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EXTRACTION OF THE FEATURES OF NUMERICAL LETTERS BY THE SHIFTED PATTERN

—T. Shirai

The recognition of hand-printed and typed numerical letters has been tried by the use of a digital computer. This method is temporarily called "Shifted Pattern Method".

First, each two-dimensional pattern of black and white, disintegrated into 10×13 matrix points, is dichotomized as "one" and "zero" manually or automatically by the use of a character sampling device.

The "one" is assigned to a matrix point corresponding to the black position of the pattern and the "zero" to that corresponding to the white one.

The dichotomized pattern, fed into the computer, is translated into the shifted pattern in the following way: the "one" bit, which is located most closely to the first row, is shifted into the first row, not changing the mutual arrangement of all "one" bits in each column.

Then, the dichotomized pattern is divided into upper and lower parts.

Each divided pattern is rotated by 90 degrees and again translated into the shifted pattern in the same manner.

Attention is directed to the curvatures in the patterns.

The curvatures are classified into the four types of convexed—upward, downward, leftward and rightward—and then, the discrimination of pattern is performed by utilizing the features of the above curvatures. It should be noted that this method is made without regard to the positions, the size and the orientation of the original pattern and also to the noise, if small, in the pattern.

The result of the experiment shows that the recognition scores are 97 percent for 1,000 samples of the typed numerical letters dichotomized by the character sampling device and 87 percent for 510 samples of the hand-printed numerical letters dichotomized by the same device, and that the score of 92 percent is obtained for 1,300 samples of hand-printed numerical letters dichotomized manually.

Errata

Thermal Effect on the Ionospheric *F* Region Disturbance *By Nobuo Matuura*,
 Jour. Radio Research Laboratories, Vol. 10 No. 47, Jan., 1963

p.7 Fig. 4 (a) $\begin{cases} 1 \times 10 \\ 2 \times 10 \\ 3 \times 10 \end{cases}$ should read $\begin{cases} 1 \times 10^6 \\ 2 \times 10^6 \\ 3 \times 10^6 \end{cases}$.

p. 25 The 3rd line ($I=45^\circ$) should read ($I=49^\circ$).