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LAI-Color Vision and its Application on the Vegetative Crown of the Fruit Trees

Ahmed Yahya Ahmed Hammad

Professor and International Senior NARSS, Cairo, Egypt

Abstract: ***The current study conducted on field photos of fourteen varieties of fruit trees associated with special cases, the same number is their shadow, such as pale green is unhealthy, for leaves of citrus trees such as [Valencia orange], using LAI-Color Vision as new methodology to measure the Leaf Area Index-LAI and Vegetation Canopies, with helpful of standard metal mesh as a satellite image pixel window on the target, to extract 20 cm^2, on the field images, fully charged of fruit trees leaves, then digital processing, for color images and their shadows, under impact of four parameters such as [Mean, Std Dev, Median] and [data pixels] parameters. The study found that the [data pixels] Parameter is specialized to appearance of fruit trees shadow, such as reflection in the mirror for pictures of colorful fruit trees. The results proved the shade of olive trees more light about all the pictures of colorful fruit trees, believing that the olive is miracle in the Holy Qur'an.***

Keywords: LAI-Color Vision; LAI-2200C Plant Canopy Analyzer; vegetative crown; Fruit trees; miracle Holy Qur'anic; Silhouette; shading; Mean; Std Dev; Median; data pixels; Adobe Photoshop; images

1. Introduction

The objective of the study, to achieve innovative technologies input for precision farming. Estimating Leaf Area Index for Wide Area Coverage: Leaf Area Index (LAI) is defined as one-sided green leaf area per unit ground area in broadleaf canopies (Stenberg 1996). LAI is one of the important structural variables to understand the process of plant ecosystems performance and estimate productivity (Justice 1986, Baret et al. 1991, Curran et al. 1992, Gower et al. 1999). It is directly related to several physical processes of the vegetation, for example the fraction of photosynthetically active radiation that is absorbed by the canopy (Wiegand et al. 1990). Since plant canopies are composed of leaves- which is a direct source of the energy-matter interactions and which are observed by earth-observing remote sensing systems- LAI has been an attractive variable of interest in vegetation remote sensing. Since the early stage of space borne remote sensing, many attempts have been made to estimate LAI for large areas using various types of remote sensing products (Tucker 1980, Wardley et al. 1984, Turner et al. 1999). Remotely sensed estimation of LAI has been primarily based on the empirical relationship between the field-measured LAI and sensor observed spectral responses (Curran et al. 1992, Peddle et al. 1999). Remotely sensed spectral responses of green leaves are usually represented by proxy measurements or spectral vegetation indices. Normalised difference vegetation index (NDVI), for example, is one of the most widely used indices to indirectly estimate LAI. According to Justice (1986), the maximum NDVI value in a season corresponds to the maximum LAI of vegetation cover. However, vegetation indices are sensitive to the combined effect of the canopy structure and the sun-sensor geometry (Goetz 1997, Deering et al. 1999), making it difficult to develop a universal model to estimate LAI. Adequate ground- collected LAI data acquired in the study area during the satellite pass is therefore a fundamental prerequisite in remotely sensed estimation of LAI. Measuring LAI on the ground is very difficult and requires a great amount of time and efforts (Gower et al. 1999). This is particularly prevalent in forests and densely wooded areas where the canopy structure is much more complex than grasslands and agriculture systems. There are at least four widely used methods for ground based LAI estimation. **1. Cut and Measure:** This is a destructive harvesting method and directly determining the one-sided leaf area, using squared grid paper, planimeter, photographing the harvested leaves arranged in single layer and digitising, or measuring area optically based on an automatic area measurement system. This method is rarely used for large sample areas or for forest LAI estimation. **2. Proxy Parameters:** This method involves the collection of other parameters that have direct connection to the LAI, for example, collecting and weighing leaf litter fall of the area and then converting to leaf area by determining specific leaf area (leaf area/leaf mass) for sub-samples. The weight leaf area relationship is determined *a priori*. **3. Allometry:** It is commonly used in forest LAI, estimation of carbon assimilation and productivity estimation studies. This method is based on simple physical dimensions, such as stem diameter at breast height, using species-specific or stand-specific relationships based on detailed destructive measurement of a sub-sample of leaves, branches, or whole individuals. It is expensive and time consuming to develop the relationship. **4. Non-contact methods:** This method largely relies upon optical instruments to measure the LAI without direct contact. If the cost of the equipments is justifiable for the study, this method is easy and efficient. Some of the instruments and techniques often used are, e.g. the Decagon Ceptometer, the LICOR LAI-2000. Analysis of hemispheric or wide angle photographs may also be used to determine LAI. There are also other indirect-contact LAI estimation methods such as plumb lines and inclined point quadrates, which are not widely used. (Gower et al. 1999) reported that a comparison of direct and indirect estimates of across a wide variety of ecosystems resulted in discrepancies of LAI in a range of 25-30% for most canopy types. **Establishing Empirical Relation Ship between Remote Sensing Variables and LAI:** Once the ground LAI of representative areas is known, the next step is to extrapolate this value to a wide area by means remotely sensed imageries. Several authors used different type of vegetation indices to develop an empirical relationship between the ground collected and satellite-derived variables. (Peterson et al. 1987), (Curran et al. 1992), (Nemani et al 1993 and Turner et al. 1999), used NDVI and Simple Ratio (SR) to estimate allometric based ground LAI with varying success. (Nemani et al. 1993) reported the estimation strength (R^2) of NDVI to be only 0.32, (while Peterson et al 1987) showed that an R^2 of 0.91 was achievable. The allometric method itself makes use of the empirical relationship between parameters in order to determine LAI, thereby incorporating uncertainties in the relationship. In addition to the influence of the selected appropriate vegetation index, the specific type of mathematical or statistical approach applied to establish the relationship matters. (Nemani et al. 1993) found that the addition of a SWIR reflectance to NDVI improves its ability to estimate leaf area in open forest canopies. The SWIR observation improves the delineation of background materials (e.g. Soil, litter), whose influence on the vegetation index increases with decreasing canopy closure. Using a geometric-optical model, (Brown et al 2000) found that simulated Reduced Simple Ratio (RSR) has a reduced range of LAI compared to SR for a variety of realistic background reflectance conditions in the boreal forest. Their results suggest that improved LAI estimates can be obtained using the RSR in place of SR observations.

2. Materials and Methods

2.1 Technical Summary

A. Calculating Vis: This study tests some of the widely used VIs derived from MODIS Terra imagery to find out the most suitable one for estimation of LAI in the Ethiopian Rift Valley and its immediate surroundings. The indices selected the required MODIS bands to calculate them and their unique characteristics.

B. Ground Collected LAI: Half-meter by half-meter quadrants were demarcated in the 44 stratified random samples Grasses and herbs were harvested, their green biomass was weighed at the site and the area of each leaf in the sample was measured digitally. The sampling was only applied to land cover classes dominated by grass and herbaceous plant as well as to agriculture fields that are fairly homogeneous to represent a MODIS pixel. Because the aim of this study emphasizes on investigation of ecosystem productivity in terms of animal feed, wooded areas were of no particular interest during biomass modeling. The influence of few scattered trees on the entire pixel is assumed to be too insignificant to interfere in the empirical modeling process. Random samples, which were found to contain sizable woody vegetation components, were excluded from data collection.

C. Correlation of LAI and Vis: Leaf Area Index was found to correlate strongly with all vegetation indices calculated from the MODIS image and with green biomass harvested at the same time. Only the Tasseled Cap greenness index and SAVI exhibited correlation coefficients less than 0.8 with both LAI and green biomass. Though it was expected that SAVI might not be performing like the others owing to the prevalence of green vegetation during the month the MODIS image was acquired, Tasseled Cap greenness presumed to perform better than it did. Probably the prototype MODIS Tasseled Cap coefficients that are used in this study still need further investigations before they are applied globally (Zhang et al 2002). The 'corrected' NDVI (NDVIc) excelled marginally in its correlation with biophysical measures of LAI and biomass, (Muzein, et al 2006).

Leaf area index (**LAI**) is a dimensionless quantity that characterizes plant canopies. It is defined as the one-sided green leaf area per unit ground surface area (*LAI = leaf area / ground area, m^2 / m^2*) in broadleaf canopies, (Watson 1947) In conifers, three definitions for LAI have been used: *

Half of the total needle surface area per unit ground surface area, (Chen & Black 1992). * Projected (or one-sided, in accordance the definition for broadleaf canopies) needle area per unit ground area. * Total needle surface area per unit ground area. LAI ranges from 0 (bare ground) to over 10 (dense conifer forests).

Interpretation and application of LAI, see Photo Gallery 1: LAI is used to predict photosynthetic primary production, evapotranspiration and as a reference tool for crop growth. As such, LAI plays an essential role in theoretical production ecology. An inverse exponential relation between LAI and light interception, which is linearly proportional to the primary production rate, has been established: [citation needed]. Where Pmax designates the maximum primary production and designates a crop- specific growth coefficient. This inverse exponential function is called the primary production function.

Determining LAI: LAI can be determined directly by taking a statistically significant sample of foliage from a plant canopy, measuring the leaf area per sample plot and dividing it by the plot land surface area. Indirect methods measure canopy geometry or light extinction and relate it to LAI, (Breda 2003).

