Photographic Height/Length & Scientific Characteristics for Identity

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Abstract

Each and every individual is having its own biological characteristics that scientifically originated through DNA configuration. Name is given by parent and the person is having specific out-looks and gait that he is identified from the distance by closely friends and relatives. Administratively a person is having identity card along with pass-port size photograph and a certificate from authority having name, birth date, relations with other person, service or business detail etc. These are social data some of the ID card is having finger print and retina data for identity. There are also a permanent and life time scientific characteristics that are reliable and cannot be tempered. Identity card having both social and scientific data is a perfect identity of the subject from birth to death. Initially some data such as height and length is to be updated till the subject is mature. The person cannot be freed from his\her criminal behavior once is captured in camera. Height/length data of subject and front facial geometric design of standing photograph are forensic characteristic of the subject, even crashed dead bodies can be identified easily and perfectly and recently buried body can also be identified.

Relatively height and length data of the subject is obtained from the distance using control object and camera. Manually measured data is having one digit after decimal point while computerized length data is having three digits and twelve digital data is calculated mathematically. The data obtained from any distance is to be converted mathematically in to fix distance photography as a result actual and correct height/length data are obtained. It becomes the identity numbers of the subject. Using both social and scientific data a person is correctly and scientifically identified.

Keywords: Fixed Distance Photography; Photograph and Its Geometric Design; Identity Sequence of Height; Photographic Height; Forensic Height\Length of Structural Body

Introduction

DNA patterned is identity of the individual. The internal/external characteristics that are originated through DNA configuration, that can be measures, describe and records. Indian government has accepted DNA as identity of the person by passing resolution in the parliament in 2018-2019 [1]. Scientific characteristics are front facial appearance, gait, color of eye and skin, blood group, thumb impression, finger prints, foot print, voice print, height/length etc. Front facial full sized standing photograph & its geometric design and fixed distance twelve digital height/length data of the subject is specific forensic data of identity, obtains using camera and control object, as a result pointing out of the subject from the mass can easily be done without knowledge of that particular subject and without the help of identifier (khabari). Appearance & smartness is change with increasing the age and rest of them are almost life time data. ID card with social and scientific characteristics is perfect document of identity.

Front Facial Geometric Design of the Subject

Photograph is the image of the subject that mathematically proportional with the structural body. Image height is length between head point and toe point, related with the distance. It is mathematically explained as below [2,3].

(1) Bigger the height of subject bigger is the image height. (Distance is constant).

(2) Bigger the height of image less is the distance. (Subject is constant)

(3) If the subject is snapped twice, both images will be of the same size or proportionally related with structural body.

(4) It is obvious in the field work of photography to have the same size of image with the different distance is never possible and to have same size of images for two subject with the same distance having different height is also not possible, conditions that, the camera and its lens configuration should remain same. Proportion is mathematical relation between two numeric figures and can be converted into equation.

(5) The ratio value of control (foot rule) image height and exhibit image height is related with the position situation on the ground and distance from the camera.

(6) Front facial photograph is having 0.0° degree angle of photography that is photographer and subject is facing to each other having same geological direction plane.

(7) Any distance between ending point of two organs is proportional with the image height and height of the structural body.

Considering figure 1550.0 and 235.0 is proportional to each other.

1550.000 α 235.000

235.000 x 6.59574468085 =1549.99999999

1550.000:: 235.000 = 6.59574468085:: 1.00000000000

Figure 235.000 is proportional to 1550.000 having connecting link 6.59574468085.

Figure 177.000 is proportional to 1550.000 having connecting link 8.75706214689. °The three membered sequence (1550.0, 235.0, 177.0) is structural height sequence and

(304.8, 235.0, 177.0) is control object height sequence.

1550.0 mm is measured height of the subject…..Hs (subject).

A foot-rule of 304.8 mm is height of control object…Hs (control object)

235.0 is height of control image… hs (con)

177.0 is height of exhibit image … hs (exh)

Front Side Photograph

Front side photograph of the suspected accused/subject is to be snapped by the expert photographer of the authority. Other data related to the subject are to be collected and stored in the record and are named-control data. The person may get bails during judicial process and mixed up in the society and do not obey summons of the court. Investigating agency has to find out such "bhagedu" person.

