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Qualitative Analysis of Class Characteristics of Individuals Belonging To Northern India of Handwriting Samples Written in Devanagari Script

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Abstract

Handwriting is a compact neuromuscular reflex action performed on the writing materials containing numerous characterizing and classifying characteristics. Normal person's handwriting comprises of numerous individualizing individual characteristics and numerous class or nationality characterizing characteristics which in combination help to maintain identity of person and also to classify person to a particular group. As India is a multilingual country so Examination of handwriting of Indian population is effected mainly script variation all over India. Hindi is most famous and common language all over India as it is been taught till secondary class as must to all the citizens of India [1]. A very little and primitive work is done so far on the analysis of variation of class characteristics of handwriting written in Devanagari script on population basis. In present study variation of handwriting features in handwriting written in Devanagari script with respect to population of different states of northern India are studied using various optical instruments like stereo microscope, comparison microscope and some basic measurement tools like Osborn's slant measurement protector etc.

Keywords: Neuromuscular; Reflex action; Stereo Microscope; Comparison Microscope; Devanagari script .

Introduction

In the present study, an attempt has been made to analyze Hindi (Devanagari) handwriting samples of individuals of states of Punjab, Haryana, Delhi and Uttar Pradesh by using simple microscopy, measurement tools and photography tools [2]. An attempt has been made to compare class or general characteristics of individuals of states of Punjab, Haryana, Delhi and Uttar Pradesh and to simultaneously find out distinguishing characteristics that could be used to differentiate writers belonging to states of Punjab, Haryana, Delhi and Uttar Pradesh. It was concluded that some class characteristics are helpful in differentiating individuals of states of Punjab, Haryana, Delhi and Uttar Pradesh (Figure 1). It was also concluded that this study would prove helpful in studying the handwritings written in Devanagari script and in carrying out analysis of the related cases by narrowing down the investigation [3-7]. Review of literature shows that very less research work has been conducted related to Devanagari script (Hindi) in Indian states [8-10]. Keeping in mind the versatility and uniqueness of Devanagari script present study was carried out to comparative analysis of the class characteristics (such as size, slant, alignment, spacing, angularity, initial and terminal strokes, connecting strokes, style, arrangement and letter forms) in Hindi handwriting samples (Devanagari script) written by individuals belonging to states of India such as Punjab, Haryana, Delhi and Uttar Pradesh (Figure 2).

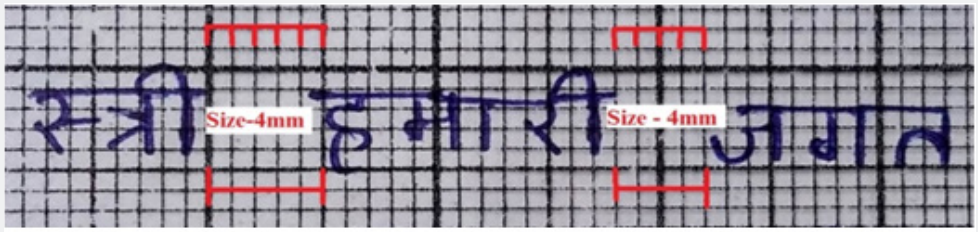

Figure 1: Even spacing of 4mm in handwriting sample.

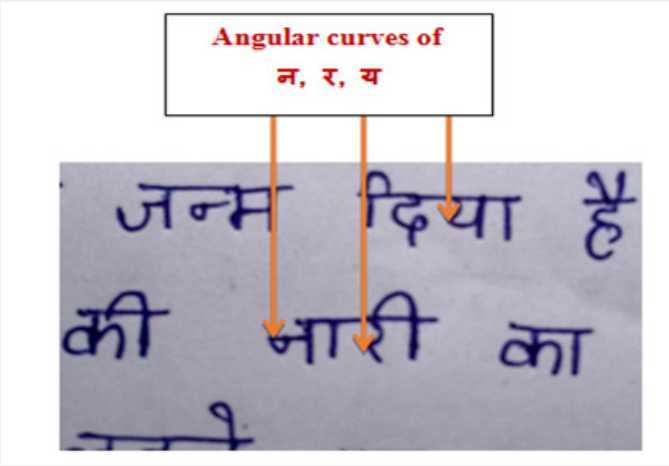

Figure 2 : Angular curves of letter न, र, य.