Direct methods: Direct methods can be easily applied on deciduous species by collecting leaves during leaf fall in traps of certain area distributed below the canopy. The area of the collected leaves can be measured using a leaf area meter or an image scanner and image analysis software. The measured leaf area can then be divided by the area of the traps to obtain LAI. Alternatively, leaf area can be measured on a sub-sample of the collected leaves and linked to the leaf dry mass (e.g. via Specific Leaf Area, SLA ^{cm2}/g). That way it is not necessary to measure the area of all leaves one by one, but weigh the collected leaves after drying (at 60–80 °C for 48 h). Leaf dry mass multiplied by the specific leaf area is converted into leaf area. Direct methods in evergreen species are necessarily destructive. However, they are widely used in crops and pastures by harvesting the vegetation and measuring leaf area within a certain ground surface area. It is very difficult (and also unethical) to apply such destructive techniques in natural ecosystems, particularly in forests of evergreen tree species. Foresters have developed techniques that determine leaf area in evergreen forests through allometric relationships. Due to the difficulties and the limitations of the direct methods for estimating LAI, they are mostly used as reference for indirect methods that are easier and faster to apply.

Indirect methods, Photo Gallery 2: A hemispherical photograph of forest canopy. The ratio of the area of canopy to sky is used to approximate LAI. Indirect methods of estimating LAI *in situ* can be divided in two categories: (1) indirect contact LAI measurements such as plumb lines and inclined point quadrats (2) indirect non-contact measurements. Due to the subjectivity and labor involved with the first method, indirect non-contact measurements are typically preferred. Non- contact LAI tools, such as hemispherical photography, Hemiview Plant Canopy Analyser from Delta-T Devices, the CI-110 Plant Canopy Analyzer[1] from CID Bio-Science, LAI-2200 Plant Canopy Analyzer [2] from LI-COR Biosciences and the LP-80 LAI ceptometer [3] from Decagon, measure LAI in a non-destructive way. Hemispherical photography methods estimate LAI and other canopy structure attributes from analyzing upward-looking fisheye photographs taken beneath the plant canopy. The LAI- 2200 calculates LAI and other canopy structure attributes from solar radiation measurements made with a wide-angle optical sensor. Measurements made above and below the canopy are used to determine canopy light interception at five angles, from which LAI is computed using a model of radiative transfer in vegetative canopies. The LP-80 calculates LAI by means of measuring the difference between light levels above the canopy and at ground level, and factoring in the leaf angle distribution, solar zenith angle, and plant extinction coefficient. Such indirect methods, where LAI is calculated based upon observations of other variables (canopy geometry, light interception, leaf length and width, (Blanco Folegatti 2003). are generally faster, amenable to automation, and thereby allow for a larger number of spatial samples to be obtained. For reasons of convenience when compared to the direct (destructive) methods, these tools are becoming more and more important.

Disadvantages of methods: The disadvantage of the direct method is that it is destructive, time consuming and expensive, especially if the study area is very large. The disadvantage of the indirect method is that in some cases it can underestimate the value of LAI in very dense canopies, as it does not account for leaves that lie on each other, and essentially act as one leaf according to the theoretical LAI models, (Wilhelm, et al. 2000). Ignorance of non-randomness within canopies may cause underestimation of LAI up to 25%, introducing path length distribution in the indirect method can improve the measuring accuracy of LAI, (Ronghai, et al. 2014), [4].

Leaf Area Index, Leaf area index and light interception, Photo Gallery 3: Leaf area index (LAI) is the ratio of leaf surface over of soil surface. LAI is the figure that indicates from a plant, the number of layers that can be covered with leaves from that plant on the soil surface where the plant is growing. For example: a Leave Area Index of 3 means that with all the leaves of this crop the soil, on which it is growing, can be covered with three layers of leaves. Leaf area index is determined measuring the surface of all the leaves of a plant. The sum of these leave surfaces is divided by the surface of soil that a plant occupies. In a crop with a closed canopy and 40 000 plants per hectare, one plant occupies 2500 cm2 soil surface. With a LAI=3 the total surface of all the leaves of the plant then totals 7500 cm2). For the determination of the LAI the plant cannot be kept intact, while also the determination of the LAI is labour intensive. Leaf area index (LAI) and percentage of soil coverage with green leaves Often the more practical method to determine the leaf size as an indication for light interception is the determination of the percentage of soil coverage by green leaves. With a LAI of 3 almost 100% of the incoming light is intercepted and thus LAI = 3 corresponds with a soil coverage of 100%, [5].

The definition of leaf area index, Photo Gallery 4: In many textbooks, leaf area index (LAI) is defined as the total leaf area per unit ground area. I want to know LAI is defined only by leaves that are directly above the ground (e.g., perpendicular to the ground)? Is LAI independent of the position of the sun? Biology Stack Exchange is a question and answer site for biology researchers, academics, and students. It's 100% free, no registration required, [6].

Scientific technical visualization of the scientific idea for LAI-2200C Plant Canopy Analyzer, Photo Gallery 5 and our Leaf area index, Photo Gallery 6: Imagine creative technician The technology of the LAI-2200 is the most commonly used indirect LAI measurement technology worldwide. Leaf Area Index (LAI) is the ratio of foliage area to ground area. The LAI-2200 computes LAI from measurements made above the canopy and below the canopy, which are used to determine canopy light interception at 5 angles. These data are fit to a well-established model of radiative transfer inside vegetative canopies to compute leaf area index, mean tilt angle, and canopy gap fraction, (Hammad, A.Y. 2012).

2.2 Measurement and computation

First sector: LAI-Color Vision is a new methodology to measure the [Leaf Area Index], to conduct this technique, invented a solid grid one square meter, and divided into ten square cm representatives to the area of the satellite image pixel window on the target, for field used horizontally position on herbal plants or vertically on the vegetative crown of the fruit trees, for optimal study of shadows: better measurement and imaging of four directions for one tree, in current study, the field work was in the direction side of the shadow of the tree on the ground, stabilized by hand or holder, subsequently snapshot, by digital camera, for the objective on the image is to be standard descriptive. Transfer to laboratory work for digital image processing, on the photo software such as Adobe Photoshop, and other image processing software, then getting four adjacent squares of solid grid center on the image, representatives 20 cm square, and next step installations one adjustment for all images, in this study it was composite adjustment layers, such as Auto -contrast Above Auto -color for Silhouette processing final images for each tree, composite image associated with composite image and their output data of [Mean, Std Dev, Medianand data pixels] parameters, as in the visuals (Photo Gallery 11). LAI-Color Vision images and their data used with the data of LAI-2200C Plant Canopy Analyzer or used independently.

Second Sector: LAI-2200C Plant Canopy Analyzer, World standard for indirect LAI measurements, Photo

Gallery 7: The LAI 2200C Plant Canopy Analyzer uses a non-destructive method to easily and accurately measure Leaf Area Index (LAI). It consistently outperforms other methods such as Ceptometry and Hemispherical Photography in terms of flexibility, advanced features, accuracy, and ease of use, [7]. **LAI-2200C Applications:** The technology of the LAI-2200C Plant Canopy Analyzer is used in a wide range of applications, including studies of canopy growth, canopy productivity, forest vigor, canopy fuel load, air pollution deposition modeling, insect defoliation studies and remote sensing. LAI is also one of the fundamental measurements associated with carbon flux studies and global carbon cycle research. The technology of the LAI-2200C and its predecessor, the LAI-2000, is the most commonly used indirect LAI measurement technology worldwide, [8].

Leaf Area Photo G**allery 8:** Measuring the leaf area of plants spans many scientific disciplines. Monitoring the distribution and changes of leaf area is important for assessing growth and vigour of vegetation on the planet. A measurement that is seemingly so simple and fundamental is really the backbone that provides the framework for further research in areas like ecology, agronomy, entomology, and carbon cycle research and plant pathology. These and many other disciplines rely on the measurement of leaf area in much of their work, [9].