Exhibit photograph is to be snapped in the field or at security point by investigating agencies.

Conditions to obtained photographs are as under.

(1) Camera and subject should have same geological plane.

(2) Photographer and subject should be facing to each other.

(3) Angle of photography should be 0.0° that is camera (photographer) and subject should have same geological plane.

(4) First identity feature of height and length are obtained as under.

(a) Length between head point and toe point (b) Length between right and left shoulder end points

(c) Length between right and left buttocks end points (d) Minimum length of the structural body.

In the field work photography, control length data is the length of any fixed surrounding article.

It is measured manually as control or helper of the investigator is to carry the control article. Using these data a person can be pointed out as the suspect within few seconds. Searching can be done at many places at a time without helps of informer.

Geometric Design of the Photographs and Comparison

Photographic height is the length between head point and toe point. Connecting different selected ending points of organ geometric design is created and compared mathematically or using an overlapping technique.

Equations of available sequences and relations:-

Available sequences are (1550.0, 235.0, 177.0) and (304.8, 235.0, 177.0)

Any sequence having three member as [A, B, C], where A is height data of structural body or height of control object, B is control image height, C is exhibit image height, 2nd and 3rd member are directly and indirectly proportional with 1st member is the identity sequence of height, on increasing the height both images reached to the destination at the same time. The images do not have indirect relation is un-identity sequence will reach to the destination at the different time.

Length between organs is distance between two ending points of the limb.

1550.0 mm is measured height of the subject…..Hs (subject).

A foot-rule of 304.8 mm is height of control object…Hs (control object)

235.0 mm is image height of a control foot-rule…. hs (con)

177.0 mm is image height of exhibit subject ……..hs (exh)

1550.0:: 304.8 = 5.08530183727:: 1.00000000000

Height of the subject is 5.08530183727 times bigger than the height of control foot rule.

Identity sequence and relations:-

235.000 x 6.59574468085 = 1549.99999999

Height of the subject is 6.59574468085 times bigger than image height of the subject.

Figure 235.000 is directly related to 1550.000 ……………………………………….. (a)

177.000 x 8.75706214689 = 1549.99999999

Figure 177.000 is directly related to 1550.000 ……………………………………………… (b)

Ratio of images:- 235.000::177.000 = 1.32768361581:: 1.00000000000

177.000::235.000 = 0.75319148936:: 1.00000000000

1.32768361581….It is mathematical relation between control and exhibit image height…. MR(con)

0.75319148936….It is mathematical relation between exhibit and control image height…. MR(exh)

MR (con) is bigger than MR (exh)

235.0 x 0.75319148936 x 8.75706214689 = 1549.99999999.

Figure 235.0 is indirectly related to 1550.000...(c)

177.0x1.32768361581x6.59574468085=1549.99999998.

Figure 177.0 is indirectly related to 1550.000 …………………………………………………..(d)

If exhibit image is to enlarge up to the height of subject, it is relatively be increased 1.32768361581 times per unit of distance is photographic relation. PR (exh). If control image is to enlarge up to the height of subject, it is relatively be increased 0.75319148936 times per unit of distance is PR (con). The images will reach up to destination at the same time.

MR (con) = PR (exh) = 1.32768361581 and MR (exh) = PR (con) =0.75319148936

Fixed Distance Sequence and Relation between Image Height and Distances

Image height is inversely proportional with the distance, bigger the height of image less is the distance. Mathematical relation for height images and distant is P1xP2=D1xD2=1.0.

Multiplication ratio of images is equivalent to multiplication ratio of distance.

P1= hs (con) ÷ hs (exh)   and   P2= hs (exh) ÷ hs(con)

D1= d1(con) ÷ d2(exh)   and   D2= d2(exh) ÷ d1(con)

The distance can be described and measures from the position situations of subject and control object on the plain ground. (1) Fusion of height situation (2) Fusion of distance situation and (3) Lens configuration changes the unit of distance as a result camera and its lens configuration should remain same for a complete experiment.