Materials and Methodology

Following steps were undertaken to determine class characteristics in handwriting samples of individuals belonging to four states of India such as Punjab, Haryana, Delhi and Uttar Pradesh:

a. The handwriting samples were collected from 200 individuals of age group 18-60 years (50 samples each from areas of Punjab, Haryana, Delhi and Uttar Pradesh) after filling the particulars in the given consent form [10-15].

b. The class characteristics (such as size, slant, alignment, spacing, angularity, initial and terminal strokes, connecting strokes, style, arrangement and letter forms) were examined with the help of magnifying glass, stereomicroscope, measuring scales, Measurement grids for size measurements and reproduction of protractor on plastic transparent sheet for slant measurement (Osborn, 1929) [15-20].

Results and Discussion

It was noted that some particular attributes are quite prominent and can indicate particular samples of handwriting belonging to particular background. Observations of handwriting samples of all the four states have been summarized as follows:

i. Punjab - Maximum number of handwriting samples of individuals belonging to Punjab has been found to attain the handwriting characteristics - backward slant and forward slant to upright slant, mixed alignment, uneven spacing, tapering initial and terminal strokes, mixed type of style of writing, right margins absent, underscoring present and punctuation marks present on the baseline [21,22].

ii. Haryana - Maximum number of handwriting samples of individuals belonging to Haryana has been observed to attain the handwriting characteristics [23-25]. - medium size handwriting with medium size word Om (ॐ), upright to backward slant, downhill alignment, right margins present and left margins and top margins absent, indention present and coma below the baseline and parenthesis above the baseline[26,27].

iii. Delhi - Maximum number of handwriting samples of individuals belonging to Delhi has been observed to attain handwriting characteristics - forward slant, uphill alignment, mixed type of curves, blunt and mixed type of initial and terminal strokes, connecting strokes absent, left and top margins present and bottom margins absent and purnviram present above the baseline [28,29].

iv. Uttar Pradesh - Maximum number of handwriting samples of individuals belonging to Uttar Pradesh has been observed to attain handwriting characteristics - large size word Om (ॐ), mixed type of slant, even spacing, mixed type of angularity of curves, connecting strokes present, printed style of handwriting, indention absent, underscoring absent and purnviram present below the baseline and coma present above the baseline[30].

Some characteristics appeared in the same pattern in handwriting samples of individuals belonging to two states and in different pattern in the other two states (Figure 3). These characteristics are placement of punctuation mark with respect to baseline, letter forms of त्र in word यत्र (Figure 4). Letter forms of 8 and 9. Some characteristics appeared differently in all the four states [31]. These characteristics could be helpful in differentiating the handwritings of all the four states. These characteristics are size of handwriting, size of word Om, slant, alignment, spacing, angularity of curves, initial and terminal strokes, connecting strokes, and arrangement of handwriting and letter forms of ॐ (Figure 5). Letter ख in word रखने (Figure 6). Numerals 00 in 2001, ८&९.

