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Analysis on Handwritten Document Text to Identify Human Personality Characteristics

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Abstract

It is important that a company uses the right means to recruit employees with certain personal characteristics as needed. Nowadays, the techniques to respond to psychological tests on people's characteristics have been widely understood by most job applicants, so that it is difficult to know their true personality. Graphology is a way to identify a person's characteristics by analyzing the handwriting from the document text made by the applicant. The two types of text documentof each applicant are obtained from people of different ages and different writing times. The methods of graphology used in this research for identifying the handwriting are preprocessing and feature extraction. The preprocessing method uses projection integrals, shear transformations, and template matching. While the feature extraction process applies 10 features, they are, margins, line spacing, space between words, size of writing, style,zone, direction of writing,slope of writing, width of writing and shape of the letter.The result of the experiments from five writers shows the accuracy of writing identification equals to 82%, while personality identification equals to 67,4%.

Keywords: Personal characters, Handwriting, Identification, Text document, Graphology

1. INTRODUCTION

The recruitment process of the employee in a company is an early step to find the right person that meets the qualifications required by the company. During the selection process, the Human Resource Development division has an important role to determine the right person to fill the right position in the company. The psychology test is one of the ways to learn the personality of the candidates, so the Human Resource Development division

will be able to determine the candidates who have a suitable personality as required by the company.

Basically, there are some techniques that are only known by the experts to answer the psychology test. However, there are a lot of people who already familiar with the techniques, this is mainly because there are a lot of books out there that reveals the solution to finish the psychology test perfectly, and it will be the main problem for the human resource development division because there is a high possibility that the candidates will manipulate the answer of the test, that will surely affect the performance of the company in the future, because their employee can be unproductive and their will to work that is not optimal.

Graphology express that a personality and the way of thinking can be shown from a handwriting of a person, this is caused by the actions that occur when someone is writing, without them realizing it [1-4]. During the recruitment process, the analysis of the precision of the work position and also the counseling of the employee in their workplace can be helped with grapology method [1-3][5]. The graphology test is able to find some hidden aspects of the candidates during the recruitment process that is assumed to be more beneficial than the interview. Graphology also express that the personality of someone such as feelings, fear, integrity, incuistorial personality, work motivation, leadership and so on that can be expressed by the handwriting [1-3][5].

In this research, we developed a system to learn the personality of the candidates by their handwriting in accordance to the graphology, that is grouped based on the positive and negative characteristic. We model a system as proposed, where after the feature extraction process, the personality of the candidates will be outputted based on the positive and negative characteristic. The interview method is used as the clarification process to the result of the system with the real personality.

2. RELATED WORKS

Previous researchers have conducted research to recognize a person's personality using handwriting [3][9-10]. They were using different parameters.

The research is conducted by Sri Widoretno, M. Sarosa, and Muhammad Aziz Muslim used the basis of integral projection method as the identification of writing with description of the nature of the user based on each recognizable pattern as the final result [9]. Gray-scaling and thresholding methods are used as pre-processing. The segmentationincludes segmentation of lines, segmentation of words, and segmentation of letters. Segmentation is done to find out the pattern of margin, slope, size and distance of space in the handwriting. Moreover, its feature extraction includes average size of height and width of characters, ascenders and descenders, and modeling strokes.

Dewi Mutamimah, in her research,used 4 features for the introduction of personal characters, such as font, zone, style and space [10]. This study

used the writing of data as much as one line by utilizing mobile technology on android operating system. In the personal characters' description, the researcher performs a combination of all personality based on features, so the personal characters that appear are the whole between the negative and the positive. Experiments were performed on 24 posts from different people giving 100% results to find the writing zones using vertical and differential projection histograms, font size 95.83%, space of word with 91.66% success and writing styles having an accuracy higher than 95.83%.

The research of Kukuh Adi Prasetyo [11] was a continuation of Dewi Mutmainah's research. The features used in this research were the margins, the distance between lines, the direction of writing, the slope of writing, the width of writing, and the form of writing as a parameter of personal recognition. However, this study used two lines of data writing. The researcher's personality descriptor calculates the relationship matrix of the main properties of the answer from a graph of 36x36 graphologists to determine the corresponding personality, value 1 indicates the related property while number 0 indicates that they are unrelated. By experimenting 25 posts from different people gives the average success of the app to determine the ultimate personality 80% and the average success of the app to determine the personality detail 80%. This app is good enough to recognize a person's personality.

The current research also recognizes one's personality by utilizing graphology to know the personality using handwriting analysis as one's personality information between positive and negative qualities [9][11]. However, the research will be done using handwriting documents that have multiple lines, using 10 features. The features that is usedare margins, line spacing, space between words, size of writing, style, zone, direction of writing, slope of writing, width of writing and shape of the letteras personality analyzes. In this study, personality introductions are proposed to assist Human Resource Recruitment in employee recruitment. Therefore, it is necessary to classify the personality of the company's demand for candidate personality and the selection process as determinants of employee acceptance.