(Author used Nicon-D40X and mobile camera to obtained images.)

Fixed distance sequence is calculated from available sequence. (1550.0, 235.0, 177.0)

1. 1550.0 ÷ 235.0 = 6.59574468085. It is factor of sequence (F).

Subject height is 6.59574468085 times bigger than control image height. It is height of control foot-rule per unit of distance and is snapped from 25 unit of distance.

6.59574468085 x 25.0 = 164.893617021 mm is height of control image

MR (exh) = PR (con) =0.75319148936.

Exhibit image is 0.75319148936 time smaller than control image.

164.893617021 x 0.75319148936 = 124.196468990 mm.

Fixed distance sequence is (1550.0, 164.893617021, 124.196468990)   and

(304.8, 164.893617021, 124.196468990)

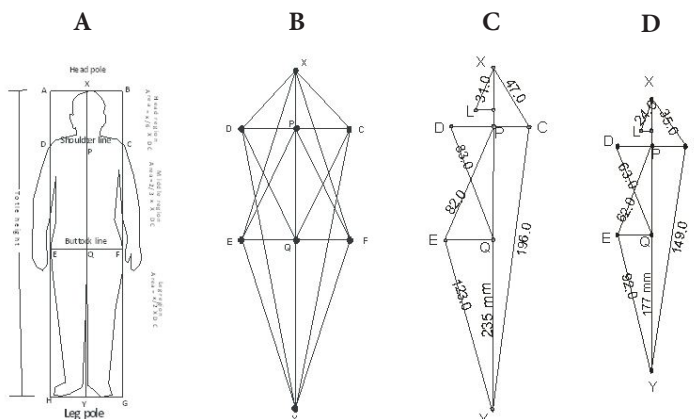Data can be explained by Figures 1(A), 1(B), 1(C) and 1(D).

Figure 1: (A) Front facial standing structural body of the human being and its border line having head region, middle region and leg region. The total length of height line XPQY is x mm than 1/6x is head region area, 2/3x is middle region area, and x/2 is leg region area. AXB is head pole line. DPC is shoulder line. EQF is buttock line and HYG is leg pole line. XPQY line is center line of the structural body. Points X, P, Q and Y are center points of respective line AXB, DPC, EQF and HYG; **(B)** Typical geometric design of structural body; **(C)** Measured control length data between ending points of organ that selected; **(D)** It is available exhibit length data between ending points of organs that obtained from the field

Relation of Distance between Ending Points of Organs, Image Height, and Height of Subject

Available lower ear ending point & head point (XL) sequence is (304.8, 31.0, 24.0)

(1) Height of control object=304.8

(2) Height of exhibit subject = 1550.0

(3) 1550.0:: 304.8 = 5.08530183727

(4) 304.8 x 5.08530183727 = 1550.0

(5) hp (con) = 31.0 and hp(exh) = 24.0

(6) P1=31.0÷24.0=1.29166666666

(7) P2=24.0÷31.0=0.77419354838

(8) F=304.8÷31.0=9.83225806451

(9) f = 304.8 ÷ 24.0 = 12.7000000000

Control ------- Exhibit

hp(con) x P2 x f = hp(exh) x P1 x F

31.0 x 0.77419354838 x 12.7000000000 = 24.0 x 1.29166666666 x 9.83225806451

304.799999997= 304.799999998

Length of organs and distance between ending points of organs are proportional with image height of control object.

