International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 2 Mar-Apr 2023, pp: 1735-1740 www.ijprajournal.com ISSN: 2249-7781

Detection of Pests prone area using Drones and Image mapping in Dapoli (Konkan Region)

A.D. Salvi[1],P. R. Kolhe[2], B. R. Gujar[3],A.A. Kale[4],M.M. Khatal[4], A. Kumar[4]
S.V. Pathak[5], M.H. Tharkar[5]

[1]*M.Tech, College of Agriculture Engineering and Technology, Dr. BSKKV, Dapoli Maharashtra, India*
[2]*Associate Processor (CAS), College of Agriculture Engineering and Technology, Dr. BSKKV, Dapoli Maharashtra, India*
[3]*Young Professional (NAHEP), Dr. BSKKV, Dapoli Maharashtra, India*
[4]*M.Tech, College of Agriculture Engineering and Technology, Dr. BSKKV, Dapoli Maharashtra, India*
[5]*Assistant Processor, College of Agriculture Engineering and Technology, Dr. BSKKV, Dapoli Maharashtra, India*

Submitted: 15-04-2023 Accepted: 25-04-2023

ABSTRACT
Geographic Information System(Civilians) involves the collection, operation and analysis of spatial data. Upstanding imaging is one of the derivatives for data accession from the platform of the Unmanned Upstanding Vehicle(UAV). Upstanding imaging has been considerably used for foliage mapping in numerous fields. In Malaysia, crop monitoring of Mango colony area is still done in a conventional way despite the large area of Mango colony. Combination of the UAV upstanding imaging and image processing ways can be used to ameliorate the Mango colony operation. foliage has its unique electromagnetic hand and each band can be linked to analyses the crop health from the electromagnetic hand reflectance value. thus, UAV is suitable to capture different gamuts band image. In this exploration, we produce digital charts of a Mango colony and use it to produce foliage indicators(VI); Normalized Difference Vegetation Index(NDVI), regularized Difference Red- Edge(NDRE), Chlorophyll Index- Green(ClG), Chlorophyll Index- Red- Edge(ClRE).The visualization of the Vegetation Indices is the compared to the ground verity tree observation. We also analyses for the stylish Vegetation Index. The stylish Vegetation Index can also be used by growers in managing their colony. NDRE was the stylish index in imaging the foliage health in the Mango colony. The delicacy attained was 92. Farmers benefit by the use of these charts as field visits can be minimized. The value of the foliage indicators can be applied into Civilians database where the value of the image analysis can be recorded in the database therefore it can help growers to emphasize on the problematic area. Using this chart, growers can concentrate on the diseased trees and give applicable treatment.

I. INTRODUCTION-

Mangifera indica, generally known as mango, is a species of unfolding factory in the family Anacardiaceae. It's a large fruit tree, able of growing to a height of 30 metres(100 bases). It's one of the most popular fruits in the region and is gathered a time. A significant figures of growers, substantially smallholders take over to Mango civilization in due to the strong demand and high profitable value from the original and global request presently. Business returns from growing Mangos promises new wealth if prices hold up. Geographic Information System(Civilians) is a study area of collecting, managing and analysing spatial data. It scrutinizes spatial position and classifies layers of information for visualization by using chart displays from database analysis.This is because GIS can perform analysis, provides information and also maintains a database for a good Mango plantation management solution. Remote sensing is one of the derivation for data acquisition from the platform of the unmanned aerial vehicle (UAV) and ground-based systems. Agricultural remote

inside field inconstancy for site-explicit administration rather than uniform administration as in customary cultivating. Throughout the years, remote sensing has been extensively used for vegetation mapping in many fields. Aerial photogrammetry has been embraced for observing vegetation just as Mango plantations. If farmers are

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 2 Mar-Apr 2023, pp: 1735-1740 www.ijprajournal.com ISSN: 2249-7781

embarking on planting Mango on a big scale, they definitely need a new system that can monitor the Mango plantation area as well as to provide good quality planting management plan to ensure the quantity and quality of fruits are able to meet the consumer needs. Unlike any other fruits, Mango is seasonal fruits and Mango. In India, therefore the Mango industry is still at initial stage. Over time, we anticipate greater investment in this sector, as large-scale Mango production gains traction and proves successful. In contrast to commercial oil palm planting with proven success for about 100 years, large-scale Mango planting in India is considered young by comparison and lacks comprehensive technical know-how.

