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A Credit Card Fake Detection System using Image Cryptography

1st K. Shiva Prasad
Dept of ECE
Assistant professor
Nalla Malla Reddy Engineering College
Hyderabd,India,500088
shiva13b71d5516@gmail.com

2nd P.Surendranath
Dept of ECE
Assistant professor
Nalla Malla Reddy Engineering College
Hyderabd,India,500088
suri.495@gmail.com

3rd Ch.Mahesh
Dept of ECE
Assistant professor
Nalla Malla Reddy Engineering College
Hyderabd,India,500088
chinnams22@gmail.com

Abstract*– Image processing has a projection of object which are visible in human body. Due to advancement in computing methodologies have led to efficient image processing which are useful in medical diagnosis, treatment planning & medical research. In clinical diagnosis using medical images segmentation of objects is a critical task due to noise and multi resolution of objects. The better segmentation can be performed by the integration of useful data obtained from separate images. An involuntary technique able to identify an accessible segment through the biparietal plane of the fetal head and a segment through the fetal femur in ultrasound images is developed. Once the accurate anatomical segment for measurement is identified by the machine, the placement of the measurement calipers is involuntarily determined by fitting an active contour model to the structure of interest. The fetal femur length (FL) &biparietal diameter (BPD) are then calculated automatically. The validation data set contained 167 and 197 B mode images for BPD and FL dimensions, respectively. The images were extracted using 4 different ultrasound scanners, which resulted in varied image quality and gain settings. The mean gestational age (GA) of the fetuses for 20 weeks, range 16 to 41 weeks. A dimension success rate of 90% was achieved for both BPD and FL. The correlation coefficients between the manual and automated measurements were 0.995 (BPD) and 0.967 (FL), mean errors were -1.7 mm (FL)&0.5 mm (BPD) and error range with 95% confidence interval (CI) were −3.8 - 4.8 mm (BPD) and −11.4 - 8.1 mm (FL). The routine dimension results were consistent in both high and low gain settings. The intraclass correlation coefficients between manual and routine measurements were 0.995 (95% CI;0.981-0.999)forBPDinhighgain,1.0(95%CI;0.998-1.0)for BPD in low gain, 0.998 (95% CI; 0.991 - 0.999) for FL in high gain and 0.999 (95% CI; 0.996 - 1.0) for FL in low gain settings. The method was implemented on a prototype, portable ultrasound machine designed to be used in low- and middle-income countries (PC). The overall performance of the method supports our hypothesis that automated methods can be used and are beneficial in a clinicalsetting.

Keywords –Image Processing, Biparietal Diameter, Femur Length, Portable Ultrasound Machine, Automatic Measurement

I. INTRODUCTION

An ultrasonography scanning in pregnancy has turn into the general for care in rich countries (RC). It will be presently watched from 12th week or around 18th week, or both. The normal motivation of the ultrasonography investigation may be to discover the area of the placenta & embryo, the amount of fetuses, the GA (gestational age), EDD (evaluated day of delivery) & to identify anomalies as a premise for further medical administration of fetal. The profit of utilizing ultrasonography to develop care of pregnancy will be similarly significant in poor countries (PC) as in the rich countries. In PC, inadequate dating, high rate of fetal growth limit, inadequate recognitions of twins before delivery are common components. Though, the utilization for ultrasonography in PC may be not as broad as in RC to a many causes. A significant part of the ultrasonography machinery enhanced for utilize in RC may be too sensitive to be utilized in PC's rough situations. Because of changing the sources of present & voltages, huge varieties in transport, humidity & temperature, dusty environments, vibration & shock, fundamental parts break and can't a chance to be repaired. An additional significant challenge will be high price of ultrasonography machinery. Furthermore, in the rustic regions of PC, there will be a lack of technical awareness for working ultrasonography machines. Our investigate assembly will be presently enhancing a prototype of portable, affordable, & user friendly ultrasonography machine is on the basis of tablet gadget (Figure 1).