304.799999997x5.08530183727=304.799999998x5.08530183727

1549.99999998 = 1549.99999998……….Height of subject

Length of organs and distance between ending points of organs are proportional with height of exhibit subject.
Ratio of distance between selected ending point of organ:-

(1) Distance between head point and toe point (XY)
235.0:: 177.0 = 1.32768361581:: 1.00000000000=P1
177.0:: 235.0 =0.75319148936:: 1.00000000000 =P2
P1 x P2 = 1.32768361581X0.75319148936 = 0.99999999999

(2) Lower ear ending point & head point (XL)
031.0:: 024.0 =1.29166666666:: 1.00000000000=P1
024.0:: 031.0 = 0.77419354838:: 1.0000000000=P2
P1XP2 =1.29166666666 X 0.77419354838 = 0.99999999998

(3) Shoulder point & head point (XC)
047.0:: 036.0=1.30555555555:: 1.00000000000=P1
036.0:: 047.0=0.76595744680:: 1.0000000000 =P2
P1XP2= 1.30555555555 X 0.76595744680 = 0.99999999998

(4) Shoulder point & center of buttock line point (QD)
083.0:: 063.0 =1.31746031746:: 1.00000000000 =P1
063.0:: 083.0= 0.75903614457:: 1.00000000000 =P2
P1XP2 =1.31746031746 X 0.75903614457= 0.99999999998

(5) Center of shoulder line & buttock point (PE)
082.0:: 062.0 =1.32258064516:: 1.00000000000 =P1
062.0:: 082.0 = 0.75609756097:: 1.00000000000 =P2
P1 X P2 =1.32258064516 X 0.75609756097 = 0.99999999999

(6) Shoulder point & leg point (YC)
196.0:: 149.0 = 1.31543624161:: 1.00000000000=P1
149.0:: 196.0 = 1.00000000000:: 0.76020409163=P2
P1 X P2 =1.31543624161 X 0.76020409163 = 1.00000001315

(7) Buttock point & leg point (YE)
123.0:: 092.0 = 1.33695652173:: 1.00000000000 = P1
092.0:: 123.0 = 0.74967479670:: 1.00000000000 = P2
P1 X P2 =1.33695652173 x 0.74967479670 = 0.99999999999

Distance is inversely proportional to the image height as a result ratio value of the distance D1xD2 will be same as P1XP2.

P1XP2=D1XD2=1.00000000000

Fixed Distance Sequence and Fusion of Height Situation

Available height sequence is (304.8, 235.0, 177.0) and

Fixed distance sequence is (304.800,164.893617021,124.196468990)

Both are having same mathematical and photographic relations between control and exhibit image.

(1) Hs(con)=304.8 mm (2) hs(con)= 164.893617021 (3) hs(exh)=124.196468990 (4) PR(exh)=1.32768361581 (5) PR(con)= 0.75319148936 (6) 25.0 mm height of control foot-rule is a unit of distance (7) Fixed distance unit for experiment is 25.0.(8) Image height of control is to fixed about 125.0 mm to 250.00 mm

Fusion of height situation:-

A is the unit of distance that to be increase as per PR to have same data of height.

$$Control = Exhibit$$

$$hs(con) + PR(con) \; A = hs(exh) + PR(exh) \; A$$

$$164.893617021 + 0.75319148936 \; A = 124.196468990 + 1.32768361581 \; A$$

$$164.893617021 - 124.196468990 = (1.32768361581 - 0.75319148936)$$

$$40.697148030 = 0.57449212580 \; A \quad A$$

$$70.8402190427 = A$$

$$164.893617016 + 0.75319148936 \; A = 124.196468990 + 1.32768361581 \; A$$

$$164.893617016 + 53.3562500876 = 124.1964668990 + 94.00533981187$$

$$218.249867103 = 218.249865017 \quad diff = 0.000016933 \; mm$$

Both control and exhibit images if increases 70.8402190427 unit of distance as per their PR, both will be having same height of 218.249867103 mm.

Fusion of height = (70.8402190427, 218.249867103).

Control and exhibit images have to increase 86.550133099 mm to reach up to height of a control.