II. MATERIAL AND METHOD

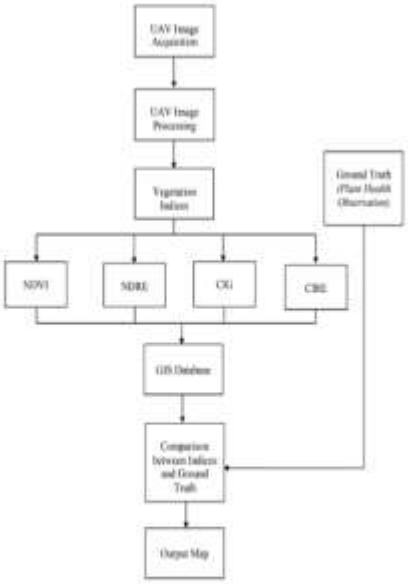


Figure 1: Workflow of the project study

The study area for this study as shown in Figure 3.1 concentrate on Mango plantation region in DBSKKV CAET, Dapoli. This site is situated in Dapoli Taluka of Ratanagiri District. Its geographic location is 17°45' 14" North, 73° 10' 47" East

i) Data acquisition

Collection of ground samples

The data consist of the total area of the Mango plantation and 5 sample of trees. The tree health is classified by healthy and unhealthy by looking at the leaves of the trees which are affected by disease. Some part of tree is selected as a sample of trees that affected by diseases. By doing ground data survey, we can import the data into GIS database. The collection of attribute data is defined as the data which has relation with features and it contains the information of tree features. The attribute data enables the plantation owners to do analysis so that improvements to the plantation management systems can be done.

Fig- shows the image of sample trees that are affected by diseases.

ii) Image acquisition

Image acquisition of Mango plantation area was captured by using multispectral camera and mounted in UAV fixed wing called UX5AG. The sensor used is Mica Sense 5 bands. The UAV is plant focused and rugged for relevant crop with an all-terrain and intuitive solution. The UAV key applications are for monitoring crop plantation area, tree characterization as well as precision farming. Despite its low payload capacity, Delair UX5AG only retains lightweight on-board multispectral camera which acquires R, G, B, Red Edge and NIR images.

iii) Image processing

The conventional photogrammetric technique cannot be used when managing the UAV

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 2 Mar-Apr 2023, pp: 1735-1740 www.ijprajournal.com ISSN: 2249-7781

pictures. Since absolute positioning information cannot be gotten, the picture preparing strategy without absolute positioning information is proposed. The technique incorporates three stages: programmed grafting, rectification and mosaic. After the above advances, correcting pictures in all flight districts should be possible rapidly, and essential is accommodated the accompanying orthorectification and classification.

iv) Analysis Of Images

Regularized Difference Red- Edge(NDRE)

NDVI is a simple matric of foliage indicator computation to descry the overall factory health condition of durian colony. The NIR value from the data accession will hit the splint of the healthy tree also reflect back the light to the atmosphere. If the quantum of chlorophyll content from the tree is low, it'll reflect low NIR value. The algorithm of the NDVI computation differentiates in the quantum of reflected intensity from NIR and RGB. The value range from NDVI computation will produce range from-1 to 1. The lower value indicates unhealthy shops while the loftiest value indicates healthy shops following the quantum of chlorophyll content. The Mica Sense Red Edge Multispectral camera from UX5AG captured R, G, B, Red Edge and NIR value.

The analysis of NDVI computation is done using Pix4D Mapper software and imported to ArcGIS software for farther analysis. Factory health algorithm similar as NDVI and NDRE can separate the proportion of light captured across different bands to cipher numerical values for each pixel of durian colony area chart. By using this value we can separate between healthy and unhealthy areas. NDVI formula is fitted in the Pix4D Mapper Index Calculator