To lesser level the usability device threshold, we are in the procedure of computerizing as large portions of the manual estimation methods as probable & execute them on the convenient machine. It will be our theory that robotized estimation routines consolidated with an insignificant user interface (UI) (Figure 1(b)) will encourage the adoption of ultrasonography in PC. With this UI, the works discovered in a conventionalist ultrasonography bit of machinery is carried out by basic touch connections. For example: the examine depth will be balanced by a pinch-zoom gesticulation on screen; the cine circle capacity will be performed toward sliding the finger on screen starting left to right; the estimation position calipers might be effortlessly balanced by a drag gesture. Additional capacities are accessed toward utilizing the side buttons. The anticipated

end outcomes will be a robust, inexpensive ultrasonography machine for a sufficient picture quality, which will be worked in PC by faculty with restricted technical information & understanding. The assessment of GA may be vital & frequently absent in PC. The GA will be utilized to anticipate EDD, track fetal development also refine clinical management done association with premature conveyance also around term. To ascertaining GA & consequently EDD, the biparietal diameter (BPD) or the fetal femur length (FL) are the vast majority regularly utilized & great archived parameters. Usually, both BPD and FL are measured manually by ultrasonography prepared midwives, sonographers, radiographers alternately doctors. The fetal dating methodology obliges the restriction from claiming an ultrasonography examine plane holding provided anatomic landmarks and placement from claiming estimation markers. The estimations are prone to both intra & inter-observer variability. So as to decrease these errors, the estimation procedure may be rehashed an amount about times (typically three) & possibly imply or the most extreme esteem for these estimations will be recorded. Right change of the picture get setting is vital will acquire equivalent outcomes to a number alternately group keeping. Whether the get will be set excessively raised alternately excessively awful squat, it might drastically influence the FL & BPD estimation also consequently the ascertained GA. A few routines —ranging from semi-automatic will fully automatic— to moving forward the exactness about BPD & FL estimations to rearranging the fetal dating procedure need been distributed in the written works. However, none of these systems might have been outlined to use for versatile ultrasonography supplies. The point of this Examine might have been on creating & accept a programmed strategy should perceive an introduced examine plane through the fetal leader Furthermore femur et cetera measure the FL & BPD. The strategy might have been intended to run on an off-the-rack tablet gadget for constrained computational force Also Consequently it could a chance to be effortlessly coordinated circuit for a compact ultrasonography machine. A further point might have been to aggravate the technobabble adjust on flimsy get settings.

FIGURE 1.(A) MEASUREMENT OF THE BIPARIETAL DIAMETER (BPD). (B) SCREEN CAPTURE OF THE USER INTERFACE FOR BPD MEASUREMENT

II. MOTIVATION

The project's motivation will be in most recent upgrades in clinical operations, medicinal industries, & small sensor technological invention have provided base frameworks to recognizing upgrading effective flexible frameworks. They provide probably of flexible in use, & scalability of framework. The raspberry pi has turned out to be perfect as the essential of such a framework. There are numerous realistic utilizations for the fetal observing for example, tracking through FECG & ECG in a fetal, outer fetal. Despite this has been outlined for passive screening it might be probable to have this utilized for definitely updating somebody of a BPD & fetal progress.

III. CHALLANGE

The challenge is to build an automated segment anatomical image structures to compute standard obstetric biometric parameters, from 2D fetal ultrasound images, taken on fetuses at different gestational ages (21 weeks, 28 weeks, and 33 weeks). The segmentation is a big challenge which is to obtain good quality image and to measure the BPD andFL. By measuring the fetal then each device is connected with a database and every results are saved in it and even though we have to send the results through message. So to send the fetal information to patient mobile we develop a mobile application for 24*7monitoring.

IV. RESEARCH METHODS

The field of obstetrics and gynecology on medical uses ultrasonography devices to estimate gestational age, estimate delivery day and to visualize maternal fetal development. This is because it is easy to use, and this examination is minimally invasive to mother and fetus. However this ultrasonography examination requires special skills from its users, because the accuracy of this ultrasound results depends on the user's skill. In addition, the resulting image quality factor also affects the diagnosis.

