\left(LBP_{P,R}(i,j),k\right), \quad k \in [0.K] \tag{5}$$

with

$$w\left(LBP_{P,R}(i,j),k\right) = \begin{cases} VAR_{P,R}(i,j), & LBP_{P,R}(i,j) = k \\ 0, & otherwise \end{cases} \tag{6}$$

\

V. Probabilistic Neural Network (PNN)

Donald Specht suggested an alternative back-propagation neural network by the Probabilistic Neural Network (PNN) in 1990. PNN has some benefits, i.e. training requires just one iteration, and a Bayesian approach offers a general solution. PNN is a radial-base network (RBF). It is a neural network. RBF is a bell shaped function which measures a nonlinear variable.

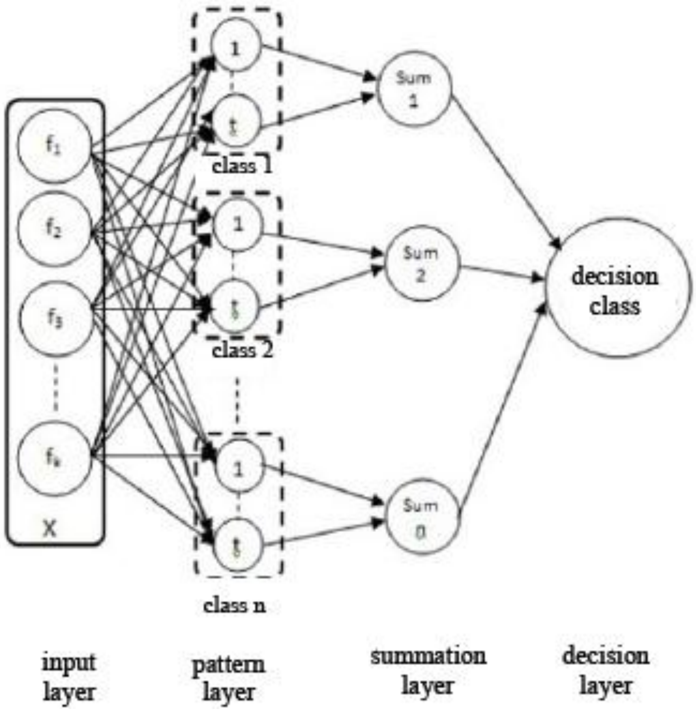

Figure 1. Structure of PNN

PNN consists of four layers, input, pattern and output layers. PNN consists of four. Figure 1 shows the structure of the PNN. The components of the PNN are as:

ISSN 2515-8260 Volume 07, Issue 09, 2020

1. Input layer

   Input layer x is a k-value that must be assigned to one n class.

2. Pattern layer

   Pattern layer functions between input x and weight x of the dot element! $Z! = x . x!$", $Z!$Divided into the radial base feature τ and added by a certain inclination, i.e. radbas n = exp (−n) . The equation in the template layer is then determined as follows:

$$f(x) = exp\left(-\frac{(x-x_{ij})^T(x-x_{ij})}{2\sigma^2}\right) \quad (7)$$

   Where xij transmit vector type teaching I order j.

3. Summation layer

   Through architecture of each class is applied to this layer in order for each class to generate a population density function. In this layer the equation used is:

$$p(x) = \frac{1}{(2\pi)^{\frac{k}{2}}\sigma^k t}\sum_{i=1}^{t} \exp(-\frac{(x-x_{ij})^T(x-x_{ij})}{2\sigma^2}) \quad (8)$$

4. Output layer

   Input x is graded in class I in the judgment layer if meaning p! x is larger than any level.

4 Result and discussion:

A. Data Collections

The leaf plant is cultivated in Biofarmaka IPB, Cikabayan IP B, the ex-situ Conservation Centre, Indonesia, Faculty of Forestry IPB and the Bogor Botanical Gardens, West Java, Indonesien, from the Ex-situ management field of medicinal plants.The number is 1.440 pictures including 30 varieties of medicinal plants. There are 48 optical pictures of each species. The resolution of the image is 270 pixels by 240. Captured RGB images from the sensor and then transformed RGB images to gray-scale and redimensioned to 240x270 pixels.The analysis findings indicate that the accurate description of medicinal plants is 56.33%. Because of the poor accuracy of the picture processing, the photographs were captured on a smartphone device. The lighting of the photographs is special. Any species have a common texture in medicinal leaf plants. We produced medicinal plants automatically with a combination of leaf characteristics such as size, colour, and texture.

