Article Improvements

<u>Current article (submitted manuscript)</u>

Anderson Chaves Carniel, Ricardo Rodrigues Ciferri, and Cristina Dutra de Aguiar Ciferri, "Handling Fuzzy Points and Fuzzy Lines using the FuzzyGeometry Abstract Data Type".

<u>Previous article (preliminary version)</u>

[1] Anderson Chaves Carniel, Ricardo Rodrigues Ciferri, and Cristina Dutra de Aguiar Ciferri, "An Abstract Data Type to Handle Vague Spatial Objects Based on the Fuzzy Model," *Proceedings of the Brazilian Symposium on Geoinformatics*, 2015, pp. 210-221.

<u>Summary of the Differences</u>

In this article, we propose the FuzzyGeometry abstract data type, a novel abstract data type (ADT) to handle fuzzy lines and fuzzy points in the PostgreSQL/PostGIS spatial database management system. A preliminary version of this work was presented in [1]. In this article, we introduce several novel contributions, as follows.

- We modify the introduction (in Section 1) by adding a discussion related to the representation of vague spatial data based on both the exact model and the fuzzy model. This discussion will provide guidelines for the reader when he/she must use each one of these models.
- We emphasize, in this article, the specification of the implementation and serialization of fuzzy lines and fuzzy points. We aim that the reader be able to understand the details below the higher-level fuzzy concepts presented in this article. They are specified in Section 4.1.
- We define the following textual and binary representations: Fuzzy Well-Known Text and Fuzzy Well-Known Binary. They are defined in Section 4.2. In addition, we introduce examples of instance of the Fuzzy Well-Known Text.

- We depict graphical representations of several spatial fuzzy operations involving FuzzyGeometry objects with their appropriate textual representations, as described in Section 4.3.

- We introduce a new section (Section 5), in which we add a running example that shows how to use the FuzzyGeometry ADT. Several examples are showed, which include the following SQL commands: CREATE TABLE, INSERT, and SELECT. This section aims to help the reader to easily use the FuzzyGeometry ADT by the means of SQL language.