

Title	鼻の3次元構造解析による個人識別
Author(s)	北田, 基樹
Citation	
Issue Date	1998-03
Type	Thesis or Dissertation
Text version	author
URL	<a href="http://hdl.handle.net/10119/1135">http://hdl.handle.net/10119/1135</a>
Rights	
Description	Supervisor:小谷 一孔, 情報科学研究科, 修士

# Person Identification by Analysis 3-Dimensional Structure of Nose Image

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February 13, 1998

**Keywords:** person identification, human communication, face expression, nose image, morphology.

This paper propose person identification by analysis 3-dimensional structure of a nose image.

Now, with highly-developed and diffused computer, a person identification are automatically. Also, a human communication between a machine and a human are on the increase. At this time, if computer can understand one's personality and identify a human, more highly and efficiency communication will be realized. For that purpose, it is necessary to develop technic of extracting one's personality and analysis one's personality.

By way of example a simplicity person identification used of computer, based on a code, password and so on. But a code and password have a weak spot for a swindle and forgery. However, a fingerprint, a voice print, a face, a retina, an iris, DNA and so on are difficulty forgery. A fingerprint, a retina, an iris, DNA are made practicable. But these system think security.

Therefore, this paper propose person identification system for a human communication. We show two important factors of person identification for a human communication to do as follows :

- (a) A man does not receive a burden of mental and physical.
- (b) There is no effect of face expression.

As to (a), a face image pay attention to most natural method when man do identify a person and be not given a burden of mental and physical. We show two typical method to do as follows :

- (1) Based on shape and mutual relationship of facial parts(such as an eyes, a nose, a mouth and so on).
- (2) Based on shade and depth pattern of a face.

These method do not examine effect of face expression. However, face expression is important keyword. Therefore we are necessary to examine effect of face expression.

In this paper, we take notice of a nose image that is not given effect of face expression, and identify person by analysis a nose image.

This paper consist of two parts.

- (1) Confirm a nose image is effective in person identification.
  - a)Analyze individuality of a nose image and effect of face expression by subjectivity assessment.
  - b)Analyze individuality and effect of face expression by analysis shade and depth pattern of facial parts.
- (2) Identify person by analysis feature of a nose image.
  - a)Identify person by simple similarity.
  - b)Identify person by pattern spectrum of morphology.

As to (1), identified person by subjectivity assessment a nose image. We analyzed simple similarity between different parson and between different face expression. As a result, shade and depth pattern of a nose image did not have much effect than a eye and a mouth image. Also shade pattern of a nose image had much individuality than depth pattern. We will be analyze a cause have an effect on structure of nose or a measuring device. Concerning lighting and rotation, shade pattern of nose image had much effect than depth pattern.

Therefore, shade pattern is fit fixed lighting situation and no rotation. Depth pattern is fit some other situation.

As to (2), identified person by simple similarity. As a result, identify ratio of shade pattern was 95%. In this case, identified person even if face expression was difference. Identify ratio of depth pattern was 75%. In this case, enough classify person.

Also, identified person by pattern spectrum of morphology. As a result, Identify ratio by pattern spectrum did not have much better than simple similarity. But pattern spectrum was not effected by change position. Concerning lighting, pattern spectrum was not effected by brightness, but it was given effect contrast.

Future, we will be examined the most suitable structuring element and make good use of pattern spectrum.