3. Results and Discussion

First sector LAI-Color Vision: In the Main Table No.1, and its associated graphs, from (1-8), according to data from Histograms, associated with images of vegetable crowns at fruit tree and its shades, in 20 cm^2, from the network center, Number 14 Histogram, for color images, output of digital processing, by install the physical state of all images with a “Auto color” then “Auto contrast” layer, respectively, similar 14, for digital processing their shadows, and digital processing (shadows), after digital processing of color images, see the Photo Gallery 11, all digital data is statistical, related to the physical properties of fruit leaf image pixels, in field work, and their shadows, the number of pictures is fourteen varieties of fruit trees associated with special cases, the same number is their shadow, such as pale green is unhealthy, for leaves of citrus trees such as [Valencia orange]. The effect of the difference in the size of the leaves in the Valencia orange, the effect of the photograph direction, around the fruit tree, the effect of the inclination angles / Tilt angles, such as, the inclination angle of photography, the angles of the geometric position of the leaves site position on the tree, the distance and proximity to the fruit tree during filming, and cases of young & old growing of Mango leaves, the study included the vegetative crown of following species: Pomegranate , Date palm, Apricot , Olive (two plant strain), Valencia orange, Mango, Peaches, Banana, 'Keitt' mango, (nine types of fruit trees), without special cases, in the statement Digital, in the main table, to reach the number of the different images of fruit trees, and their shadows to fourteen pictures, (See photo gallery). The numeric data in the main table, arranged in ascending order, under four statistical parameters, each parameter is influential in numeric data, the standard scientific term for statistical parameters are Mean, Std Dev, Median for the Pixels in the image and Pixels (Represents the number of pixels in the image), distributed under them as ascending order its digital statement, as in the main table, for each photo of the fruit tree leaves in 20 cm square, against the same ascending order of digital data values for their shadows, the four parameters are combined with **Histograms**, as in **(Photo Gallery 10 and 11)**, for all color images and their shadows, the associated histograms in RGB- Mod , even though the shadow for leaves of fruit trees looks like Black and white / in grayscale, but the digital processor of the shadows in RGB- Mod, this is visual vision different and numeric value than Grayscale –Mode and black and white-Mode (photocopy-Mode), the statistical results confirmed, that interactive physical characteristics, as follows in the discussion, for leaves of the fruit trees, coupled with their shadows, and from the results of its statistical digital outputs, function on them and from reality of their digital manifestation in twenty-eight histograms, as measurement of color images and their shadows, to form 112 numbers evenly distributed between color images, and their shadows, according to their digital output, in the histograms associated with them, the function of the retina to obtain 20 square cm of the fruit tree leaves, without override or decreases, for leaves surface area , Which appear behind the retina window, 20 square cm from focal point of mesh one square meter, the discussion of results as follows: In general and according to the main table, and Graphical 1-8, outputs of statistical data associated with Histograms in the (photo gallery). Despite the difference in numbers, subsequently ascending order, for each of the fourteen leaves of representatives fruit trees , in the main table, its eight graphs, but they take the same trend, under the four statistical tests, the shadows are considered a fingerprint confirmed and characteristic of the fruit trees, under the four statistical tests, for each statement of the color image, its shadows, this general stability, in the graph Line, for each unit of color image data and its shadow, under one statistical test, due to a state of Physical equivalence, in the process of transforming the color image into its shadows, under one statistical test, this Physical equivalence appears under multiple samples entering the reaction under one parameter, despite the difference in ascending numerical order, for each of the fourteen kind and their shades, this physical properties phenomenon , when digitized, from the color image of fruit trees, to their shadows, is equivalent to a relative physicist, its reference to the one clan, the fruit tree family, irrespective of differences in species, is relative physical equivalent, reference to harmony of the one tribe, of the fruit tree clan, regardless of differences in species, except one statistical parameter, gives homogeneity of the tribe, combined with the distribution of various fruit trees, representative of the same distribution in their shadows, such as the mirror, as relative, as shown, in Graphs 7 and 8, representative of the pixels number of color images, and their shadows, this is an honest representation and classification of the fruit trees shadows, according to the digital data of their colorful images and their shadows. In general, as in the summary table of averages 2, found a digital exchange such as the highest value, with the lowest numerical value, for the color image data of the fruit leaves in 20 cm square, with its shades, under the statistical parameters, the four, and the highest value for the number of pixels of the color image with their shadows, under the four statistical parameters, and settle down the highest value for the pixels number of the color images, compared to their shadows were the lowest value. For appearance the correlation between the group of fruit trees and their shadows, under the influence of the four statistical analyzes, as in Table 3, and follow the analyzes colors, First: under Mean, Peaches are concentrated in fourth place, in the ascending order of the numeric values of the color images and their shadows, it turns out of the digital comparisons between color images and their shadows, digital assemblies, separate in groups of different fruit trees leaves and their shadows, such as vegetable clusters, separate, it looks like coups in ascending order, In both columns, view stability to arrange numeric data for a group of different leaves, at the bottom of the two columns, approximately, the peach is concentrated in the second order, at the top of the group, of the color image data, while reflected at the bottom of the shadow column. For those separate groups, they do not appear except by comparison between the two columns, data colorful images of leaves fruit trees and their shadows. In general, the parameter Mean, negative representation for the classification of the shadows of fruit trees, but has physical properties, data of fruit tree images and shadows, such as inversion processes, and at the time stability in the ascending order, in both columns, there is a pivotal category, fixed in the ascending order, in both columns, such as peach, that is, seeing the fruit trees under the parameter Mean, although it is a distorted vision, But is physically neutral, relative equivalence as previously mentioned, see Histograms of 1-6, this physical equivalence, this Physical equivalence, does not appear, except for a large number of samples, for fruit tree leaves of different varieties and cases.

Second: Under the statistical parameter Std Dev, this is one of the most important statistical parameters, considered Std Dev for data under each column are significant value and qualitative comparison of the digital data of color images with their shadows, honest of the pivotal direction, which reflected, in the direction of data, from bottom to top, for shadows data, with data of color images of the vegetative mass of the leaves of different fruit trees, the data of the shade of fruit tree leaves, when compared, with their color images and digital processing detection, an autism photographic standard, in the data of Banana & Olive 2, they form a group in reflexive mode and coup, for each other, Their pixel values are deposited in the color image data column, while they are at the top of their shadow column data. Break up Collection : Valencia orange 3, Peache, Valencia orange 2, Olive 1, Mango Young Growth, Date palm, Valencia range 1 & Pomegranate, according to for the descending order of digital data in a single series, combined with a scattered distribution of their shadow data, penetrates it the Valencia orange -Unhealthy growths, l ate at the bottom of that string, while it is at the top of the color image data column, as well as penetrated by a group [Mango Keitt & Mango Growing older], by late shift for being at the top of the color data column, the Apricot remains deposited in the data column of the shadows, while it is the second top, in the color image data column. In general, specified for regular separation for groups in a column of Color image data is the data of their shadows, the separation is determined in three groups, while scenes of independence of Valencia orange -Unhealthy growths and Apricot at the top of the color data column.

Third: Under the statistical parameter Median, in general the sensor to classify the digital data of fruit leaf images, it is according to their shadow data, as general under Median, the classified groups, taking the situation of the coup, under their shadow, at the top and bottom of the data under the shadow column, do not express the type of leaves of fruit trees, under the Color data column, as general fifth group, under the shadows data column located in the last data, the same group approaches them under colored images data, late at the bottom of the data, while the fourth group is pivotal, in the same position as the ascending order of the data under the color image column data, under their shadow, are located in the same positions of ascending order, when numbers 8, 9, and where the number 10 is pivotal of the same order for Valencia orange 1 data, under its shadow, a sudden large decline occurs in numerical value from level 9 to level 10, the data takes a descending order of 10 sudden slope, and drops to 3, a difference of seven degrees, then a clustered assembly of the Valencia 1 orange numeric statement occurs, with Olive 1 & Banana, recording a single numerical 3 value, meaning that Valencia orange 1, under the column of color images, is equivalent to the data of the above three types, under the column data shadows, in the three preceding parameters, the shadows data affect the separation of data under the color image, shading data, is considered change detection, of color image data, all of them, including the phenomenon of the coup, it is characterized by digital data of digital images, as a whole. And under the shadow data column, Group 2 shared with Group 3, in a single digit statement is 57, shared between, Valencia orange -Unhealthy growths and Mango Young Growth and unique Olive 2 is Top Data Shadows, registered statistical number of Median pixels is 118.

Fourthly: Under the statistical parameter, the [Pixels Number] per unit area is 20 square centimeters, this is one of the most important parameters, the sun in the classification of fruit trees leaves, from their shadows, here the shadows are classified for leaves of different fruit trees such as their image in the mirror, according to the ascending order of the digital data under the color images of tree leaves, then to their shadows. The Table under [Pixels Number] Physically balanced, in general, the data is divided under the color image column, and their shadows into two main sections, section data with great numerical value, the data section with the lowest graphical value and lack of intermediate values, the separation of three groups, under the two sections above mentioned, the middle group [Group 2], Valencia orange data representative, Centrally classification, showing clearly the highest data representing fruit tree leaves of Valencia orange -Unhealthy growths, in the color image data, and under the column of their shadows, therefore this parameter represents the number of pixels in 20 cm square is change detection, for unhealthy citrus leaves, such as Valencia orange -Unhealthy growths in a group Valencia orange data and an axial link between the higher and lower value sections, nevertheless it considered representative in the top value section, it is specified for the end of the highest value chain. The third group, is a regular trilogy at the bottom of the columns, while the first group is a regular series, in both columns, despite the penetration power of Valencia orange, as high value, in the first series under the pixel shadow column, for leaves fruit trees, in 20 cm square. Valencia orange group, anchored itself in the middle values, belong to the lowest value, nevertheless Valencia orange 2, showed a chromatic diffraction belonging to higher values, this is due to the difference in the size of the tree leaves, geometrical morphology of leaves, a determinant factor for data values and effective height and low, to become the Parameter of the [Pixels Number], under the column of shadows, is sensitive for the geometrical size of the fruit tree leaves, if it was Valencia orange 2, representative of the end of Valencia orange group, under colored images column, it statement would be takes an affiliation in the direction a higher sense, under the shadows data column, sense of a true chromatic reflection. In general found that, Olive 2 is highest value, under the column of shadows at the parameter Mean ‹Median, the second highest values at the parameter Std Dev, frequented within the highest values at the parameter {Median and Mean}. In the opposite direction, under the color image pixel data column, characterized as the second minimum values at the parameter Std Dev, to convergence Olive 2 with Olive 1‹ include the highest values under parameter and the number of pixels for both color image pixel data and the pixels their shadows, in a numerical sequence, more over the same location of the descending order, with disregard penetration of Valencia orange 2, Include the highest values under the [Fruit Tree Shadow] column data. Found summit competition triangular of the data, for fruit tree leaves: Mango Keitt ‹Apricot ‹Valencia orange -Unhealthy growths, at parameters [Mean ‹Std Dev and Median], categorized summit Centrally, climb up Peache instead of Valencia orange -Unhealthy growth in summit competition triangular under column data of the [Pixels Data] for the color images, it is known that Peache belongs to a vegetarian affiliation to Apricot. Banana isolated as small value under column [Pixels Data] of color images, with Olive 2, at Std Dev, to together reflect in Summit, flip-flop / conductive mode for each other, under the column of shadows. Equal to the lowest five values, for the same five varieties, under column data pixels of color images, at both parameters, Mean ‹Median, despite differences their positions in the descending order between them, some of these varieties are formed in the lowest values In both parameters, triple of them below the parameter Std Dev, they [Valencia orange 1 ‹Pomegranate and Date palm‹], be quadruple with absence of Olive 1, representative under the parameter Mean, with other competing items in the lowest digital value, such as Mango Young Growth ‹Olive 2 and Banana, as well as Banana ‹ Valencia orange -Unhealthy growths ‹Valencia orange 3 ‹Mango Young Growth and Mango Growing older under barometer data pixels, at columns color images. On the other hand, under the summit data of the shadows leaves columns for the fruit tree leaves pixels , found that the five classes under the parameter Mean, representing some of them under the rest of the parameters, for example, under the Std Dev parameter, representative an affiliation of the highest value of the five summit under the parameter Mean: Olive 2, Valencia orange 3 and Banana, under the Median parameter found Olive 2 ‹Valencia orange 3 ‹Mango Young Growth ‹ Peach and Mango Growing older, similarly under the data pixels parameter was seen Olive 2 ‹Peache and Banana, to become Olive 2, is the participant in the top and prevailing firmly, under the shadows columns in four parameters. In the direction of the least value of the shadow columns data, under the order of the four parameters, find the following: Under parameter Mean, the five micro-data or the lowest value of the fruit trees leaves data in 20 cm^2 from the retina window, representative of them the belonging to the lowest values of the fruit tree leaves shades, for five varieties: Valencia orange 1 ‹Olive 1 ‹Pomegranate ‹