Mobile apps for the identification of medicinal plants have been established. The code is operating on Linux. It is divided into two key aspects, i.e. description of medicinal plants and quest data for medicinal plants. We have also created a database for medicinal plants (Figure 2).

ISSN 2515-8260 Volume 07, Issue 09, 2020

Figure 2. Medicinal plant database

The picture of the leaf may be taken from the gallery or cell phone for medical leaf recognition. The image is seen on the smartphone device. The consumer clicks the ID button to label the herb and MedPlant immediately identifies the medicinal plant. The recognition system is shown in Figure 3.

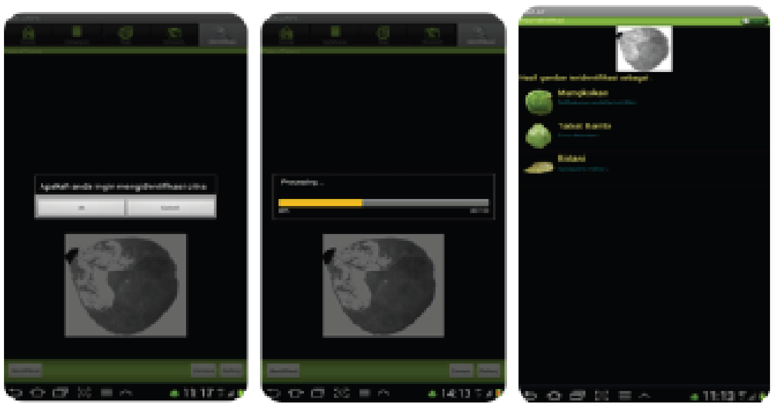

Figure 3. User Interface of medicinal plant identification

Users insert keyword and press select button for database retrieval of medicinal plants. The paper search tool for medicinal plants is shown in figure 4.

Figure 4. User Interface of document searching

A questionnaire was used to assess the efficiency of the submission. The program is tested by 20 people. They graduated at the Bogor Agricultural University (IPB) from various branches. For the questionnaire we used heuristic classification consisting of:

1 program awareness
2 Balancing framework with real-world
3 consumer autonomy and rights
4 Quality and norms
5 Error prevention
6 Identification instead of warning
7 Reliability and efficiency of usage
8 Design esthetic and minimum
9 Enable consumers to find, fix and recover from glitches
10 Assistance and documentation

In the form of recognition and record retrieval, the questionnaire is used to determine user satisfaction.Questionnaires indicate that 35% of users are pleased with the findings, 50% of users are very happy, and 15% of users are not satisfied with the results of the recognition of medicinal plants (Figure 5).