Currently existing ultrasonography machines have three-dimensional or four-dimensional. However, for developing countries like Indonesia, the availability of such machines is still limited in big cities only. In addition the equipment is quite expensive so the patient must pay more expensive as well. For that reason, in many regions of Indonesia still use 2 dimensional ultrasonography machines. As a note, the ultrasonography machines in the rural area have a low resolution and some required functions must be run manually. Also, in some areas, there is no ultrasonography available at all. As described in the previous sub segment, in this paper we will discuss about the use of image processing techniques in estimating gestational age and uterinediameter.

FIGURE 2. (A)ORIGINAL IMAGE. (B) PRELIMINARY SEGMENTED OBJECTS. (C) INSCRIBED HEAD ELLIPSE

V. IMPLEMENTATION

Gestational age is different from fetal age. Fetal age is based on the normal ovulation cycle of about 14 days after menstruation. If a woman has a 28 day and regular menstrual cycle, usually the fetus age has a 2 week gestational age. In other words, when a woman is 8 weeks pregnant, then the age of the fetus is 6 weeks. Meanwhile,

the determination of gestational age based on ultrasonograpy examination could be done in 2ways:

Measuring the diameter of fetal sac (Mean Sac Diameter)is described in Equation1.

$$MSD = \frac{p+l+t}{3} \quad \text{(Eq 1)}$$

Wherein:

p = length (mm) l = width (mm) t = height(mm)

Estimated gestational age could use the formula as described in Equation 2:

$$\Delta t = MSD + 40days \quad \text{(Eq 2)}$$

Wherein:

Δt = Gestational age (days)

MSD = mean sac diameter (1day/1mm after 40 days)

Measuring distance between head-butt fetal (Crown Length/CL) We can estimate gestational age using formulaas described in Equation3.

$$\Delta t = CL + 60weeks \quad \text{(Eq 3)}$$

Wherein: Δt =Gestational age (weeks), CL = Crown Rump Length(mm)

VI. IMAGE PROCESSING PROCESS

This panel is divided into 3 panels, namely Image Template panel, Fetal Detection panel, Image Processing Operation panel. Here's an explanation of each panel :(i) Image Template Panel has a function to call predefined templates. The template command is asfollows:

```
[Filename pathname]= uigetfile({'*.jpg';'*.bmp';}, 'Select an Image'); imgname=[pathname filename]; axes(handles.gambartemplate); imshow(imgname);
```

Ui get file to search the image file, then it will be saved in the form of filename and pathname matrix. Then this matrix will be displayed on axes via axes command (handles. gambartemplate); Then the image will be displayed on the axes named gambartemplate. The matrix will be displayed on the image template via the im show command (imgname). After the template call is complete, it can be continued with fetal detection. (ii) Fetal Detection Panel: The fetal image detection program has a function to crop the image to facilitate the search of fetal image diameter. This detection stage uses the template matching method, which is an image matching method by finding the smallest parts and matching the image template. Template image testing results will be presented in the Results and Discussions segment. (iii) Image Processing Operation Panel: It is divided into 3 parts, namely: binary converter panel, morphology operation panel and edge detection panel. Here's an explanation from each panel: (a) Binary Converter: has a function to convert grayscale image into binary image. Source code of the binary change function:

```
c=getimage(handles.citra_hasil_d
eteksi);
d=im2bw(c);
axes(handles.operasimorfologi);
imshow(d);
```

The image generated from the "UbahBiner" button is then invoked for display using the in show (d); function. The image that appears in “operandi morphology” axes will be recalled to continue the adaptive thresholding process. This process is useful to obtain a clearer picture and get an optimal value because each image has different color intensity. The results of adaptive threshold experiments will be presented in the Results and Discussions segment. (b)Morphology Operation Panel: Morphological operation is a step to clean up the image after the image is altered binary. There are several push buttons on the morphology operation i.e., push button dilation, erosion, opening and closing. (c) Edge detection: has a function to clarify the borders of the usg image. Use of edge detection is only done if the borders of the image are not clearly visible. However, if the peripheral borders are clearly visible then no edge detection isperformed.

The pregnancy age in the image can be determined by entering the MSD formula (Equation 2) into the source code. By combining the MSD formula to the diameter source code asfollows.

```
usia = MSD+30;
set(handles.hasilusia,
'string',usia);
axes(handles.axes6);
```

Source code formula age = MSD + 30; Where the MSD is taken from the diameter result. The sum of MSD with variable 30 means that gestational age is calculated from 30 days. The fetal sac will expand by 1mm / day. Table-2 shows some examples of pregnancy age based on diameter and vice versa.

