Received March 4, 2021, accepted March 4, 2021, date of current version March 16, 2021.
Digital Object Identifier 10.1109/ACCESS.2021.3064459

COMMENTS AND CORRECTIONS

Corrections to "Toward an Optimized Neutrosophic k-Means With Genetic Algorithm for Automatic Vehicle License Plate Recognition (ONKM-AVLPR)"

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The intention of this correction is to better explain how the published article [1] relates to the article [3], which was referenced in [1] but without sufficient delineation.

A. OPTIMIZED NEUTROSOPHIC K-MEANS

The full mathematical representation of the neutrosophic process has been discussed briefly according to the following citations [2]–[21]. This would conclude the following general NS representation as follows:

$$R(T, I, F)_{NS} = \{T(c, d), I(c, d), F(c, d)\} \quad (1)$$

$$F(c, d) = \frac{\overline{R}_{max} - \overline{R}(c, d)}{\overline{R}_{max} - \overline{R}_{min}} = 1 - T(c, d), \quad (2)$$

Whereas the intensity value of the pixel (c, d) is R (c, d), its local mean value represented by $\overline{R}(c, d)$ which is acquired by means of average filtering with mask size = 3 × 3, and $\overline{R}_{min}, \overline{R}_{max}, \lambda(c, d), \lambda_{min}, \lambda_{max}$ have been represented in detail in [3], [5].

$$E_{NS} = E_T + E_I + E_F, \quad (3)$$

where E_{NS} has been represented with details in [3], [5]

This operation has been utilized using the β-mean which improves truth (T) subset until the entropy of the indeterminate (I) subset decreased and remains constant with the appropriate number of trials. (β-mean) operation for the neutrosophic image R_{NS} has been represented according to the following citations [3], [5], [7], [8]:

$$\overline{R}_{NS}(\beta) = R(\overline{T}(\beta), \overline{I}(\beta), \overline{F}(\beta)), \quad (4)$$

where $\overline{T}(\beta)$, $\overline{I}(\beta)$ and $\overline{F}(\beta)$ are expressed as follows:

$$\overline{T}(\beta) = \begin{cases} T(c, d), & I < \beta \\ \overline{T}_{\beta(c,d)}, & I \geq \beta \end{cases} \quad (5)$$

$$\overline{I}_{\beta}(c, d) = \frac{\overline{\lambda}_T(c, d) - \overline{\lambda}_{T_{min}}}{\overline{\lambda}_{T_{max}} - \overline{\lambda}_{T_{min}}} \quad (6)$$

whereas $\overline{T}_{\beta(c,d)}, \overline{\boldsymbol{\lambda}}_{\boldsymbol{T}}(\boldsymbol{c}, \boldsymbol{d}), \overline{\boldsymbol{\lambda}}_{\boldsymbol{T_{min}}}, \overline{\boldsymbol{\lambda}}_{\boldsymbol{T_{max}}}$ have been represented in detail in [3], [5], [8]. Accordingly, a genetic algorithm has been used as discussed in the previous section. Algorithm 2 represents a simple trajectory of the genetic algorithm. The optimal value of (β) has been achieved using maximum Jaccard (JAC) which is a statistical measurement that calculates the union"∪" and the intersection "∩" operators of any two sets. This fitness (JAC) is given by [3]

$$JAC(f, q) = \frac{R_f \cap R_q}{R_f \cup R_q}, \quad (7)$$

where R_f refers to the segmented region of interest of the (LP) region and R_q refers to the ground truth of (LP) region.

B. OUTCOMES

1. We have recognized multiclass characters and letters in both Arabic and English (high- and low-resolution images)
2. We have enhanced the recognition accuracy under different license plate image degradations, challenging conditions, and license plate disruptions.
3. We have applied the connected components labeling analysis (CCLA) algorithm for identifying the connected pixel regions and grouping the appropriate pixels into components to extract each character effectively.
4. We have dealt with all types of internal and external noises
5. Optimized neutrosophic k-means have been used for the first time in the state of the art of intelligent

transportation systems as most of its usage was covering just biomedical engineering applications.

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