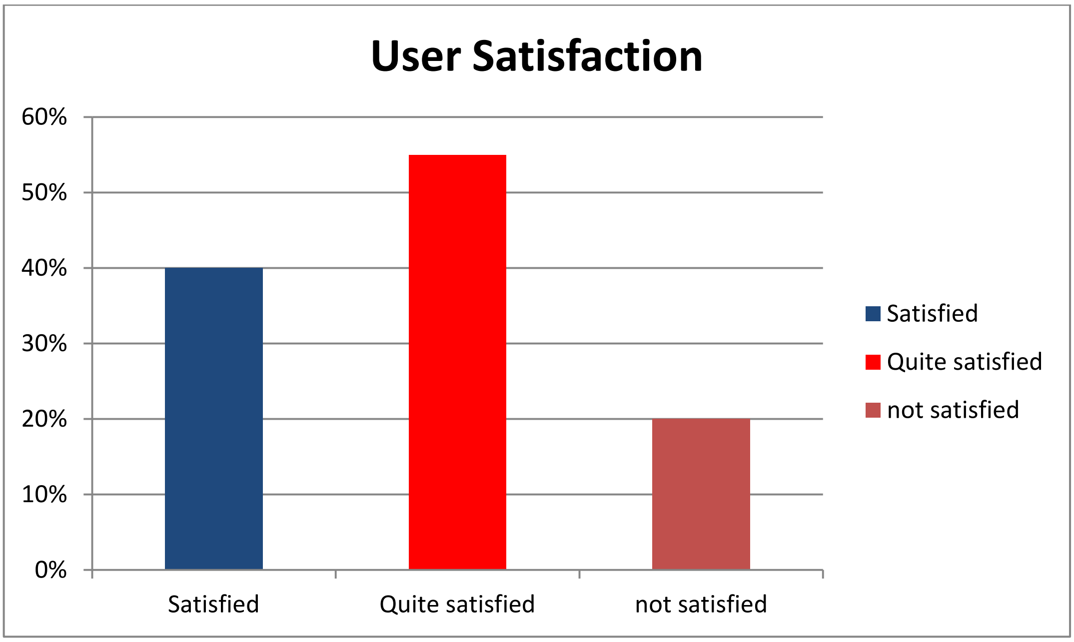

Figure 5. User satisfaction for medicinal Plant detection

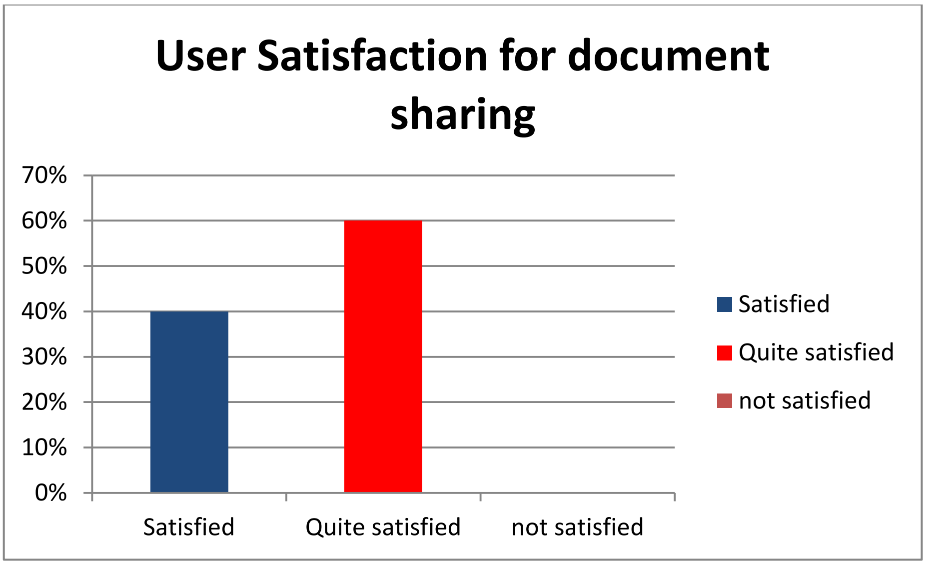

Figure 6. User satisfaction for document sharing

Figure 6 shows user satisfaction for documentsearching. User satisfaction evaluation for document searching show that 40% of user satisfied, 60% of user quite satisfied and 0% of user not satisfied. This indicated that the application gives the relevant document to user.

5 Conclusion:

MedPlant-a mobile medicinal plant identification application centered on leaf picture has been created. The program has two key purposes, i.e. the recognition of a medicinal plant and the search for medicinal plants. MedPlant is a machine-aided medical plant identification device using visual processing technology, computer vision and smart information systems.In order to classify the image, we used local binary designs to extract the texture of the leaf and probabilistic neural network. The recognition of medicinal plants is based only on the texture of the leaves. The exact description of medicinal plants based on leaf texture is 56.33%. Now, MedPlant has been created utilizing leaf features such as size, color and texture variations.MedPlant can help to uncover new plant varieties, plant taxonomy, invasive plant identification, food / poison detecting plant species and so forth. It also allows people, organizations and populations to build unused and untapped expertise to exploit medicinal plant value. As a consequence, the power, money and economic prosperity would rising.