I. TABLE-1. EXAMPLES OF PREGNANCY AGE BASED ON DIAMETER.

Diameter(mm)	Pregnancy age(days)
47	77
33	73
41	71
58	88
50	80
45	75

Some of the parameters that affect the results include: threshold value, number of morphological operations and

edge detection, and also errors from gestational age. According to the threshold, each image gets different threshold treatment. The threshold value determines the quality of the image to be processed further so that the accurate diameter and gestational age is obtained. The threshold value has a range between 0 and1.

As a comparison, we also did the calculation of gestational age manually. The original USG image is manually measured using paint. The first step of inputting the original image to the paint is then measured by spreading a straight line. Straight line is seen based on the result of image calculation using Matlab. Once known coordinates of each point in units of pixels and then converted into units of mm. Wof here 1 pixel = 0.26458 mm. The diameter of the image is measured using the phytagoras formula. The value of gestational age generated by the formulation of MSD can be tested for success rate by comparing pregnancy age of MSD calculation result with manual calculation. Figure-9 shows comparison of gestational age calculated by MSDand manually.

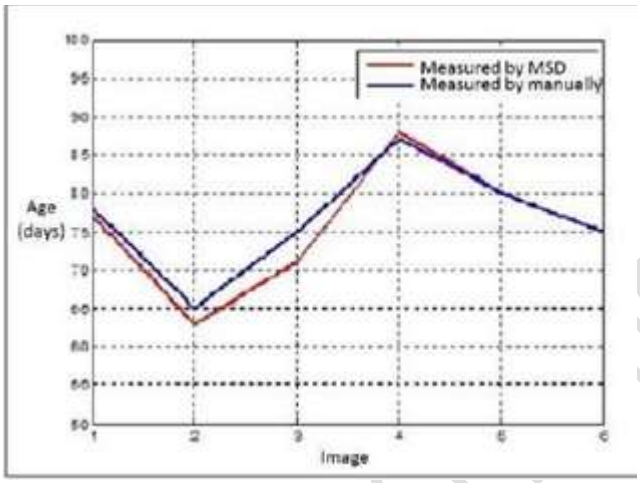

FIGURE-3. COMPARISON GRAPH OF GESTATIONAL AGE CALCULATED BY MSD AND MANUALLY

Some factors that have potential for generating an error are: (i) Original USG images obtained with low resolution and less obvious contrast. (ii) Resize the original image of ultrasound, so the ultrasound image has scale. (iii) Not all morphological operations are used. The operations used are only related to image cleanup.

The mean age of MSD calculation results for the entire image is 75.67 days and the data distribution for the age score of the MSD calculation result has a standard deviation of 8.43. The mean age of manual calculations for the overall image is 76.67 days and the data distribution for the age value of the manual calculation has a standard deviation of 7.23.

VII. COMMUNICATION

The transformation of information like data regarding the patient MSD, BPD, fetal diameter and the fetus age are sent to the patient mobile number through message or we can send the information through email so that we have developed an application or else we can use free services like thinkspeak.com.

Major part in India all high range hospitals use this kind of services but we make this usable to government hospitals primarily and remaining hospitals which are economical in nature.

VIII. CONCLUSION

A robotized estimation procedure for utilize in obstetrics has been executed & enhanced in an off-the-shelf tablet gadget. The mechanically measured values of FL & BPD were similar to manual estimations. The accuracy & execution of outcomes are comparable to those of other state of art automatic models that will be run only on high end ultrasonography machines. Through its incorporation under a moderate & simple to utilize ultrasonography machine for example, the UF scanner, the technique has possibility to clinical usability in PC. Moreover, the robotized estimation strategy will be adaptive to picture gain settings. This is a feature that will encourage the accomplishment of uniform outcomes from estimations between clients in a low innovative setting found in PC, & therefore will help both ease of use & expanded quality of estimations.

Then untimely the results could be sending to the patient through email or message. This facility is very useful for the patients to monitor the fetal time to time and to become healthy.

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