Date palm ‹Valencia orange 2 ‹Apricot, this is under the Std Dev parameter, while under the parameter Median, represented varieties: Valencia orange 1 ‹Olive 1 and Banana, with a digital unity for them which is number 3, there is no digital distinction between them, then Pomegranate and Date palm, with absence of Valencia orange 2, Apricot, not as the two representatives under the parameter Mean, while a trilogy of the five categories appears below Mean, were representative in the parameter under the data pixels belonging to the least value under Mean, they Valencia orange 1 ‹Pomegranate and Date palm, nevertheless Pomegranate classified within the highest values under the data pixels Parameter, contrary to belong of the lower value under the parameters [Mean ‹Std Dev and Median]. Table 4: Descending order, a general digital vision, f or pixel data columns and color images, associated with the columns of their shadows, each under the parameter it represents, for the four parameters, found the following, of physical properties of color image data coupled with their shadow data: Under Mean parameter, all the lowest value of shadows parameters separated from the pixel data of their color images, while climbing separate and isolated from them and independent digital statement, [Olive 2] 94.74, to the highest value data range, within the color image pixel data, after this, the color image pixel data starts in the regression towards the lower values starting at the value 89.53, for color image pixels of [Valencia orange 1] species, to be [Olive 2] 94.74, shadow is the separator between the highest and lowest values of fruit tree leaves pixels for color images, while [Olive 2] 104.2 in the {Mean Color Pixels}, is the delineator and separator between the highest colored values, and between the intermediate, colored values. Under the parameters Std Dev, the mass set values of the shadows reflected, it is at the top of the data, while color pixels are the lowest values, to be [Olive 1] 77.63, Std Dev Shades, are the separator between the highest shadow values and between intermediate values shadows, the Peache, Valencia orange-Unhealthy growths , Valencia orange 2 and Apricot Piercing and competing the lowest values of shadows, they are pixels values of color images, in general, shadows values are representative them for the above mentioned varieties, as the higher, middle and lower values respectively for color image pixels. Under the parameter Median, the rise of [Olive 2] 118 shades, to the top of digital data for color image pixels, it is the second highest numerical value, after Apricot 132 pixels color value, then descend Pixel values of color images up to their lowest values, under it shades are merge and unite of Valencia orange -Unhealthy growth with Mango Young Growth, as unified number is 57 Median shades, with a vision, the difference digital multiplication between this number and [Olive 2] 118 value shades, a severe refraction of the shadows of fruit trees, against the shade of Olive trees, then the chromatic number is deposited, for pixels of fruit trees leaves colorful of Valencia orange 2, to unite in number 55 shadows of Peache trees, this is the first digital union between the shadows of fruit tree leaves, with pixels of another fruit tree image, to begin after this digital unity, a sharp decline in the values of the fruit trees shadows, even Pomegranate representative digital [1] shades. Under Parameter data pixels, is a the optimal model, for the relationship of leaves fruit trees, with their shadows, such as facial reflection in the mirror, a sincere statement of leaves fruit trees and reflect their shadows, the Shadows generally capture the highest value in the data pixels, compared with their colorful images, the data pixels, of fruit trees leaves are moving to the gradient of the highest value, represented by Mango Keitt and its shadow, to the lowest value representative by Mango Growing older and its shadow, note that [Olive 2], followed it [Olive 1], in descending order, to form an olive band, from serial number 8-11 and in the serial number 1 & 3 Valencia orange, is serial number 18-21 Double succession, both shadow data precedes for pixels data of Their colorful images, the same dual succession, between Date palm and Mango Young Growth, at the end of the minimum of data pixels, formed Mango Group, consisting of chromatic Mango Young Growth, then Mango Growing older shades and the lowest digital level of a parameter, the data pixels is Mango Growing older, 69660, Colorful pixels in 20 cm^2 , followed Valencia orange -Unhealthy growths, located directly the [Valencia orange 3 & 1] area, while separated from them Valencia orange 2, shades in the advanced position up at serial number 5, between Peache and Apricot, while a delayed statement of the colored data pixels of [Valencia orange 2] as border separator between Date palm and Mango Young Growth shades, on the other hand between the number of their colored data pixels, at serial number 24. Table 5: expression about the proportion of digital data to each other, associated with expressed as a percentage in the form of integer, this is a weak expression, not suitable for statistical operations, for this purpose the expression must be on a percentage with a fraction, nevertheless can benefit from this integer %, to see how harmonious of Fruit trees clan to each other, under the colored data pixels of fruit trees leave images, with their shadows at the four parameters, as in the context of the following discussion, overview where [Olive 2] isolated shades, registered 12%, at the top of Mean parameter, is highest percentage, even for the percentage of pixels of color images, followed directly [Olive 2] shadow, registered 29%, at the top of Median parameter, the next to them Mango Keitt, 15%, Colored, a scientific reality unfolds [Olive 2] shades, generally are the highest percentage, for the colored data pixels columns and their shadows, under the four statistical systems, then all the percentages in the four parameters, descending to reach the zero% at Pomegranate, under the shadow column, in the Median statistical test. Appearance of spreading the phenomenon of [agglomeration and autism] digital, percentage, this is an evidence of the severity physical harmony of the fruit trees clan and to each other, found under the Median parameter, independence partial, in the top of the column of shadows, as well as slight partial independence of data, Under test the colored data pixels. If fractions appear for percentages, the result will be significant differences, because the four tests are statistical, all of their outputs have significant differences, the value of digital autism in the percentage test, the expression of intensity degree of phytoplankton/ Physical vegetarian affiliation, even there is a digital affiliation between [Olive 2 with Olive 1], percentage, at the colored data pixels.

Second Sector: LAI-2200C Plant Canopy Analyzer, World standard for indirect LAI measurements applications on the shades of fruit trees

4. Conclusion

LAI -color vision is the first world's technique, for accurate statistical and physical calculation, for the LAI -process, the system can work independently, or added it to LAI-device, with the installation of a small camera, and add physical statistical software, and by concept of philosophy precision agriculture for fruit trees: LAI -color vision is the real time and navigation of the precision agriculture. scientific facts, the fruit trees went up and raced their shadows under parameters [Mean and Median], while at the horizon [Olive 2], preceded by its shadow, under [Std Dev] and data pixels] parameters, the shadows data of the olive trees are high for all values as a whole, whatever the values of color pixels or the pixel values of their shadows, believing that the olive is miracle in the Qur'an. In the future, work on calculations derived from the four parameters: Mean, Median Std Dev, number of pixels in 20 cm^2, the applications on all targets charged on all kinds of the images, films, videos, since the world's first camera images and even the latest camera pictures in the world, the applications on all extracted images, from all sensors, the applications of all imaging outputs from the full electromagnetic spectrum, the applications in all scientific fields, and on all targets that appear on satellite image. If the [data pixels] is the best parameter, to represent, the shadows of trees, such as the face in the mirror, the other three parameters give change detection, statistical and physical, to explanation the data under the [data pixels].