3. ORIGINALITY

This research uses a new approach to analyze personality by handwriting documents consisting of multiple lines of writing. The handwriting document is obtained from several people's handwriting. Each person gives handwriting results on a 210mm × 297 mm sized paper of two sheets.

[1]https://health.detik.com/berita-detikhealth/2330931/-tulisan-tangan-sering-berubah-ubah-seiring-waktu-pertanda-apa was accessedin 16 April 2018 at 09.06 wib.

The first and second sheets are distinguished by time. The handwriting is obtained from people of different ages between 20 to 30 years, regardless of their gender or socioeconomic status. The rules are considered based on the level of maturity. The ages of children and adolescents will tend to have fluctuating writing because this is a stage of age when a person is in the phase of searching for identity. Thus, the handwriting often changes. However, the adult writing will tend to remain.

4. SYSTEM DESIGN

This research will use featuresincludingmargins, line spacing, space between words, size of writing, style, zone, direction of writing, slope of writing, width of writing and shape of the letter. This combined 4 features of Dewi Mutamimah's research [10] and 6 features of Kukuh Adi Prasetyo's research [11] into 10 features. This is an attempt to obtain higher accuracy in the personality analysis of previous studies.

To provide a global overview of the system to be built, the following is a design drawing process of personality recognition through handwriting.

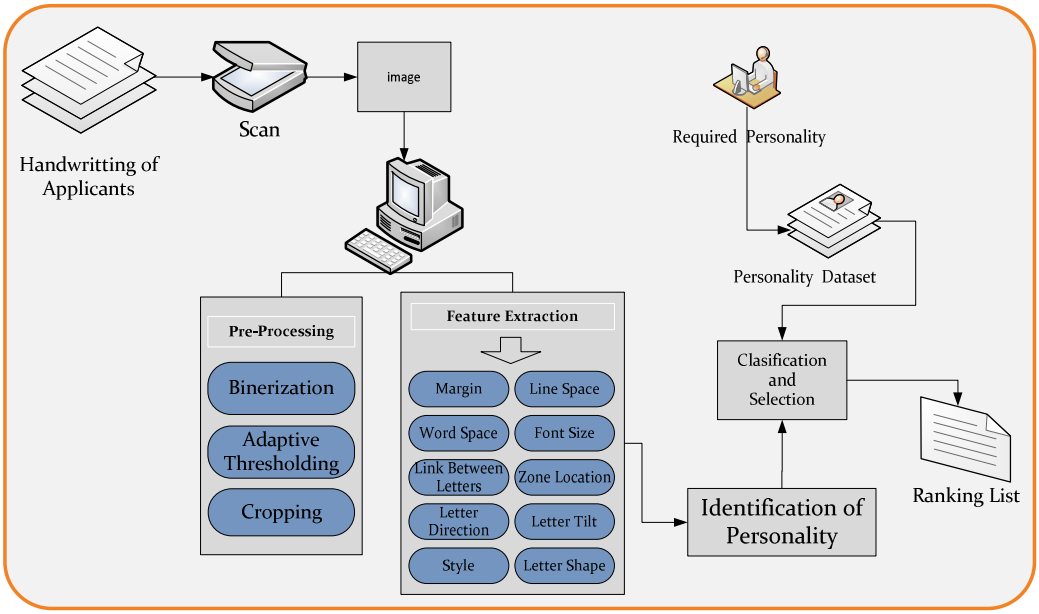

Figure 1. The System Design of our proposed research

4.1 Data Collection

The data used are two types of data, personality data and handwriting data. Personality data is collected from graphology books taken based on margins, line spacing, space between words, size of writing, style, zone, direction of writing, slope of writing, width of writing and shape of the letter.

In addition to personality data collection, handwriting data were collected from different people from 20 to 30 years old on A4 paper which will be used for testing on the system.

4.2 Preprocessing

The preprocessing stage consists of binarization and segmentation. Binarization changes the color of the image to a black and white image. Segmentation performed on preprocessing is divided into 2 types. They are segmentation for writing area capture process, and segmentation for writing every line [9-11]. Preprocessing is the first step in data processing. The first step to do is binerization or color change of image [7][12-13].

4.2.1 Binerization

Binarization is the process of changing the color of the image into black and white images or 0 and 255 [8-11]. Binarization is done using the threshold value of the image to be in though. The image color is divided into two, i.e. black and white parts or images 0 and 1. The color division of the image is separated by the threshold value which determines if the pixel of the image is below the threshold value then the image pixel will be changed to 0 and if it exceeds the threshold value then the image pixel it will be changed to 255 [10-13]. The value used is the threshold value in general that 128 [10].

