Correction to: Redefinition of the concept of fuzzy set based on vague partition from the perspective of axiomatization

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I recently found that several errors occur in the statement of Definition 5.2 in Section 5 in the paper "Redefinition of the concept of fuzzy set based on vague partition from the perspective of axiomatization".

As it had been pointed out at the end of Section 4 of this paper that "the set of vague attribute values is defined as a free algebra on the elementary set of vague attribute values", and fuzzy sets are mathematical formulation for vague attribute values, hence, the set of fuzzy sets in \( U \) can be seen as freely generated by a vague partition of \( U \).

Based on this consideration, Definition 5.2 of this paper can be corrected as follows:

**Definition 5.2** Let \( U = [a, b] \subset \mathbb{R} \) and \( \widetilde{U} = \{\mu_{A_1}(x), \ldots, \mu_{A_n}(x)\} \), \( n \in \mathbb{N}^+ \), a vague partition of \( U \). The set \( \mathcal{F}(\widetilde{U}) \) of fuzzy sets in \( U \) with respect to \( \widetilde{U} \) consists of the following elements:

1. if there exists \( i \in \pi \) such that \( \mu_A(x) = \mu_{A_i}(x) \) for all \( x \in U \), then \( A = \{(x, \mu_A(x)) \mid x \in U\} \in \mathcal{F}(\widetilde{U}) \);
2. if \( \mu_A(x) = \bar{p}(x) = 1 \) for all \( x \in U \), then \( A = \{(x, \mu_A(x)) \mid x \in U\} \in \mathcal{F}(\widetilde{U}) \);
3. if \( \mu_A(x) = \mu(x) = 0 \) for all \( x \in U \), then \( A = \{(x, \mu_A(x)) \mid x \in U\} \in \mathcal{F}(\widetilde{U}) \);
4. if \( A = \{(x, \mu_A(x)) \mid x \in U\} \in \mathcal{F}(\widetilde{U}) \) and \( r \in \mathbb{Q}^+ \), then \( A' = \{(x, (\mu_A(x))^r) \mid x \in U\} \in \mathcal{F}(\widetilde{U}) \);
5. if \( A = \{(x, \mu_A(x)) \mid x \in U\} \in \mathcal{F}(\widetilde{U}) \), and \( N \) is a strong negation on \([0, 1]\), then \( A^N = \{(x, (\mu_A(x))^N) \mid x \in U\} \in \mathcal{F}(\widetilde{U}) \);
6. if \( A = \{(x, \mu_A(x)) \mid x \in U\} \), \( B = \{(x, \mu_B(x)) \mid x \in U\} \in \mathcal{F}(\widetilde{U}) \), and \( \odot \) is a triangular norm, then \( A \odot B = \{(x, \mu_A(x) \odot \mu_B(x)) \mid x \in U\} \in \mathcal{F}(\widetilde{U}) \);
7. if \( A = \{(x, \mu_A(x)) \mid x \in U\} \), \( B = \{(x, \mu_B(x)) \mid x \in U\} \in \mathcal{F}(\widetilde{U}) \), and \( \oplus \) is a triangular conorm, then \( A \oplus B = \{(x, \mu_A(x) \oplus \mu_B(x)) \mid x \in U\} \in \mathcal{F}(\widetilde{U}) \);
8. \( \mathcal{F}(\widetilde{U}) \) not include other elements.

In fact, \( \mathcal{F}(\widetilde{U}) \) can be considered as a function space based on \( \widetilde{U} \).

We apologize to the readers for any inconvenience these errors might have caused.