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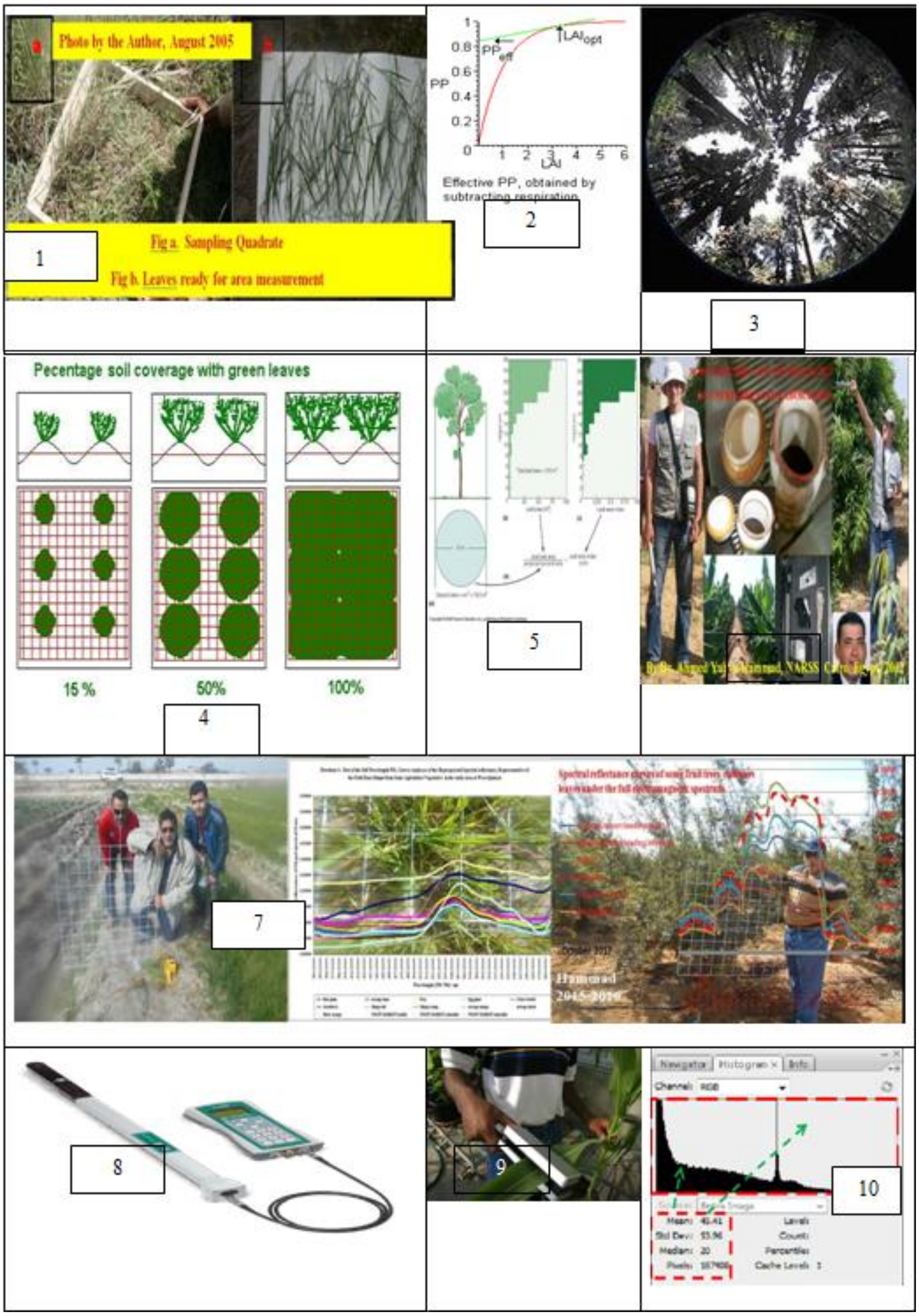
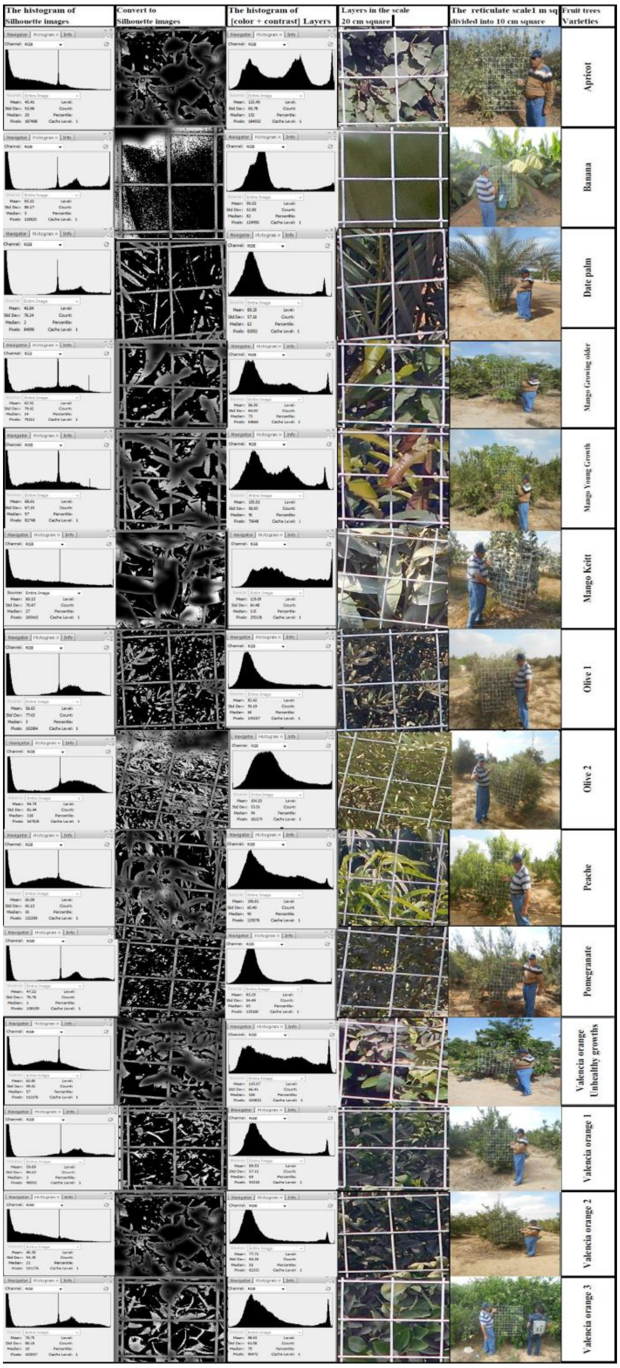
Photo Gallery: References



First sector: LAI-Color Vision results

Photo Gallery: 11, Photo Gallery number 11: After field operations getting the digital images convert to silhouette images at the same time direct access to auto-histograms included output data under [Mean, Std Dev, Medianand data pixels] parameters, acquisition data through a mesh window 20 cm square, center of one square meter in vertically and parallel mode to the target such as the vegetative crown of the fruit trees, this is a new methodology to measure the Leaf Area Index and cover vegetarian.



The Main Table No.1, and its associated graphs, from (1-8), according to data from Histograms, associated with images of vegetable crowns at fruit tree and its shades, in 20 cm square, from the network center, The data is in descending order The data is in descending order mode under [Mean, Std Dev, Medianand data pixels] parameters, for digital image data, and its shadow.

The Std Dev histogram for color photos processing			The Std Dev histogram of Silhouette images		
1	66.41	Valencia orange -Unhealthy growths	1	89.17	Banana
2	65.78	Apricot	2	81.44	Olive 2
3	64.48	Mango Keitt	3	80.23	Valencia orange 1
4	64.03	Mango Growing older	4	80.18	Valencia orange 3
5	61.58	Valencia orange 3	5	77.63	Olive 1
6	60.40	Peache	6	76.76	Pomegranate
7	60.28	Valencia orange 2	7	76.24	Date palm
8	59.19	Olive 1	8	70.47	Mango Keitt
9	58.03	Mango Young Growth	9	70.02	Mango Growing older
10	57.18	Date palm	10	67.15	Mango Young Growth
11	57.11	Valencia orange 1	11	66.13	Peache
12	54.49	Pomegranate	12	59.42	Valencia orange -Unhealthy growths
13	53.31	Olive 2	13	54.35	Valencia orange 2
14	52.85	Banana	14	53.96	Apricot
Average	59.65		Average	71.65	
The Median histogram for color photos processing			The Median histogram of Silhouette images		
1	132.00	Apricot	1	118.00	Olive 2
2	115.00	Mango Keitt	2	57.00	Valencia orange -Unhealthy growths
3	106.00	Valencia orange -Unhealthy growths	3	57.00	Mango Young Growth
4	94.00	Olive 2	4	55.00	Peache
5	91.00	Mango Young Growth	5	27.00	Mango Keitt
6	90.00	Peache	6	21.00	Valencia orange 2
7	82.00	Banana	7	20.00	Apricot
8	79.00	Valencia orange 3	8	14.00	Mango Growing older
9	73.00	Mango Growing older	9	10.00	Valencia orange 3
10	69.00	Valencia orange 1	10	3.00	Valencia orange 1
11	63.00	Pomegranate	11	3.00	Olive 1
12	62.00	Date palm	12	3.00	Banana
13	60.00	Olive 1	13	2.00	Date palm
14	55.00	Valencia orange 2	14	1.00	Pomegranate
Average	83.64		Average	27.93	
The Mean histogram for color photos processing			The Mean histogram of Silhouette images		
1	129.09	Mango Keitt	1	94.74	Olive 2
2	125.49	Apricot	2	70.75	Valencia orange 3
3	115.67	Valencia orange -Unhealthy growths	3	68.61	Mango Young Growth
4	106.61	Peache	4	65.09	Peache
5	105.01	Mango Young Growth	5	63.22	Banana
6	104.20	Olive 2	6	62.92	Mango Growing older
7	98.43	Valencia orange 3	7	62.85	Valencia orange -Unhealthy growths
8	96.65	Mango Growing older	8	60.13	Mango Keitt
9	95.03	Banana	9	59.69	Valencia orange 1
10	89.53	Valencia orange 1	10	56.30	Olive 1
11	83.42	Olive 1	11	47.22	Pomegranate
12	83.25	Pomegranate	12	46.84	Date palm
13	80.28	Date palm	13	46.50	Valencia orange 2
14	77.71	Valencia orange 2	14	45.14	Apricot
Average	99.31		Average	60.71	
The Pixels histogram for color photos processing			The Pixels histogram of Silhouette images		
1	255136.00	Mango Keitt	1	265415.00	Mango Keitt
2	225576.00	Peache	2	232299.00	Peache
3	184032.00	Apricot	3	191376.00	Valencia orange 2
4	162174.00	Olive 2	4	187408.00	Apricot
5	145157.00	Olive 1	5	167628.00	Olive 2
6	135168.00	Pomegranate	6	152084.00	Olive 1
7	124956.00	Banana	7	138159.00	Pomegranate
8	104832.00	Valencia orange -Unhealthy growths	8	128520.00	Banana
9	95472.00	Valencia orange 3	9	112176.00	Valencia orange -Unhealthy growths
10	93318.00	Valencia orange 1	10	103037.00	Valencia orange 3
11	82333.00	Valencia orange 2	11	98592.00	Valencia orange 1
12	82052.00	Date palm	12	84096.00	Date palm
13	76648.00	Mango Young Growth	13	82748.00	Mango Young Growth
14	69660.00	Mango Growing older	14	76112.00	Mango Growing older
Average	131179.57		Average	144260.71	