(218.249867103 + 86.550132897 = 304.8).
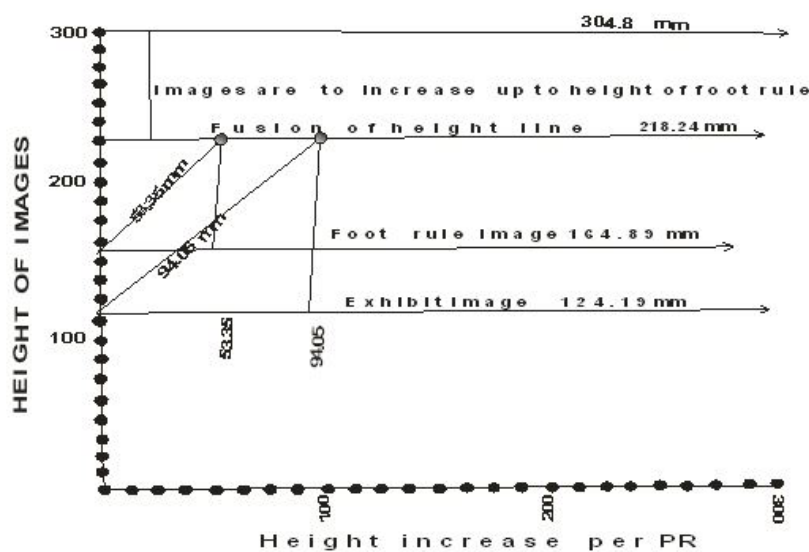
The data can be explained by graph (Figures 2A and 2B).

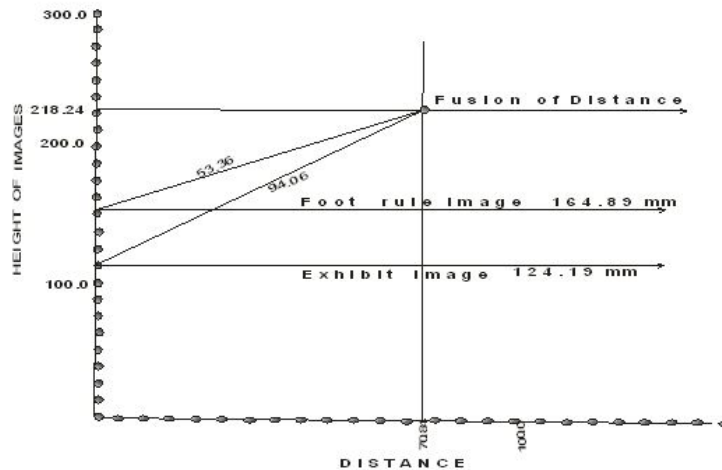**Figure 2: (A)** Height of image Vs Height increased as per PR

Figure 2B: Height of image Vs Distance

Fixed Distance Twelve Digital Photographic Height of Structural Body

	Control	Exhibit

1. Measured height: -   304.8 mm   1550.0 mm
2. Available height of image:-   …….. 235.000 mm………………177.000 mm
3. Fixed distanced image height:- … 164.893617021 mm ……..124.196468990 mm
4. Increased 70.8402190427 unit of distance as per.

                              53.3562500876 mm …… 94.00533981187 mm
                Fusion of height:-   218.249867103 mm ….. 218.249865017mm
                       (0.000016933 mm difference is to be neglected.)

5.   218.249867103 is increased 86.550132897 mm to reach up to height of control foot rule

                              304.8 mm ……………… 304.8 mm

     Multiplied with 5.08530183727 (Ratio of measured height of subject and control)
     (1500.0 ÷ 304.8 = 5.08530183727) Subject height is 5.08530183727 times bigger than control.

                              1550.00294926 mm   1550.00294926 mm
                                      or   or
                              5.08531151334 feet   5.08531151334 feet

Author has measured twelve digital heights of five subjects, the result is as under

Subject no 1:

Name:- Mr. K.M.Dhruv
Measured height:-1610.0 mm
Available height of images:-   43.283 mm (con) and 228.652 mm (exh)
Ratio of control and exhibit= 43.283 (con) :: 228.652 (exh) = 1.000::5.28272069865
                              228.652 (exh) :: 43.283 =   1.000:: 0.18929639801
MR (exh) = PR(con) = 5.28272069865 ….. MR(con) = PR(exh) =0.18929639801
Available height of sequences are (1) 304.8, 43.283, 228.652
Subject image height is 5.28272069865 times bigger than control. It is to be considered as height of control foot-rule per unit of distance and is snapped from 25 unit of distance.
       5.28272069865 x 25.0 =132.068017466 mm is height of control image
132.068017466 x 5.28272069865 = 697.678449498 mm height of exhibit image
Fixed distance sequence =(304.8 ,132.068017466, 697.678449498)
Fusion of height = (36.3937871770, 235.541212822)
Twelve digital height of subject is 1610.17326894 mm or 5.28215223097 feet