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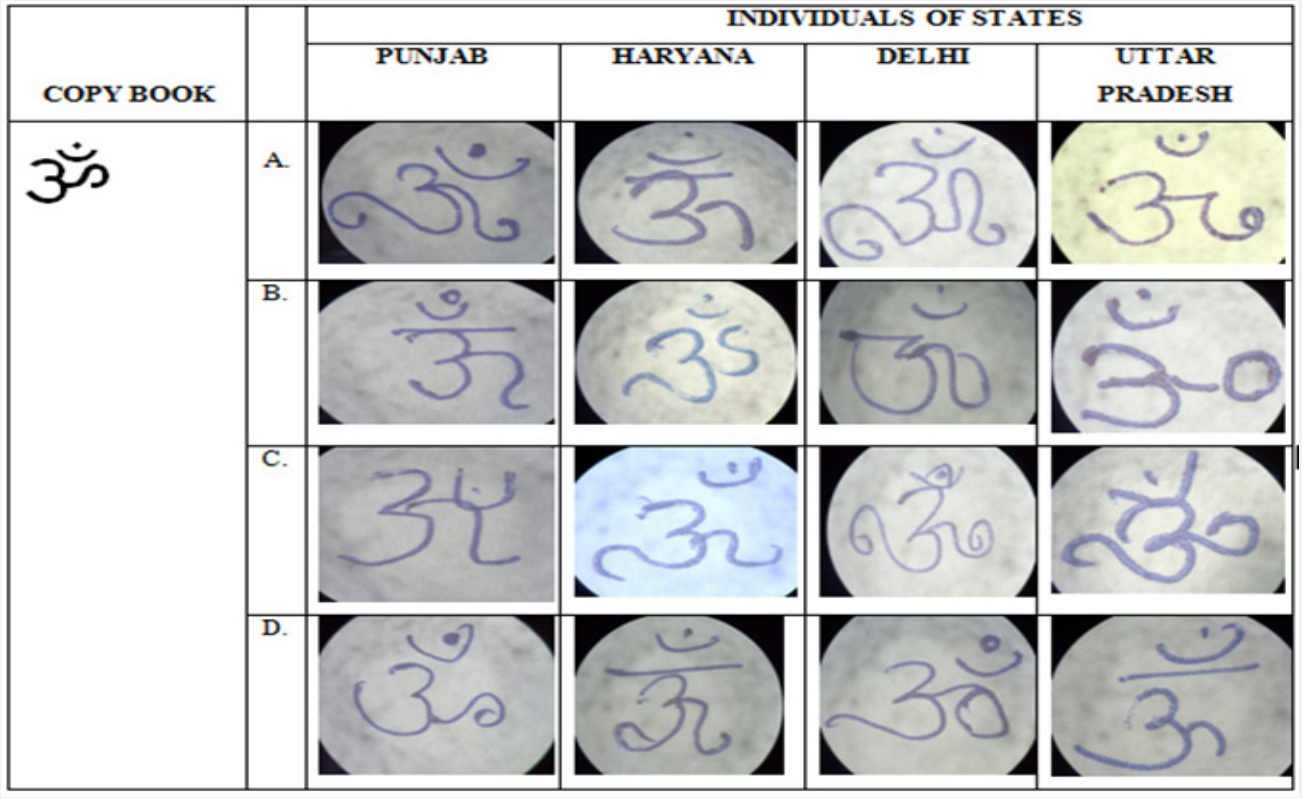

Figure 3 : Different Forms of Om in Handwriting Samples Of Individuals Of States Of Punjab, Haryana, Delhi And Uttar Pradesh.

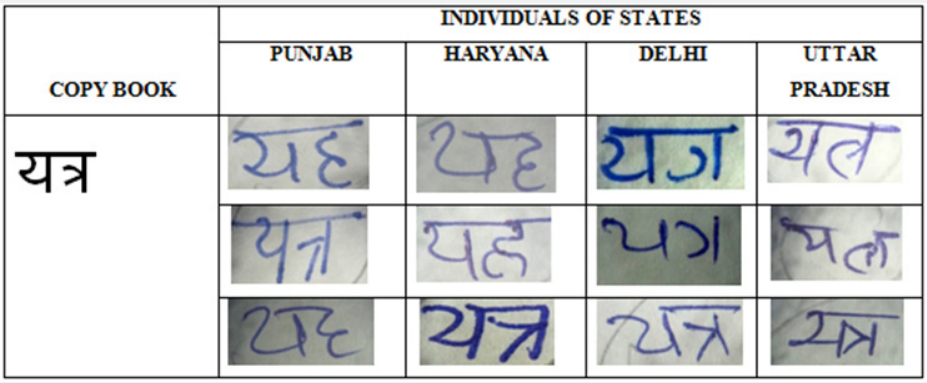

Figure 4 : Different Forms of त्र in यत्र In Handwriting Samples of Individuals of States of Punjab, Haryana, Delhi and Uttar Pradesh.