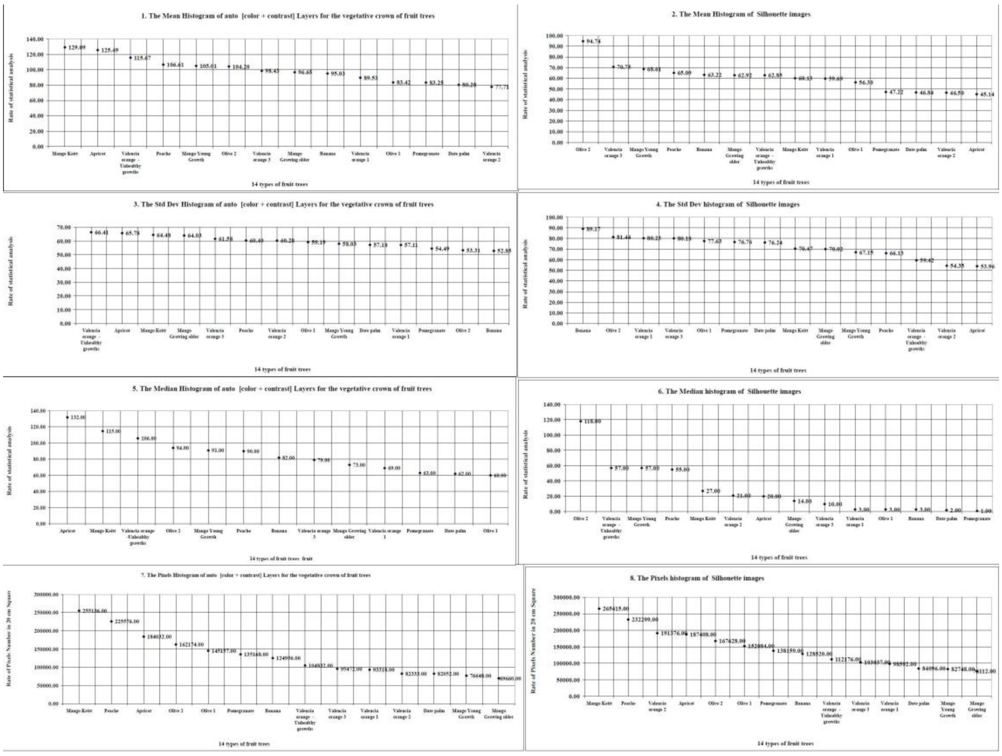


Table 2 the summary of averages and summation of the data, observes the phenomenon of the coup data, this is common in digital data common in digital data for digital photos

		Mean	Std Dev	Median	Pixels No.
∑	Color	1390.37	835.12	1171.00	1836514.00
	Silhouette	850.00	1003.15	391.00	2019650.00
Average	Color	99.31	59.65	83.64	131179.57
	Silhouette	60.71	71.65	27.93	144260.71
اعلى القيم ∑	Color	581.87	322.28	538.00	972075.00
	Silhouette	362.41	408.65	314.00	1044126.00
Average	Color	116.37	64.46	107.60	194415.00
	Silhouette	72.48	81.73	62.80	208825.20
أقل القيم ∑	Color	414.19	274.94	309.00	404011.00
	Silhouette	242.00	301.01	12.00	444585.00
Average	Color	82.84	54.99	61.80	80802.20
	Silhouette	48.40	60.20	2.40	88917.00
The Histogram data of auto [color + contrast] Layers for the vegetative crown of fruit trees					
The Histogram data of Silhouette images					
in 20 cm Square		Red : Highest value3lue : Lowest values			

Table 3: For appearance the correlation between the groups of fruit trees and their shadows, under the influence of the four statistical analyzes, tracking the analyzes colors Auto [color + contrast] Layers for the vegetative crown of fruit trees images in 20cm Square

Auto [color + contrast] Layers for the vegetative crown of fruit trees images in 20 cm Square

The Mean histogram data		↓ Indication for inversion of Digital color			**The Mean histogram of Silhouette images**		
1	129.09	Mango Keitt		94.74	Olive 2		1
2	125.49	Apricot		70.75	Valencia orange 3	Group 1↓	2
3	115.67	Valencia orange -Un gr.		68.61	Mango Young Growth		3
4	106.61	Peache		65.09	Peache		4
5	105.01	Mango Young Growth		63.22	Banana	Group 2↓	5
6	104.20	Olive 2	Group 1	62.92	Mango Growing older		6
7	98.43	Valencia orange 3		62.85	Valencia orange –Un gr.		7
8	96.65	Mango Growing older	Group 2	60.13	Mango Keitt		8
9	95.03	Banana		59.69	Valencia orange 1		9
10	89.53	Valencia orange 1		56.30	Olive 1		10
11	83.42	Olive 1		47.22	Pomegranate	Group 3	11
12	83.25	Pomegranate	Group 3	46.84	Date palm		12
13	80.28	Date palm		46.50	Valencia orange 2		13
14	77.71	Valencia orange 2		45.14	Apricot		14
The Std Dev histogram of auto [color + contrast] Layers for the vegetative crown of fruit trees					**The Std Dev histogram of Silhouette images**		
1	66.41	Valencia orange -Un gr.		89.17	Banana	Group 3↓	1
2	65.78	Apricot		81.44	Olive 2		2
3	64.48	Mango Keitt	Group 1	80.23	Valencia orange 1		3
4	64.03	Mango Growing older		80.18	Valencia orange 3		4
5	61.58	Valencia orange 3		77.63	Olive 1	Group 2	5
6	60.40	Peache		76.76	Pomegranate		6
7	60.28	Valencia orange 2		76.24	Date palm		7
8	59.19	Olive 1	Group 2	70.47	Mango Keitt	Group 1	8
9	58.03	Mango Young Growth		70.02	Mango Growing older		9
10	57.18	Date palm		67.15	Mango Young Growth	Group 2	10
11	57.11	Valencia orange 1		66.13	Peache		11
12	54.49	Pomegranate		59.42	Valencia orange –Un gr.		12
13	53.31	Olive 2	Group 3	54.35	Valencia orange 2	Group 2	13
14	52.85	Banana		53.96	Apricot		14
The Median histogram of auto [color + cont		**The Median histogram of Silhouette images**					
1	132.00	Apricot	Group 1	118.00	Olive 2	Group 2↓	1
2	115.00	Mango Keitt		57.00	Valencia orange -Un gr.		2
3	106.00	Valencia orange -Un gr.	Group 2		Mango Young Growth	Group 3	3
4	94.00	Olive 2		55.00	Peache		4
5	91.00	Mango Young Growth	Group 3	27.00	Mango Keitt	Group 1↓	5
6	90.00	Peache		21.00	Valencia orange 2		6
7	82.00	Banana		20.00	Apricot	Group 1↓	7
8	79.00	Valencia orange 3	Group 4	14.00	Mango Growing older	Group 4↓	8
9	73.00	Mango Growing older		10.00	Valencia orange 3		9
10	69.00	Valencia orange 1			Valencia orange 1		10
11	63.00	Pomegranate	Group 5	3.00	Olive 1		11
12	62.00	Date palm			Banana		12
13	60.00	Olive 1		2.00	Date palm	Group 5↓	13
14	55.00	Valencia orange 2		1.00	Pomegranate		14
The Pixels histogram of auto [color + contrast] Layers for the vegetative crown of fruit trees					**The Pixels histogram of Silhouette images**		
1	255136.00	Mango Keitt		265415.00	Mango Keitt	Group 1	1
2	225576.00	Peache		232299.00	Peache		2
3	184032.00	Apricot		191376.00	Valencia orange 2	Group 2	3
4	162174.00	Olive 2	Group 1	187408.00	Apricot		4
5	145157.00	Olive 1		167628.00	Olive 2		5
6	135168.00	Pomegranate		152084.00	Olive 1	Group 1	6
7	124956.00	Banana		138159.00	Pomegranate		7
8	104832.00	Valencia orange -Un gr.		128520.00	Banana		8
9	95472.00	Valencia orange 3	roup 2 Valencia orang	112176.00	Valencia orange -Un gr.		9
10	93318.00	Valencia orange 1		103037.00	Valencia orange 3	Group 2	10
11	82333.00	Valencia orange 2		98592.00	Valencia orange 1		11
12	82052.00	Date palm		84096.00	Date palm		12
13	76648.00	Mango Young Growth	Group 3	82748.00	Mango Young Growth	Group 3	13
14	69660.00	Mango Growing older		76112.00	Mango Growing older		14

Table 4: The digital interaction affect between all data, under effect of each parameter of the four statistical coefficients

B. 1. The Mean histogram of auto [color + contrast] Layers for the vegetative crown of fruit trees

Color	1	Mango Keitt	129.09
Color	2	Apricot	125.49
Color	3	Valencia orange -Un gr.	115.67
Color	4	Peache	106.61
Color	5	Mango Young Growth	105.01
Color	6	Olive 2	104.20
Color	7	Valencia orange 3	98.43
Color	8	Mango Growing older	96.65
Color	9	Banana	95.03
Silhouette	10	Olive 2	94.74
Color	11	Color Valencia orange 1	89.53
Color	12	Color Olive 1	83.42
Color	13	Color Pomegranate	83.25
Color	14	Color Date palm	80.28
Color	15	Color Valencia orange 2	77.71
Silhouette	16	Valencia orange 3	70.75
Silhouette	17	Mango Young Growth	68.61
Silhouette	18	Peache	65.09
Silhouette	19	Banana	63.22
Silhouette	20	Mango Growing older	62.92
Silhouette	21	Valencia orange -Unhealt	62.85
Silhouette	22	Mango Keitt	60.13
Silhouette	23	Valencia orange 1	59.69
Silhouette	24	Olive 1	56.30
Silhouette	25	Pomegranate	47.22
Silhouette	26	Date palm	46.84
Silhouette	27	Valencia orange 2	46.50
Silhouette	28	Apricot	45.14

