Title of Project : From Text Engineering to Text Science

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Research Project Number : 17H06100　Researcher Number : 70315125
Research Area : Multimedia, database
Keyword : text science, text engineering, character recognition, machine learning, font design

【Purpose and Background of the Research】

Text and its component characters are one of the most important media for our intellectual activity and communication. In this project, we will establish new research field, called "text science". Its purpose is to fully understand multiple functions of text and characters, which are not analyzed in past researches. Specifically, we will analyze the following four functions objectively with a large amount of real data: disambiguation of scene context, ubiquitous message transmission, nonverbal impression expression by font design, and legibility against distortion.

【Research Methods】

(1) Disambiguation of scene context: We will analyze how textual information in scene helps to disambiguate its surroundings as a label. In other words, we will analyze the interaction between scene and textual information.

(2) Ubiquitous message transmission: We will analyze what kind of messages texts and characters send to us in daily life. In addition, we will compare information given as textual message with semantic information implicitly given from scene images.

(3) Nonverbal impression expression by font design: We will analyze the relationship between semantics and font design of words. Furthermore, we will try to realize an automatic font design method so that the font expresses specific impression.

(4) Legibility against distortion: We will investigate why characters can keep its legibility under various distortions and noise. In addition, we will generate a new alphabet (i.e., a set of character symbols) in an automatic way, where each symbol can be distinguished clearly from the others even under various distortions.

【Expected Research Achievements and Scientific Significance】

We expect to have multiple research achievements in both of fundamental and application.

(1) As fundamental achievements, we will establish a new scientific framework for communication utilizing multiple functions of text and characters. In addition, our research results of analyzing the simplest patterns, i.e., character symbols, will contribute to general pattern recognition and artificial intelligence research.

(2) In application fields, we contribute to environment, art and design, society and welfare, and humanity and life, because text and characters are related to all human activities. As application examples, we will realize a supporting system for scene understanding and a font design method so that the font expresses specific impression and keeps sufficient legibility under various distortions.

【Publications Relevant to the Project】

Uchida S., Text Localization and Recognition in Images and Video, in Handbook of Document Image Processing and Recognition, Springer-Verlag, London, 2014.

Zhu A., Gao R., Uchida S., Could Scene Context be Beneficial for Scene Text Detection? Pattern Recognition, vol.58, pp.204–215, Oct. 2016

【Term of Project】 FY2017-2021

【Budget Allocation】 116,000 Thousand Yen

【Homepage Address and Other Contact Information】
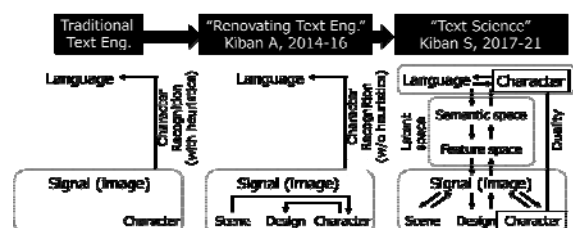
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Figure 1　From text engineering to text science