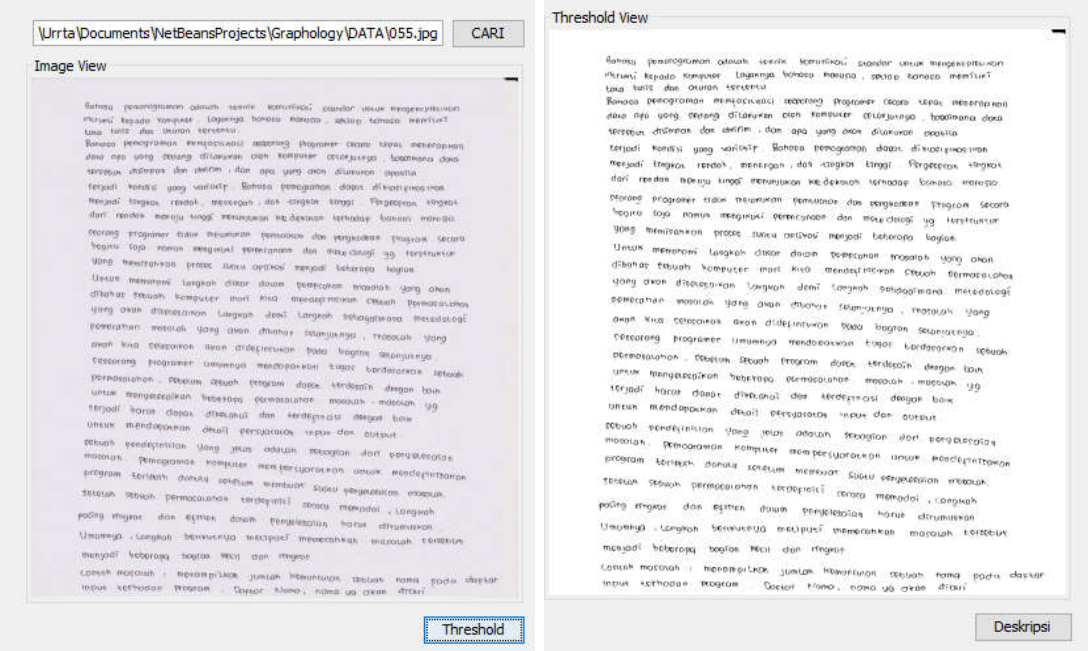

Figure 2. (a) Original image and (b) Result ofThresholding

The above image is the result of binarization, colored images are changed to black and white images.

4.2.2 Cropping Area

Cropping the writing area is an important object retrieval of an image [9-10]. The important object of this research is the complete area of writing. Cropping area in this research using vertical projection integral method and integral horizontal projection. Integral vertical projection is to get upper and

lower bounds of writing area, and Integral horizontal projection is to get left and right boundaries of writing area [9-10].

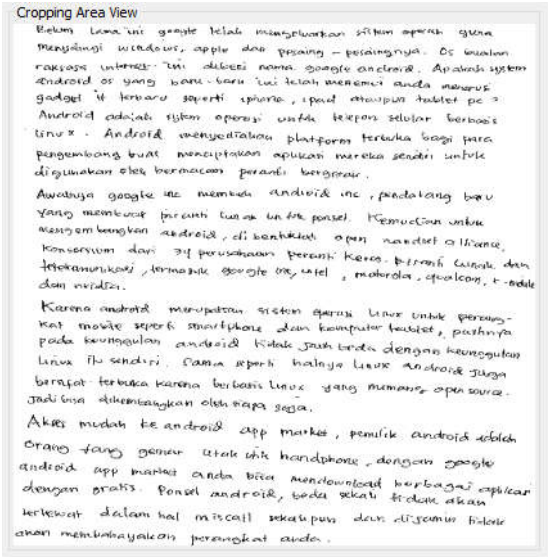

Figure 3. Cropping area result

The above image is the result of the cropping area process, the useless white area is removed.

4.2.3 Cropping Line

Cropping line is the retrieval of thewriting object in each line [9][11]. The initial step is to calculate the integral vertical projection of the entire area. Then look for the starting and ending points on each line of writing, then take part in the starting point position with the endpoint limit.

Figure4.Cropping line result

4.3 Extraction Feature

The extraction feature is the identification stage of writing . It is the process of recognizing the pattern of writing based on graphology [3-4][7] [9-14]. To decide type of identification process, the research used a rule in accordance with the provisions in the graphology book changed according to logic to apply to the system.

4.3.1 Identifying The Margin

The left margin and right margin have a specific meaning on each identification result [3-5][7][15][17-18]. Identification of left and right margins is done by calculating the white value of the cut image in its top and

bottom positions to the black limit. The white value is calculated until the first black point value is gained. The left margin is obtained by calculating the white value with the horizontal projection integral from the left. Moreover, the right margin is obtained by calculating the white value with the horizontal projection integral from the right direction.