$$NDVI = \frac{(NIR-Red)}{(NIR+Red)}$$

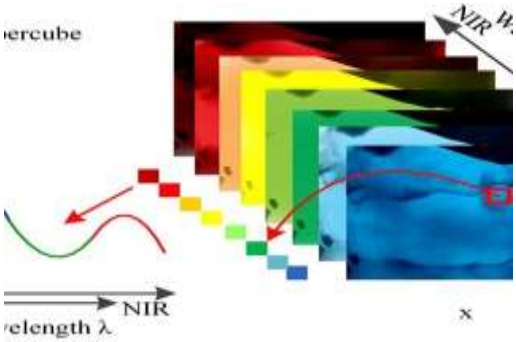
• Normalized Difference Red-

Edge(NDRE) Normalized Difference Red- Edge(NDRE) is a foliage indicator for estimating foliage health using the red- edge band. It's especially useful for estimating crop health in the medial to late stages of growth where the chlorophyll attention is fairly advanced. Also, it can be used to collude the within- field variability of nitrogen leafage to understand the toxin conditions of crops. computation of NDRE is grounded on the equations as shown below Gitelson and Merzlyak, 1994)

$$NDRE = \frac{(NIR-RedEdge)}{(NIR+RedEdge)}$$

RESULT AND DISCUSSION

Vegetation Analysis Visualization Map



Relationship between vegetation indices and Ground truth image

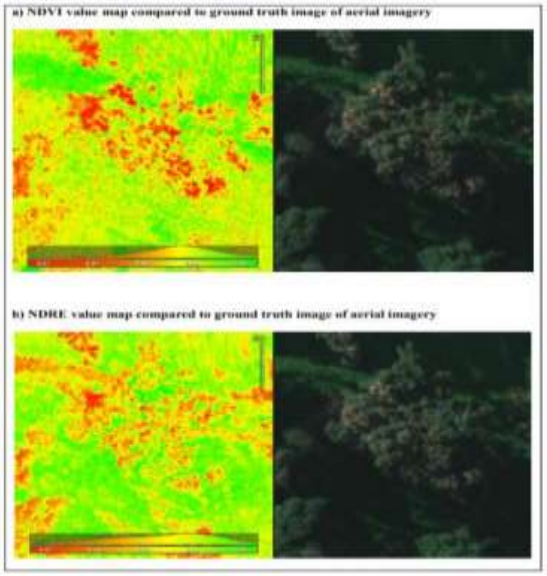


Figure 3: Vegetation Index vs ground truth

This isolation is because of the Mango trees characteristics in this study area. The distribution value that indicated infected tree with complaint is lower in NDRE chart therefore can descry better visualization of infected tree as compared to NDVI chart. NDRE chart shows easily the leaves that are affected with conditions. This will help growers to fantasize trees which are affected by conditions. thus, ground visits by growers can be minimized.(The comparison has been done using software Pix4D Field software operation. Misclassification Chart The NDRE and NDVI bracket chart is also overlaid with the ground verity trees point to see the misclassified

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 2 Mar-Apr 2023, pp: 1735-1740 www.ijprajournal.com ISSN: 2249-7781

tree. The results show that 2 trees were misclassified in the NDRE and 3 trees were misclassified in NDVI chart. The x mark represents the misclassified trees.

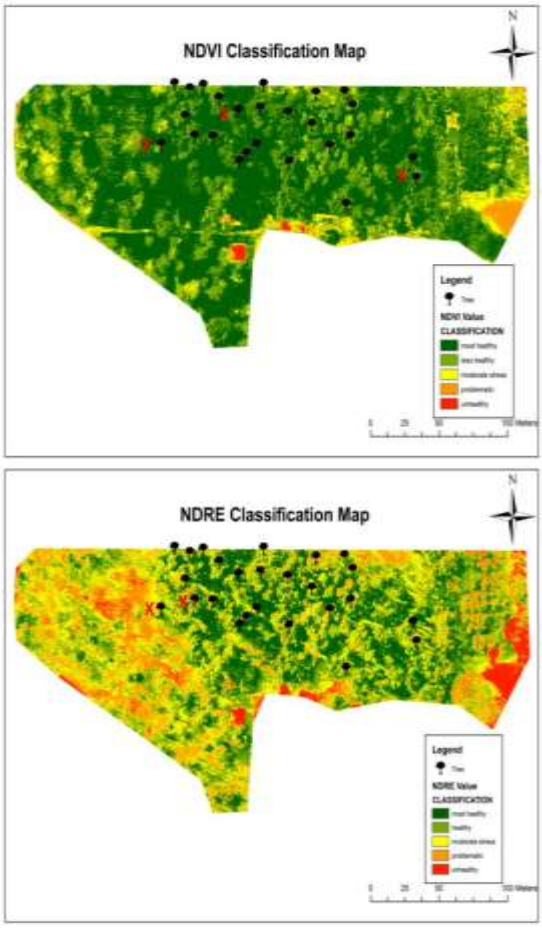


Figure 4: The overlaid map of misclassification trees with the actual ground truth observation