Reference:

1. Swetha, V. and Jayaram, R., 2019, June. A new approach for identification of plant leaf disease using classifying machine learning. In 2019 3rd International conference on Electronics, Communication and Aerospace Technology (ICECA) (pp. 1360-1365). IEEE.
2. Gayathri, S., Wise, D.J.W., Shamini, P.B. and Muthukumaran, N., 2020, July. Tea leaf disease Image Processing and Identification using Deep Learning. In 2020

International Conference on Electronics and Sustainable Communication Systems (ICESC) (pp. 398-403). IEEE.

3. Singh, P.P., Kaushik, R., Singh, H., Kumar, N. and Rana, P.S., 2019, December. Plant Leaf Disease Detection Scheme for Convolutionary Neural Networks. In 2019 IEEE Globecom Workshops (GC Wkshps) (pp. 1-7). IEEE.
4. Nisar, N., Awasthi, A., Chhabra, M. and Abidi, A.I., 2020, October. Plant Leaf Disease Visual Recognition: a Study. In 2020 Fourth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud)(I-SMAC) (pp. 373-378). IEEE.
5. Nooraiyeen, A., 2020, July. Automated Leaf Disease Detection Robotic Vehicle. In 2020 IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT) (pp. 1-6). IEEE.
6. Mim, T.T., Sheikh, M.H., Shampa, R.A., Reza, M.S. and Islam, M.S., 2019, NovemberLeaves Tomato Visual Recognition Identification Diseases. In 2019 8th International Conference System Modeling and Advancement in Research Trends (SMART) (pp. 244-249). IEEE.
7. Sankar, M., Mudgal, D.N. and Jalinder, M.M., 2019, April. Using Raspberry pi Green Leaf Disease Identification. In 2019 1st International Conference on Innovations in Information and Communication Technology (ICIICT) (pp. 1-6). IEEE.
8. Raiu, R., Subburaman, A. and Haribabu, S., 2018, March. Recognition of Shrub Ailment Using Automated Image Processing.In 2018 International Conference on Computation of Power, Energy, Information and Communication (ICCPEIC) (pp. 215-220). IEEE.
9. Dayanand, R.B. and Noola, D.A., 2019, November. Segmentation of the leaf by connected approach to pixels.In 2019 International Conference on Smart Systems and Inventive Technology (ICSSIT) (pp. 516-522). IEEE.
10. Sainin, Kumar, A. and Vani, M., 2019, Detection of tomato-based leaf disease. 10th International Computer Meeting 2019, Communication and Networking Technologies (ICCCNT) (pp. 1-6). IEEE.
11. Patil, A. and Lad, K., 2019, February. Diease identification and classification analysis for Chilli Leaf with various algorithms. In 2019 IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT) (pp. 1-4). IEEE.
12. Sazzad, T.S., Anwar, A., Hasan, M. and Hossain, M.I., 2020, June. An Image Rice blast Defining Production System. In 2020 International Congress on Human-Computer Interaction, Optimization and Robotic Applications (HORA) (pp. 1-5). IEEE.
13. Nandhini, N. and Bhavani, R., 2020, January. Diseased leaf image classification feature extraction by means of computer education. In 2020 International Conference on Computer Communication and Informatics (ICCCI) (pp. 1-4). IEEE.
14. Al-bayati, J.S.H. and Üstündağ, B.B., 2020, October. Artificial smart agriculture intelligence: changed approach to optimization in the analysis of plant diseases. In

ISSN 2515-8260 Volume 07, Issue 09, 2020

2020 4th International Symposium on Multidisciplinary Studies and Innovative Technologies (ISMSIT) (pp. 1-6). IEEE.
15. Raghukumar, A.M. and Narayanan, G., 2020, March. Algorithms for Identification of Medicinal Plants for Computer Learn Comparison. In 2020 Fourth International Conference on Computing Methodologies and Communication (ICCMC) (pp. 56-60). IEEE.
16. Pham, T.N., Van Tran, L. and Dao, S.V.T., 2020. Mango leaves with a feed forward neural network and hybrid metaheuristic function collection early disease categorisation. IEEE Access, 8, pp.189960-189973.

.