The handwriting used in this research is written on A4 paper, which has a width of 21.0 cm. Formula used to convert to cm units is as follows [11]:

$$\text{Margin in cm} = \left(\frac{x}{y}\right) * 21.0 \quad (1)$$

x: Margins in pixels
y: Paper width in pixels

Rules used for margin are if one's writing has a margin of 1 cm to 3 cm then the margin of writing is normal, if a person's writing has a margin> 3 cm then the margin of the text is wide and if a person's writing has a margin <1 cm then the margin of writing is narrow [11][15].

4.3.2 Identifying The Line Spacing

The distance between lines is differentiated into wide, normal and narrow [4][7][9][15-18]. The distance between rows is obtained by calculating the vertical projection histogram and taking the white value, then calculating the amount of white space between the black dots and the row spacing of the text.

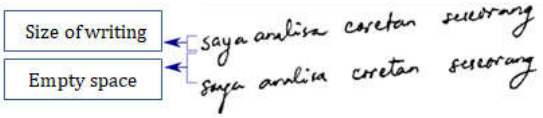

Figure 5. Illustration of spacing line [11]

The determination of the distance between lines is done by comparing the writing in the row with the spaces that become distance. If the result of comparison is <1.5 then the distance between the lines of writing is narrow, and if the result of comparison> 2 then the distance between the lines of writing is wide [11][15].

4.3.3 Identifying The Space between Words

As the distance between lines, distances between words are differentiated into wide, normal and narrow [4][7][9][15-18]. The distance between words is done by counting the vertical projection histogram on every blank space on the writing.

If the spaces are more than 30% of the text heights in a row, then the spacebar of a person is wide. And if it is below 30% then the spaces are narrowly spaced [10].

4.3.4 Identifying The Size of Writing

The size of the writing is the ratio of the area of the writing line to the writing area [4][7][9][18]. The identification of the size of the writing is calculated from the area of the writing and the area of writing of each line. After obtaining the area of each row then compared the two, between the total area of the image with the area of each row [10].

If the writing area is <7% then the writing is small. If the writing area is> 7% and less than 17% then the posts are grouped in normal letters. And if the writing area is> 17% then it is classified on uppercase size [10].

4.3.5 Identifying The Style of Writing

Style of writing is divided into two types, they separated writing and conection writing [1-3][17]. The writing style is determined with a projection histogram to search for letters that are separated from the other letters.

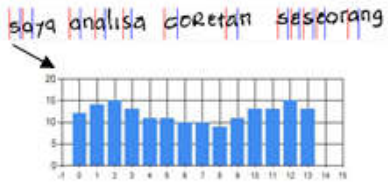

Figure 6. Illustration of separate [11]

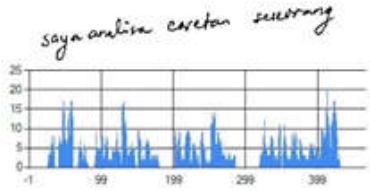

Figure 7. Illustration of connection [11]

According to the rule, if the letters are separated more than 6 each line then the writing model is a separate letter [8].

4.3.6 Identifying The Zone of Writing

The writing body is the zone where the writing has the higest histogram and is the middle letter zone [3-4][6][10]. To search for body of writing, histogram projection and differential is used to find the two tops of the image or body of writing.

Figure 8. Illustration of zone [10]

Therefore, a rule is obtained; if the number of black dots in the upper zone> of the middle zone and the lower zone then the writing includes the upper zone, if the total black point value in the middle zone> of the upper and lower zone then the writing includes the middle zone, and if the number of points black in the lower zone> of the upper zone and the middle zone then the posts include the lower zone [10].

4.3.7 Identifying TheDirection of Writing

The direction of writing is divided into three types, upright writing, decreasing writing and flat writing [2][4][6][9][11][15][8]. The first step to get the writing direction is to take 1/3 of the beginning of the post and the third of the writing.

The beginning is to calculate the integral of the vertical projection of each of the first 1/3 and 1/3 of the end. Once the position is obtained, then the first 1/3 position and the final 1/3 position are compared.

Thus, if the initial 1/3 position is less than 1/3 of the end position then the writing is said to decrease. And if the first 1/3 position is more than 1/3 of the end position then the writing is said to be ascending [11].

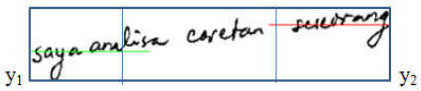

Figure 9. Illustration of direction [11]

Identifying the position of writing between ascending, descending or horizontal is done by giving a threshold value.