The spraying application of the drones used in agriculture such as agribot etc, to be used in Konkan especially Dapoli could be done using the above methods and all the below procedures. The Digital sky platform provides us the accurate and essential satellites to operate. Below are the Airspace flying zones for Konkan especially Dapoli (DBSKKV Dapoli – CAET College.)

1. Green Zone : Anyone with licence can fly the drone
2. Yellow zone : Need permission grom ground flight control center
3. Red Zone: No Flying Zone

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 2 Mar-Apr 2023, pp: 1735-1740 www.ijprajournal.com ISSN: 2249-7781

III. CONCLUSION

Remote Seeing is a rapid-fire,non-invasive and effective fashion which can acquire and dissect spectral parcels of earth shells from colorful distances, ranging from satellites to base-grounded platforms. This ultramodern technology holds pledge in agrarian crop product including crop protection. Variability in the reflectance gamuts of shops performing from circumstance of complaint and pests, allows their identification using remote seeing data. colorful spectroscopic and imaging ways like visible, infrared, multiband and luminescence spectroscopy, luminescence imaging, multispectral and hyperspectral imaging, thermography, nuclear glamorous resonance spectroscopyetc. have been studied for the discovery of factory conditions. Several of these ways have great eventuality in phytopathometry. Remote seeing technologies will be extremely helpful to greatly spatialize individual results and thereby rendering husbandry more sustainable and safe, avoiding precious use of fungicides in crop protection. Large scale husbandry of agrarian crops requireson- time discovery of conditions for complaint and pestmanagement. Remote seeing provides anon-invasive, rapid-fire, dependable, precise and accurate estimates of conditions helpingin monitoring and soothsaying pandemics. Hyperspectralremote seeing data taken from low altitude breakouts usuallyhave high spectral and spatial resolution which can be veryuseful in detecting conditions in green foliage. Multi-temporal remote seeing data have a great eventuality in cropdisease mapping at a indigenous scale. Spectra basedclassification approach is an applicable system for cropdisease identification. NDVI spectral profile between healthyand diseased crop showed large difference depicting the cropstress situation. Hence, remote seeing technology will beextremely helpful to greatly spatialize individual resultswhich in turn will render husbandry more sustainable andsafe, avoiding precious use of fungicides in cropprotection.To use the full eventuality of these largely sophisticated, innovative technologies, amulti-disciplinary approachincluding factory pathology, engineering, and informatics isrequired. A robust decision support systems by trans-correctional cooperation .

REFERENCES

[1]. Hatfield, J. L., & Prueger, J. H. (2010). Value of Using Different Vegetative Indices to Quantify Agricultural Crop Characteristics at Different Growth Stages under Varying Management Practices. 562–578. https://doi.org/10.3390/rs2020562

[2]. Myneni, R. B., Hall, F. G., Sellers, P. J., & Marshak, A. L. (1995). Interpretation of spectral vegetation indexes. IEEE Transactions on Geoscience and Remote sensing, 33(2), 481– 486. https://doi.org/10.1109/36.377948

[3]. Carmona, F., Rivas, R., & Fonnegra, D. C. (2015). Vegetation index to estimate chlorophyll content from multispectral remote sensing data. European Journal of Remote Sensing, 48, 3 19–326. https://doi.org/10.5721/EuJRS20154818

[4]. Shern, L. L. (2018). Rice Monitoring Using Obia Technique Based on Aerial Imagery (Universiti Putra Malaysia). https://doi.org/.1037//0033-2909.I26.1.78

[5]. Durio, D., Siriphanich, J., Saen, K., & Asia, E. (n.d.). Durian (Durio zibethinus Merr.). In Postharvest biology and technology of tropical and subtropical fruits: Volume 3: Cocoa to mango. https://doi.org/10.1016/B978-1-84569-735-8.50005-X

[6]. Hee, T. C. (2002). GIS-Based Management System for Durian Plantation. Universitiy Putra Malaysia.