Subject no 2:

Name:- Mr. T.D.Shah
Measured height of subject:-1433.00 mm
Available image height sequence = (304.8, 17.507, 82.307)
Ratio of height = 17.507::82.307=1.000:: 4.70137659222
                  82.307::17.507=1.000:: 0.21270365825

MR (exh) = PR(con) = 4.70137659222 ….. MR(con) = PR(exh) = 0.21270365825

      Subject image height is 4.70137659222   times bigger than control. It is to be considered as height of control foot-rule per unit of distance and is snapped from 25 unit of distance.

4.70137659222 x 25.0 = 117.534414805 mm is height of control image.

117.534414805 x 4.70137659222 = 552.573546546 is height of exhibit image.

Fixed distance sequence = (304.8, 117.534414805, 552.573546546)

Fusion of height situation:- (14.4363380788, 85.37766119210)

Twelve digital height of subject is 1432.97958530 mm or 4.70137659219 feet

Subject no 3:

Name:- Mr. S.N.Kemker

Measured height of subject:-1964.0

Available image height sequence = (304.800, 31.705, 204.220)

Ratio of image height =   31.705::204.220=1.000000000000::6.44125532250   And
                                 1.000000000000::0.15524924101

MR (exh) = PR(con) = 6.44125532250   and   MR(con) = PR(exh) = 0.15524924101

Subject image height is 6.44125532250 times bigger than control. It is to be considered as height of control foot-rule per unit of distance and is snapped from 25 unit of distance.

6.44125532250x25.0=161.031383062 mm is height of control image.

161.031383062x6.44125532250=1037.24425324

Fixed distance sequence = (304.800,161.031383062,1037.24425324)

Fusion of height situation:- ((27.5365626052, 209.07503044)

Twelve digital height of subject is 1963.29462229 mm or 6.44125532250 feet

Subject no 4:

Name:- Mr. K.B.Patel

Measured height of subject is 1400.0 mm

Available sequence of height = (304.800, 50.000, 229.750)

Ratio of image height = 50.000:: 229.750 =1.00000000000 :: 4.59500000000   and
                                 1.00000000000 :: 0.21762785636

MR (exh) = PR(con) = 4.59500000000   and   MR(con) = PR(exh) = 0.21762785636

Subject image height is 4.59500000000 times bigger than control. It is to be considered as height of control foot-rule per unit of distance and is snapped from 25 unit of distance.

4.59500000000 x 25.0 = 114.8750000000 mm is height of control image.

527.850625000 is the height of exhibit subject.

Fixed distance sequence = 304.8, 4.59500000000, 304.678998911)

Twelve digital height of subject is 1400.55600000 mm and 4.59317585301 feet

Subject no 5:

Name:- Mr. M.L.Paleja.

Height of subject = 1555.0

Available sequence = (304.8, 35.430, 180.840)

Ratio of image height = 35.430 :: 180.840 = 1.000000000000 :: 5.10414902624   and
                                 1.000000000000 :: 0.19591904445

MR (exh) = PR(con) =5.10414902624   and   MR(con) = PR(exh) = 0.19591904445

Subject image height is 5.10414902624 times bigger than control. It is to be considered as height of control foot-rule per unit of distance and is snapped from 25 unit of distance.

5.10414902624 x 25.0 = 127.603725656 mm is height of control image.

127.603725656 x 5.10414902624 = 651.308432051 is height of exhibit subject

Fixed distance height of exhibit subject is 651.308432051.

Fixed distance sequence is (304.8,127.603725656,651.308432051)

Twelve digital height of subject is 1555.74462319 mm and 5.10414906210 feet.

Length of Structural Body

Length of the body can be obtained by front side photograph having 0.0° angle of photography.