4.3.8 Identifying TheSlope of Writing

Handwriting generally has three types of slope, they are left tilt, right tilt, and erect [1-6][11][17]. The slope of the writing was obtained by finding the maximum value of the histogram integral horizontal projection of the original writings, the writings that positive shear transformation has been applied, and the writings that negative shear transformation has been applied [11][20].

It must first determine the value of m sufficient to make italic writing upright. Below is a picture illustration of the slope of writing.

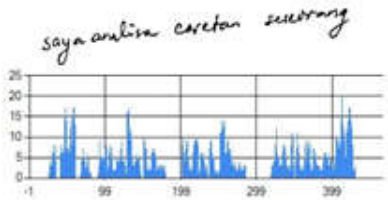

Figure 10.Horizontal Integral Projection of Original Handwriting [11]

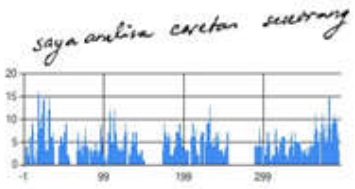

Figure 11. Shear Negative [11]

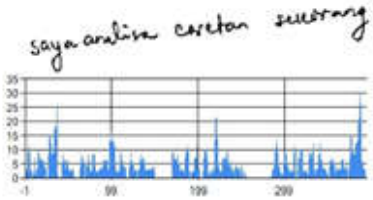

Figure 12. Shear Positive [11]

After gettingthe maximum value of the horizontal integral projection of the original handwriting, handwriting which has applied positive shear transformation, and handwriting that has applied negative shear transformation, it is known to determine the slope of writing as follows [11]:

a. Max value of positive shear transform> max value of original writing and max value of negative shear transform, slope of writing is to the right.
b. Max value of negative shear transform> max value of original writing and max value of positive shear transform, slope of writing is to the left.
c. Max value of positive shear transformand negative shear transform ≤ max value of original writing, thewriting is upright.

4.3.9 Identifying The Width Of Writing

The width of the handwriting is distinguished by the narrow or narrowed writing style [1-3][11]. Cropping the writing is done to get the letter with threshold limit; this is done to anticipate writing with a continuous style. The determination of the writing widens or narrows uses the height and width of the first letter or symmetrical letter.

The height of the letter is obtained by calculating the vertical projection integral and the horizontal projection integral to calculate the width of the letter.

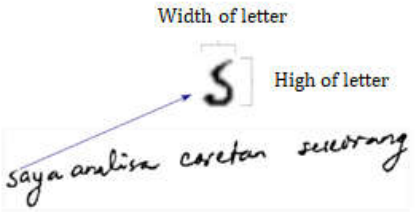

Figure 13. Illustration of width [11]

Width of handwriting has these rules; if the letter height is more than the width of the letter then the writing is narrow, and if the letter height is more than the width of the letter then the writing is wide.

4.3.10 Identifying TheShape of Letter

The shape of the letters is distinguished into spherical and pointed. Different shapes can be seen in the letters "m" and "n" [1-3][11][17].The determination of letters, conducted experiments using zero mean filtering or sum square difference [11]. Previously, 6 templates with size 13 pixels x 15 pixels have been prepared for filtering. The templates are upright round letter shape, rounded letters to the right, rounded letters obliquely to the left, upright taper letters, tapered lips to the right, tapered lops to the left.

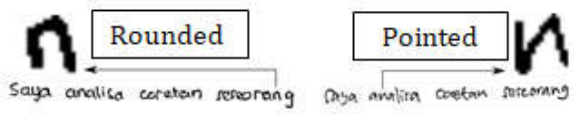

Figure 14. Examples of rounded and pointed letters [11]

Furthermore, zero mean filtering or sum square difference with those templates is done [20]. The purpose of this filtering is to find the shape of the letter. If in the writing found a round letter then the writing is using a round letter, and vice versa if found a pointed letter then the writing is using pointed letters. Determination of a pointed or rounded letter will be seen from the value generated by filtering on the template used.

5. EXPERIMENT AND ANALYSIS

This point discusses system performance. We analyzed 3 handwritings from different writers. We will see the system to finish processes and to give system performance. This experiment also compared the result of handwriting identification from system with the result of handwriting identification using graphology handbook tutorial. Then, the result of personality identification will be matched to the writer using interview method.

The result of matching personal characters, will be calculate using confusion matrix to prediction accuracy positive characteristicsand negative characteristics [21-24]. The accuracy is the total number of predictions that were correct [21-22] :

$$Accuracy = \frac{a+b}{a+b+c+d}\ x100\% \quad (2)$$

5.1 First Writer

The first handwriting that has been tested on the system gets 2 errors in identification. First, regarding the style of writing, the system states that the writing style is separated, where as according to the graphology, the writing style is identified as connected. Second, regarding the shape of letter, the system identified the shape of letter is rounded, while according to the graphology book the shape of letter is pointed. The compatibility of the system is 80% towards the first writer.