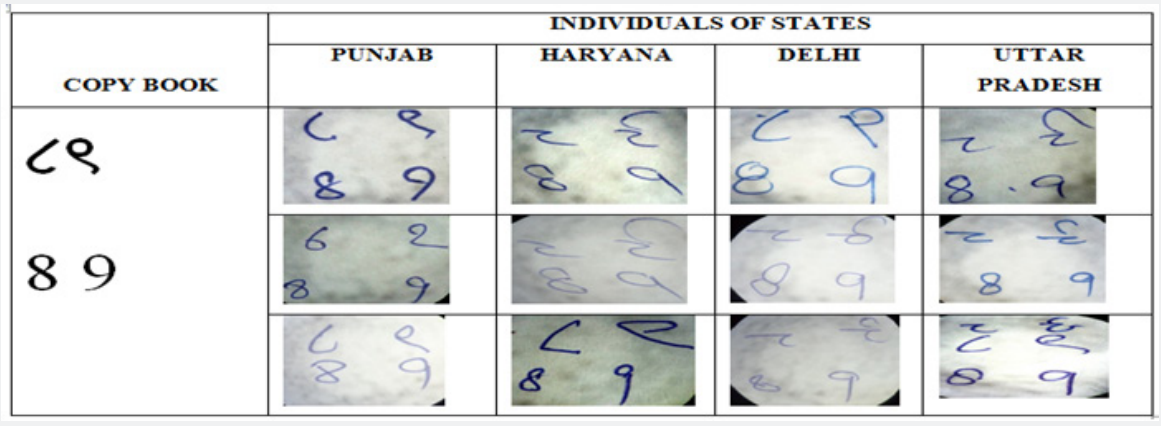

Figure 5 : Different Forms Of 8 And 9 In Handwriting Of Punjab, Haryana, Delhi And Uttar Pradesh Populations.

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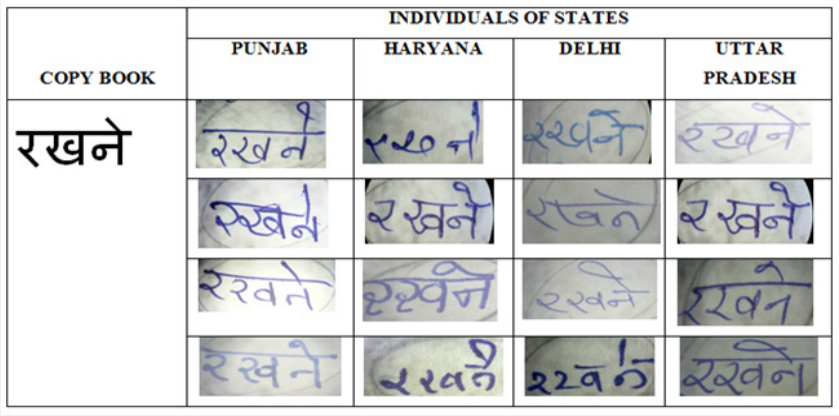

Figure 6 : Different Forms of ख in रखने in Handwriting Samples of Individuals of States of Punjab, Haryana, Delhi and Uttar Pradesh.

Conclusion

This study will help forensic document examiners to evaluate and interpret documents written in Devanagari script which is most widely used script in world. In this study comparative study was done to find out individual, distinguishing features of handwriting samples which could be helpful in identification of individuals and help linking individual to particular state [32,33]. As this is a preliminary study in future more research can be done on Devanagari script by adding characteristics, adding factors influencing handwriting and also increasing data size from additions of more number of states.

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