B. 2. The Std Dev histogram of auto [color + contrast] Layers for the vegetative crown of fruit trees

Silhouette	1	Banana	89.17
Silhouette	2	Olive 2	81.44
Silhouette	3	Valencia orange 1	80.23
Silhouette	4	Valencia orange 3	80.18
Silhouette	5	Olive 1	77.63
Silhouette	6	Pomegranate	76.76
Silhouette	7	Date palm	76.24
Silhouette	8	Mango Keitt	70.47
Silhouette	9	Mango Growing older	70.02
Silhouette	10	Mango Young Growth	67.15
Color	11	Valencia orange -Un gr.	66.41
Silhouette	12	Peache	66.13
Color	13	Apricot	65.78
Color	14	Mango Keitt	64.48
Color	15	Mango Growing older	64.03
Color	16	Valencia orange 3	61.58
Color	17	Peache	60.40
Color	18	Valencia orange 2	60.28
Silhouette	19	Valencia orange -Unhealt	59.42
Color	20	Olive 1	59.19
Color	21	Mango Young Growth	58.03
Color	22	Date palm	57.18
Color	23	Valencia orange 1	57.11
Color	24	Color Pomegranate	54.49
Silhouette	25	Valencia orange 2	54.35
Silhouette	26	Apricot	53.96
Color	27	Olive 2	53.31
Color	28	Banana	52.85

B. 3. The Median histogram of auto [color + contrast] Layers for the vegetative crown of fruit trees

Color	1	Apricot	132.00
Silhouette	2	Olive 2	118.00
Color	3	Mango Keitt	115.00
Color	4	Valencia orange -Unhealt	106.00
Color	5	Olive 2	94.00
Color	6	Mango Young Growth	91.00
Color	7	Peache	90.00
Color	8	Banana	82.00
Color	9	Valencia orange 3	79.00
Color	10	Mango Growing older	73.00
Color	11	Valencia orange 1	69.00
Color	12	Pomegranate	63.00
Color	13	Date palm	62.00
Color	14	Olive 1	60.00
Silhouette	15	Valencia orange -Un gr.	57.00
Silhouette	16	Mango Young Growth	
Color	17	Valencia orange 2	55.00
Silhouette	18	Peache	
Silhouette	19	Mango Keitt	27.00
Silhouette	20	Valencia orange 2	21.00
Silhouette	21	Apricot	20.00
Silhouette	22	Mango Growing older	14.00
Silhouette	23	Valencia orange 3	10.00
Silhouette	24	Valencia orange 1	3.00
Silhouette	25	Olive 1	3.00
Silhouette	26	Banana	3.00
Silhouette	27	Date palm	2.00
Silhouette	28	Pomegranate	1.00

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B. 4. The Pixels histogram of auto [color + contrast] Layers for the vegetative crown of fruit trees	Silhouette	1	Mango Keitt	265415.00	Mango Keitt
	Color	2	Mango Keitt	255136.00	
	Silhouette	3	Peache	232299.00	Peache
	Color	4	Peache	225576.00	
	Silhouette	5	Valencia oran	191376.00	
		6	Apricot	187408.00	Apricot
	Color	7	Apricot	184032.00	
	Silhouette	8	Olive 2	167628.00	Olive 2
	Color	9	Olive 2	162174.00	
	Silhouette	10	Olive 1	152084.00	Olive 1
	Color	11	Olive 1	145157.00	
	Silhouette	12	Pomegranate	138159.00	Pomegranate
	Color	13	Pomegranate	135168.00	
	Silhouette	14	Banana	128520.00	Banana
	Color	15	Banana	124956.00	
	Silhouette	16	Valencia oran	112176.00	Valencia orange -Un gr.
	Color	17	Valencia ora	104832.00	
	Silhouette	18	Valencia orai	103037.00	Valencia orange 3 & 1
		19	Valencia orai	98592.00	
	Color	20	Valencia orai	95472.00	
		21	Valencia orai	93318.00	
	Silhouette	22	Date palm	84096.00	
		23	Mango Youn	82748.00	
	Color	24	Valencia oran	82333.00	
		25	Date palm	82052.00	
		26	Mango Youn	76648.00	Mango
	Silhouette	27	Mango Grov	76112.00	
	Color	28	Mango Grov	69660.00	

Table 5 (a., b. and c) models and circular diagrams 9: Circular graphs expression about the proportion of digital data to each other, associated with expressed as a percentage in the form of integer, experiment without fractures.

The Mean histogram of auto [color + contrast] Layers for the vegetati			%	The Mean histogram of Silhouette images			%
1.00	Mango Keitt	129.09	9	1.00	Olive 2	94.74	12
2.00	Apricot	125.49	9	2.00	Valencia orange 3	70.75	8
3.00	Valencia orange -Un gr.	115.67	8	3.00	Mango Young Growth	68.61	8
4.00	Peache	106.61	8	4.00	Peache	65.09	8
5.00	Mango Young Growth	105.01	8	5.00	Banana	63.22	7
6.00	Olive 2	104.20	7	6.00	Mango Growing older	62.92	7
7.00	Valencia orange 3	98.43	7	7.00	Valencia orange -Un gr.	62.85	7
8.00	Mango Growing older	96.65	7	8.00	Mango Keitt	60.13	7
9.00	Banana	95.03	7	9.00	Valencia orange 1	59.69	7
10.00	Valencia orange 1	89.53	6	10.00	Olive 1	56.30	7
11.00	Olive 1	83.42	6	11.00	Pomegranate	47.22	6
12.00	Pomegranate	83.25	6	12.00	Date palm	46.84	6
13.00	Date palm	80.28	6	13.00	Valencia orange 2	46.50	5
14.00	Valencia orange 2	77.71	6	14.00	Apricot	45.14	5
	Σ	1390.37			Σ	850.00	
	Average	99.31	100		Average	60.71	100
The Std Dev histogram of auto [color + contrast] Layers for the vegetative crown				The Std Dev histogram of Silhouette images			
1.00	Valencia orange -Un gr.	66.41	8	1.00	Banana	89.17	8
2.00	Apricot	65.78	8	2.00	Olive 2	81.44	8
3.00	Mango Keitt	64.48	8	3.00	Valencia orange 1	80.23	8
4.00	Mango Growing older	64.03	8	4.00	Valencia orange 3	80.18	8
5.00	Valencia orange 3	61.58	7	5.00	Olive 1	77.63	8
6.00	Peache	60.40	7	6.00	Pomegranate	76.76	8
7.00	Valencia orange 2	60.28	7	7.00	Date palm	76.24	8
8.00	Olive 1	59.19	7	8.00	Mango Keitt	70.47	7
9.00	Mango Young Growth	58.03	7	9.00	Mango Growing older	70.02	7
10.00	Date palm	57.18	7	10.00	Mango Young Growth	67.15	7
11.00	Valencia orange 1	57.11	7	11.00	Peache	66.13	7
12.00	Pomegranate	54.49	7	12.00	Valencia orange -Un gr.	59.42	6
13.00	Olive 2	53.31	6	13.00	Valencia orange 2	54.35	5
14.00	Banana	52.85	6	14.00	Apricot	53.96	5
	Σ	835.12			Σ	1003.15	
	Average	59.65	100		Average	71.65	100
The Median histogram of auto [color + contrast] Layers for the vegetative crown				The Median histogram of Silhouette images			
1.00	Apricot	132.00	11	1.00	Olive 2	118.00	29
2.00	Mango Keitt	115.00	10	2.00	Valencia orange -Un gr.	57.00	14
3.00	Valencia orange -Un gr.	106.00	9	3.00	Mango Young Growth	57.00	15
4.00	Olive 2	94.00	8	4.00	Peache	55.00	14
5.00	Mango Young Growth	91.00	8	5.00	Mango Keitt	27.00	7
6.00	Peache	90.00	8	6.00	Valencia orange 2	21.00	5
7.00	Banana	82.00	7	7.00	Apricot	20.00	5
8.00	Valencia orange 3	79.00	7	8.00	Mango Growing older	14.00	4
9.00	Mango Growing older	73.00	6	9.00	Valencia orange 3	10.00	3
10.00	Valencia orange 1	69.00	6	10.00	Valencia orange 1	3.00	1
11.00	Pomegranate	63.00	5	11.00	Olive 1	3.00	1
12.00	Date palm	62.00	5	12.00	Banana	3.00	1
13.00	Olive 1	60.00	5	13.00	Date palm	2.00	1
14.00	Valencia orange 2	55.00	5	14.00	Pomegranate	1.00	0
	Σ	1171.00			Σ	391.00	
	Average	83.64	100		Average	27.93	100
The Pixels histogram of auto [color + contrast] Layers for the vegetative crown of				The Pixels histogram of Silhouette images			
1.00	Mango Keitt	255136.00	15	1.00	Mango Keitt	265415.00	13
2.00	Peache	225576.00	12	2.00	Peache	232299.00	12
3.00	Apricot	184032.00	10	3.00	Valencia orange 2	191376.00	9
4.00	Olive 2	162174.00	9	4.00	Apricot	187408.00	9
5.00	Olive 1	145157.00	8	5.00	Olive 2	167628.00	8
6.00	Pomegranate	135168.00	7	6.00	Olive 1	152084.00	8
7.00	Banana	124956.00	7	7.00	Pomegranate	138159.00	7
8.00	Valencia orange -Un gr.	104832.00	6	8.00	Banana	128520.00	6
9.00	Valencia orange 3	95472.00	5	9.00	Valencia orange -Un gr.	112176.00	6
10.00	Valencia orange 1	93318.00	5	10.00	Valencia orange 3	103037.00	5
11.00	Valencia orange 2	82333.00	4	11.00	Valencia orange 1	98592.00	5
12.00	Date palm	82052.00	4	12.00	Date palm	84096.00	4
13.00	Mango Young Growth	76648.00	4	13.00	Mango Young Growth	82748.00	4
14.00	Mango Growing older	69660.00	4	14.00	Mango Growing older	76112.00	4
	Σ	1836514.00			Σ	2019650.00	
	Average	131179.57	100		Average	144260.71	100