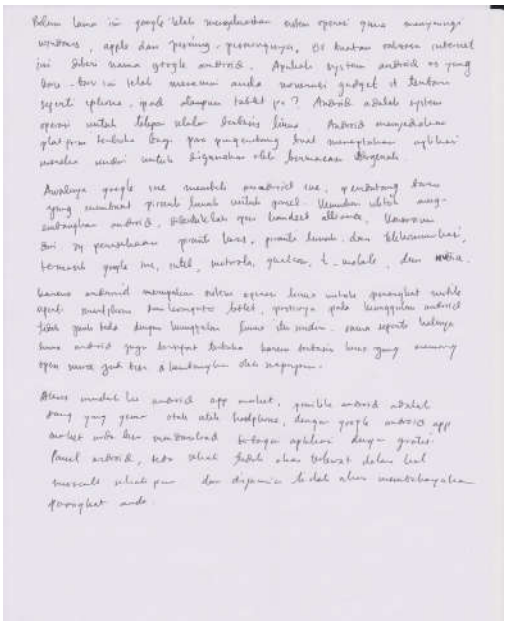

Figure 15. Handwriting of thefirst writer

Figure 15 is the result of handwriting by the first writer.

Table1. Result of Feature Identification

	System	**Graphology Handbook**
Margin	Leftnormal and Right normal	Leftnormal and Right normal
Line Spacing	Narrow	Narrow
Word Spacing	Wide	Wide
Size of Writing	Small	Small
Style of Writing	*Separate*	*Connection*
Zone	Middle	Middle
Direction of Writing	Flat Direction	Flat Direction
Slope of Writing	Flat	Flat
Width of Writing	Normal	Normal
Shape of Letter	*Rounded*	*Pointed*

Errors in the identification of style, either connected or separated might be caused by separate letters in a line of writing, with the number of more than predetermined or a thin letter connection so that the system reads noise.

The results of interviews with the first writer of 34 personal characters are positive and 29 negative personal characters by the system toward the parameters which indicates that, the positive characteristic of the first writer has a match of 70%, and the negative positive characteristic of the first writer has a 70% match.

The level of accuracy of the system to the first writer personal characters can be presented in table 2.

Table2. Value ofconfusion matrix personality

Personality Identification		*Interview*	
		Positive	Negative
System	Positive	24	10
	Negative	11	18

We can count the level of accuracy of first writer as follows:

$$Accuracy = \frac{24 + 18}{24 + 10 + 11 + 18} \; x100\% = 67\%$$

The results of matching in the system to the writer is the accuracy of personal characters to first writer is 67%.

5.2 Second Writer

The second handwriting that has been tested on the system gets 2 errors in identification. First, regarding line spacing, the system states that the line spacing is narrow, where as according to the graphology, the writing style is identified as normal. Second, regardingwidth of writing, the system identified the width of writingis widen, while according to the graphology book the width of writingis normal. The compatibility of the system is 80% towards the secondwriter.

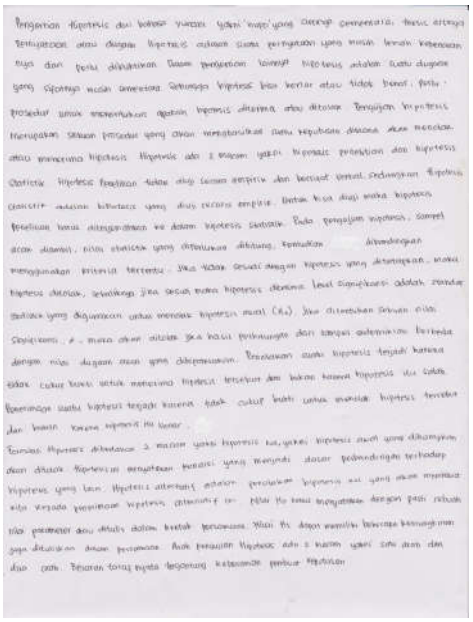

Figure 16. Handwriting of the second writer

Figure 16 is the result of handwriting by the second writer.

Table3. Result of Feature Identification

	System	**Graphology Handbook**
Margin	Left narrow and right narrow	Left narrow and right narrow
Line Spacing	*Narrow*	*Normal*
Word Spacing	Wide	Wide
Size of Writing	Small	Small
Style of Writing	Separate	Separate
Zone	Middle	Middle
Direction of Writing	Flat Direction	Flat Direction
Slope of Writing	Flat	Flat
Width of Writing	*Widen*	*Normal*
Shape of Letter	Rounded	Rounded

The results of interviews with the second writer of 46 personal characters are positive and 36 negative personal characters by the system toward the parameters which indicates that, the positive characteristic of the second writer has a match of 80%, and the negative positive characteristic of secondwriter has a 78% match.

The level of accuracy of the system to the first writer personal characters can be presented in table 4.

Table4. Value of Confusion Matrix Personality

Personality Identification		*Interview*	
		Positive	Negative
System	Positive	36	10
	Negative	7	29

We can count the level of accuracy of second writer as follows:

$$Accuracy = \frac{36 + 29}{36 + 10 + 7 + 29} \; x100\% = 79\%$$

.

The results of matching in the system to the writer is the accuracy of personal characters to second writer is 79%.

5.3 Third Writer

The third handwriting that has been tested on the system gets 1 error in identification. The system states that size of writing is small, where as according to the graphology, thesize of writing is normal. The compatibility of the system is 90% towards the third writer.

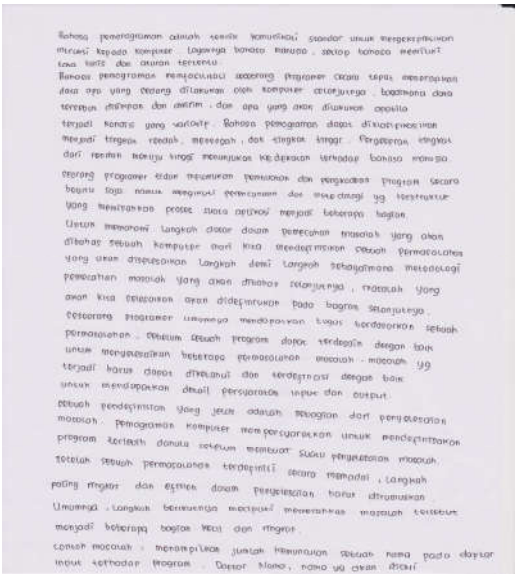

Figure 17. Handwriting of the third writer

Figure 17 is the result of handwriting by the third writer.

Table5. Result of Feature Identification

	System	**Graphology Handbook**
Margin	Left Normal dan RightNarrow	Left Normal dan RightNarrow
Line Spacing	Normal	Normal
Word Spacing	Wide	Wide
Size of Writing	*Small*	*Normal*
Style of Writing	Separate	Separate
Zone	Middle	Middle
Direction of Writing	Flat Direction	Flat Direction
Slope of Writing	Flat	Flat
Width of Writing	Normal	Normal
Shape of Letter	Rounded	Rounded

The results of interviews with the third writer of 50 personal characters are positive and 36 negative personal chracters by the system toward the parameters which indicates that, the positive characteristic of the third writer has a match of 78%, and the negative positive characteristic of thirdwriter has a 78% match.

The level of accuracy of the system to thethird writer personal characters can be presented in table 6.

Table6. Value of Confusion Matrix Personality

Personality	*Interview*

Identification		Positive	Negative
System	Positive	37	13
	Negative	8	28

We can count the level of accuracy of third writer as follows:

$$Accuracy = \frac{37 + 28}{36 + 13 + 8 + 29} \; x100\% = 76\%$$

The results of matching in the system to the writer is the accuracy of personal characters to third writer is 76%.

5.4 FourthWriter

The fourthhandwriting that has been tested on the system gets 2 errors in identification. First, regardingsize of writing, the system states that the size of writing is small, where as according to the graphology, thesize of writing is identified as normal. Second, regarding width of writing, the system identified the width of writing is widen, while according to the graphology book the width of writing is normal. The compatibility of the system is 80% towards the second writer.

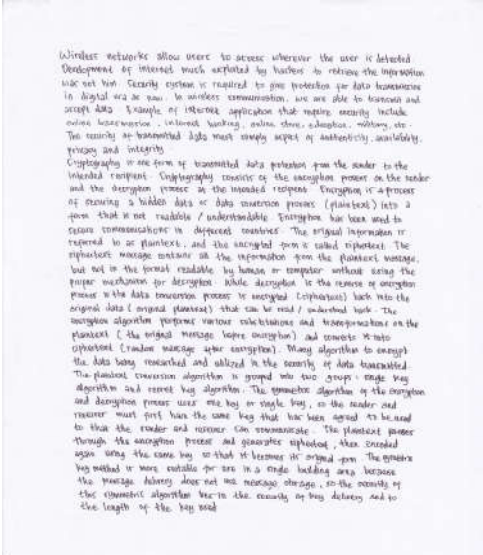

Figure 18. Handwriting ofthefourth writer

Figure 18 is the result of handwriting by the fourth writer.

Table7. Result of Feature Identification

	System	**Graphology Handbook**
Margin	Left Normal dan Right Normal	Left Normal dan Right Normal
Line Spacing	Narrow	Narrow
Word Spacing	Normal	Normal
Size of Writing	*Small*	*Normal*
Style of Writing	Separate	Separate
Zone	Middle	Middle
Direction of Writing	Flat Direction	Flat Direction
Slope of Writing	Flat	Flat
Width of Writing	*Widen*	*Normal*
Shape of Letter	Rounded	Rounded

The results of interviews with the fourth writer of 54 personal characters are positive and 42 negative personal characters by the system toward the parameters which indicates that, the positive characteristic of the fourth writer has a match of 60%, and the negative positive characteristic of fourthwriter has a 40% match.

The level of accuracy of the system to the fourth writer personal characters can be presented in table 8.

Table8. Value of Confusion Matrix Personality

Personality Identification		*Interview*	
		Positive	Negative
System	Positive	33	21
	Negative	25	17

We can count the level of accuracy of fourth writer as follows:

$$Accuracy = \frac{33 + 17}{33 + 21 + 25 + 17} \; x100\% = 50\%$$

The results of matching in the system to the writer is the accuracy of personal characters to fourth writer is 50%.

5.5 Fifth Writer

The fifthhandwriting that has been tested on the system gets 2 errors in identification. First, regardingline spacing, the system states that the line spacing is narrow, where as according to the graphology, theline spacing is identified as normal. Second, regardingshape of letter, the system identified the shape of letter is pointed, while according to the graphology book the

shape of letter is rounded. The compatibility of the system is 80% towards the fifth writer.

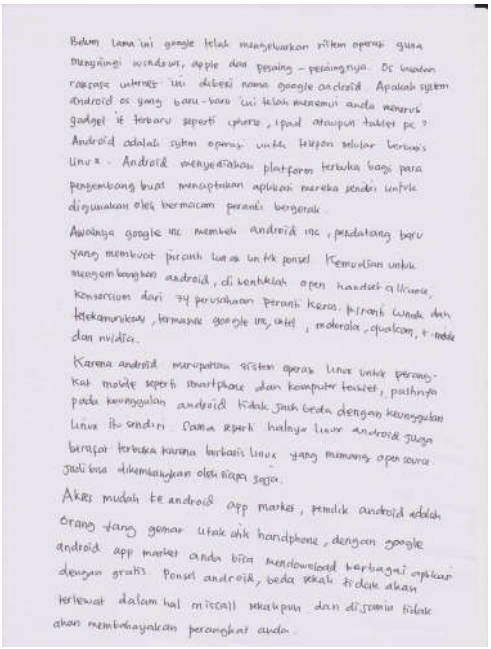

Figure 19. Handwriting of thefifth writer

Figure 19 is the result of handwriting by the fifth writer.

Table9. Result of Feature Identification

	System	**Graphology Handbook**
Margin	Left normal dan Right normal	Left normal dan Right normal
Line Spacing	*Narrow*	*Normal*
Word Spacing	Narrow	Narrow
Size of Writing	Small	Small
Style of Writing	Separate	Separate
Zone	Middle	Middle
Direction of Writing	Flat Direction	Flat Direction
Slope of Writing	Flat	Flat
Width of Writing	Narrow	Narrow
Shape of Letter	*Pointed*	*Rounded*

The results of interviews with the fourth writer of 53 personal characters are positive and 45 negative personal characters by the system toward the parameters which indicates that, the positive characteristic of the fourth writer has a match of 89%, and the negative positive characteristic of fourthwriter has a 38% match.

The level of accuracy of the system to the fifth writer personal characters can be presented in table 10.

Table10. Value of Confusion Matrix Personality

Personality Identification		*Interview*	
		Positive	Negative
System	Positive	47	6
	Negative	28	17

We can count the level of accuracy of fourth writer as follows:

$$Accuracy = \frac{47 + 17}{47 + 6 + 28 + 17} \; x100\% = 65\%$$

The results of matching in the system to the writer is the accuracy of personal characters to fifth writer is 65%.

6. CONCLUSION

Based on the analysis that has been done, obtained the conclusion. Identification of a person's personality character is obtained from the handwriting feature extraction results. The 10 features that are used such as margins, line spaces, space between words, writing sizes, styles, zones, writing directions, writing slopes, writing width and letter form are feature identification processes. Feature identification is done using projection integrals algorithm, shear transformations, and template matching, where the identification of each feature will identify a person's personality character.

Testing of 5 different handwriting, obtain different levels of accuracy for each author. The results of feature extraction have an accuracy rate of 82% of 5 handwritings. While the level of accuracy in the identification of personality characters has an accuracy rate of 67,4% of 5 handwritings, each of which has been verified against the owner of the writing.

From result and analyze that already done, it can be concluded that the system which is built on this research is able of identifying features use an extraction of handwriting with good results. So, the system can also identify the character of a person's personality to find employees who have potentially related to their job. Because the right job position can be seen from the character of personality.

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