(Both control and subject is having same geological front side plane on the plain ground that is both are facing to each other) There are mainly three parallel lengths lines with plain ground. (1) Distance between right shoulder end to left shoulder end (2) Distance between two buttocks points (3) Minimum length (girth) of the structural body (4) Ratio of control height data and length data are also obtained in units having twelve digital data for comparison.

The mathematical value of length and control ratio is same as height /control ratio. Total equations are as below.

$P1 \div P2 = D1 \div D2 = L1(shoulder) \div L2(shoulder) = L1 (buttock.) \div L2 (buttock) = L1(Mini\text{-}girth.) \div L2(Mini\text{-}girth = 1.00000000000$

Method to Obtained Data for Comparison

Step no. 1

Image height of the subject is obtained by snapping a photograph having any angle of photography.

(Angle of photography is the angle between geological north-south direction plane and front side direction plane of photographer. It may be 0.0 45.0 or 90.0 Position point of subject is either front side or to right hand side or left hand side of photographer) Lengths of subject is obtained by snapping by 0.0° degree angle photography.

Step no. 2

Computerized image height of control and exhibit is to be measured in unit of millimeter having three digits after decimal point will gives mathematical relation MR and photographic relation PR between control and exhibit. Fixed distance sequence is to be derived from this available sequence.

Step no. 3

Images are increased as per their PR up to fusion of height or fusion of distance situation having twelve digital units that calculated mathematically.

Step no. 4

Further images are increased up to the height of control image. Data is multiplied with the ratio of measured and control height will gives twelve digital data of forensic number of the individual.

Using data of height and length the person can be almost pointed out as a particular person to whom the authority is searching. Finally identity is confirmed in the premises of the investigating authority.

Above data explains   1. Twelve digital height/length of subject can be measured from distance.
                  2. Person does not know that he is being doubted.
                  3. Images are reaches the destination at the same time.
                  4. Twelve digital height of subject is forensic digital number of the individual.
                  5. Unit of number is either in millimeter or in feet.

Reproducibility and Accuracy

All the steps are addition or multiplication, except selection of standing photographic image height points. Height/Length of image is having computerized three digital length data in unit of millimeter. The difference in height/length data that selected by different expert will be hardly plus minus one millimeter that hardly affects the result. Control and exhibit subject is to be snapped on the plain ground having zero degree angle of photography. Configuration of camera lenses is to be kept same up to final result.

Conclusion

ID card with the scientific characteristics is permanent life time data that cannot be altered or tempted. A person captured in camera doing illegal act can be identified. It can also be useful in searching the subject from the mass, without helps of informer at many places at a time. The person, do not knows that he is being doubted. Make up and camouflage do not influences the result. Dead body can be identified in case of crushed-mass causalities using recent photograph and the data. In the year 2002 buried bodies are tried to identify in the state of Gujarat (India)

Author had got chance to see the postmortem at buried place during service period, the person is identified by the relative only not by investigating agency nor forensic expert.

National identification number and social security number system is used by the government of many countries[4] as means of tracking their citizen, permanent residents, and temporary resident, for purpose of work, taxation, healthcare and benefits to persons, bank, Insurance companies and other governmentally related functions. Probably the first of its kind, the personal Swedish national identity number is introduced in 1947, that covering the total resident population of the country. It is having ten to twelve digit numbers to identify individual. The social security number in US is older but it did not cover the whole population. The citizen of India is having "Adhar-Card". These is issued by the authority by collecting the data from the subject while the characteristic data of forensic card are carried by the subject himself that gifted by GOD through DNA patterns and alteration is not so easy.

Acknowledgement

References

1. The Indian government has accepted DNA structure of the individual as identity by passing resolution in parliament 1918-1919, India.

2. Thakkar AK (2017) Photogram–Image comparison and identification. J Forensic Sci Criminol 5: 403.

3. Thakkar AK (2019) Height characteristic of Pedestrian and digital identity. J Forensic Sci Criminol 7: 105.

4. Wikipedia (2014) Personal identity number, Sweden.

5. Wikipedia Tax Identification number (TIN), Sweden.