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The Mean histogram of auto [color + contrast] Layers for the ve; %				The Mean histogram of Silhouette images			
1.00	Mango Keitt	129.09	9	1.00	Olive 2	94.74	12
2.00	Apricot	125.49	9	2.00	Valencia orange 3	70.75	8
3.00	Valencia orange -Un gr.	115.67	8	3.00	Mango Young Growth	68.61	8
4.00	Peache	106.61	8	4.00	Peache	65.09	8
5.00	Mango Young Growth	105.01	8	5.00	Banana	63.22	7
	∑	581.87	42		∑	362.41	43
	Average	116.37	8.40		Average	72.48	8.60
10.00	Valencia orange 1	89.53	6	10.00	Olive 1	56.30	7
11.00	Olive 1	83.42	6	11.00	Pomegranate	47.22	6
12.00	Pomegranate	83.25	6	12.00	Date palm	46.84	6
13.00	Date palm	80.28	6	13.00	Valencia orange 2	46.50	5
14.00	Valencia orange 2	77.71	6	14.00	Apricot	45.14	5
	∑	414.19	30		∑	242.00	29
	Average	82.84	6.00		Average	48.40	5.80
The Std Dev histogram of auto [color + contrast] Layers for the vegetative crown				The Std Dev histogram of Silhouette images			
1.00	Valencia orange -Un gr.	66.41	8	1.00	Banana	89.17	8
2.00	Apricot	65.78	8	2.00	Olive 2	81.44	8
3.00	Mango Keitt	64.48	8	3.00	Valencia orange 1	80.23	8
4.00	Mango Growing older	64.03	8	4.00	Valencia orange 3	80.18	8
5.00	Valencia orange 3	61.58	7	5.00	Olive 1	77.63	8
	∑	322.28	39		∑	408.65	40
	Average	64.46	7.80		Average	81.73	8.00
10.00	Date palm	57.18	7	10.00	Mango Young Growth	67.15	7
11.00	Valencia orange 1	57.11	7	11.00	Peache	66.13	7
12.00	Pomegranate	54.49	7	12.00	Valencia orange -Unhealt	59.42	6
13.00	Olive 2	53.31	6	13.00	Valencia orange 2	54.35	5
14.00	Banana	52.85	6	14.00	Apricot	53.96	5
	∑	274.94	33		∑	301.01	30
	Average	54.99	6.60		Average	60.20	6.00
The Median histogram of auto [color + contrast] Layers for the vegetative crown				The Median histogram of Silhouette images			
1.00	Apricot	132.00	11	1.00	Olive 2	118.00	29
2.00	Mango Keitt	115.00	10	2.00	Valencia orange -Un gr.	57.00	14
3.00	Valencia orange -Un gr.	106.00	9	3.00	Mango Young Growth	57.00	15
4.00	Olive 2	94.00	8	4.00	Peache	55.00	14
5.00	Mango Young Growth	91.00	8	5.00	Mango Keitt	27.00	7
	∑	538.00	46		∑	314.00	79
	Average	107.60	9.20		Average	62.80	15.80
10.00	Valencia orange 1	69.00	6	10.00	Valencia orange 1	3.00	1
11.00	Pomegranate	63.00	5	11.00	Olive 1	3.00	1
12.00	Date palm	62.00	5	12.00	Banana	3.00	1
13.00	Olive 1	60.00	5	13.00	Date palm	2.00	1
14.00	Valencia orange 2	55.00	5	14.00	Pomegranate	1.00	0
	∑	309.00	26		∑	12.00	4
	Average	61.80	5.20		Average	2.40	0.80
The Pixels histogram of auto [color + contrast] Layers for the vegetative crown of				The Pixels histogram of Silhouette images			
1.00	Mango Keitt	255136.00	15	1.00	Mango Keitt	265415.00	13
2.00	Peache	225576.00	12	2.00	Peache	232299.00	12
3.00	Apricot	184032.00	10	3.00	Valencia orange 2	191376.00	9
4.00	Olive 2	162174.00	9	4.00	Apricot	187408.00	9
5.00	Olive 1	145157.00	8	5.00	Olive 2	167628.00	8
	∑	972075.00	54	∑		1044126.00	51
	Average	194415.00	10.80		Average	208825.20	10.20
10.00	Valencia orange 1	93318.00	5	10.00	Valencia orange 3	103037.00	5
11.00	Valencia orange 2	82333.00	4	11.00	Valencia orange 1	98592.00	5
12.00	Date palm	82052.00	4	12.00	Date palm	84096.00	4
13.00	Mango Young Growth	76648.00	4	13.00	Mango Young Growth	82748.00	4
14.00	Mango Growing older	69660.00	4	14.00	Mango Growing older	76112.00	4
	∑	404011.00	21		∑	444585.00	22
	Average	80802.20	4.20		Average	88917.00	4.40

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The Mean histogram of auto [color + contrast] Layers for the vegetat%				The Mean histogram of Silhouette images			
1.00	Mango Keitt	129.09	9	1.00	Olive 2	94.74	12
2.00	Apricot	125.49	9	2.00	Valencia orang	70.75	8
3.00	Valencia orange -Unhealthy	115.67	8	3.00	Mango Young	68.61	8
4.00	Peache	106.61	8	4.00	Peache	65.09	8
5.00	Mango Young Growth	105.01	8	5.00	Banana	63.22	7
		116.37				72.48	
10.00	Valencia orange 1	89.53	6	10.00	Olive 1	56.30	7
11.00	Olive 1	83.42	6	11.00	Pomegranate	47.22	6
12.00	Pomegranate	83.25	6	12.00	Date palm	46.84	6
13.00	Date palm	80.28	6	13.00	Valencia orang	46.50	5
14.00	Valencia orange 2	77.71	6	14.00	Apricot	45.14	5
		82.84				48.40	
The Std Dev histogram of auto [color + contrast] Layers for the vegetative crown				The Std Dev histogram of Silhouette images			
1.00	Valencia orange -Unhealthy	66.41	8	1.00	Banana	89.17	8
2.00	Apricot	65.78	8	2.00	Olive 2	81.44	8
3.00	Mango Keitt	64.48	8	3.00	Valencia orang	80.23	8
4.00	Mango Growing older	64.03	8	4.00	Valencia orang	80.18	8
5.00	Valencia orange 3	61.58	7	5.00	Olive 1	77.63	8
		64.46				81.73	
10.00	Date palm	57.18	7	10.00	Mango Young	67.15	7
11.00	Valencia orange 1	57.11	7	11.00	Peache	66.13	7
12.00	Pomegranate	54.49	7	12.00	Valencia orange	59.42	6
13.00	Olive 2	53.31	6	13.00	Valencia orang	54.35	5
14.00	Banana	52.85	6	14.00	Apricot	53.96	5
		54.99				60.20	
The Median histogram of auto [color + contrast] Layers for the vegetative crown				The Median histogram of Silhouette images			
1.00	Apricot	132.00	11	1.00	Olive 2	118.00	29
2.00	Mango Keitt	115.00	10	2.00	Valencia orange	57.00	14
3.00	Valencia orange -Unhealthy	106.00	9	3.00	Mango Young	57.00	15
4.00	Olive 2	94.00	8	4.00	Peache	55.00	14
5.00	Mango Young Growth	91.00	8	5.00	Mango Keitt	27.00	7
		107.60				62.80	
10.00	Valencia orange 1	69.00	6	10.00	Valencia orang	3.00	1
11.00	Pomegranate	63.00	5	11.00	Olive 1	3.00	1
12.00	Date palm	62.00	5	12.00	Banana	3.00	1
13.00	Olive 1	60.00	5	13.00	Date palm	2.00	1
14.00	Valencia orange 2	55.00	5	14.00	Pomegranate	1.00	0
		61.80				2.40	
The Pixels histogram of auto [color + contrast] Layers for the vegetative crown o				The Pixels histogram of Silhouette images			
1.00	Mango Keitt	255136.00	15	1.00	Mango Keitt	265415.00	13
2.00	Peache	225576.00	12	2.00	Peache	232299.00	12
3.00	Apricot	184032.00	10	3.00	Valencia orang	191376.00	9
4.00	Olive 2	162174.00	9	4.00	Apricot	187408.00	9
5.00	Olive 1	145157.00	8	5.00	Olive 2	167628.00	8
		194415.00				208825.20	
10.00	Valencia orange 1	93318.00	5	10.00	Valencia orang	103037.00	5
11.00	Valencia orange 2	82333.00	4	11.00	Valencia orang	98592.00	5
12.00	Date palm	82052.00	4	12.00	Date palm	84096.00	4
13.00	Mango Young Growth	76648.00	4	13.00	Mango Young	82748.00	4
14.00	Mango Growing older	69660.00	4	14.00	Mango Growing o	76112.00	4
		80802.20				88917.00	

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Second Sector: LAI-2200C Plant Canopy Analyzer, World standard for indirect LAI measurements applications on the shades of fruit trees: