A Complete Spatial Understanding Using Geo Intelligent Concept

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ABSTRACT:

A full spatial understanding in real time has become one of the most scientific challenge in many aspects. Spatial information, used as infrastructure for scene understanding, acquired by physical acquisition sensors (imageries and more) is limited to many factors such as: sensor resolution, sensor acquisition technique (radar, optic, laser, thermal), atmospherical state, topography and more. Thus, any information extraction interpreted through those sensors/techniques is circumstantial affected by various non-predictable factors leading to a biased consequential geo-related product. Moreover, the accuracies and reliabilities of this geo-related product is depended on a specific process constellation (acquisition outliers, acquisition condition, interpreting techniques, sensor types and more).

Spatial explicating techniques are inter-discipline processes containing spectral, geometrical and structural interpreting. Each of them uses techniques developed uniquely, where fusion is mostly done as a validation of the intersected information (feature/objects).

In this article we introduce SIGMA (holiStical Intelligent Geo MApping) concept, which is a Geo knowledge discovery methodology of extracting a complete scene comprehension and understanding achieved from spatial information (visual & physical). The scene is decomposed into its elementary components (surface objects & features, land cover and Geo scenarios.) through geometrical, spectral and contextual (topological) pre-defined characterizations. SIGMA would be developed on the summation of all professional geo knowledge and expertise in geo-information field containing: photogrammetry, artificial intelligent, data mining, computer vision, geodesy and more. Above all of these, the system would be managed by a Geo knowledge learning & adaptive engine consisted by spatial associative supportive (decision) rules and scene known characterizations.

In SIGMA concept, methodologies will be developed innovatively to explicit visual images together with other geo information infra-structures into a complete spatial understanding in terms of objects shape, objects material, objects exact position and their relations within each other and the other "ontologies" in the scene. During the conference we will present the implementation of this concept in order to obtain better scene understanding.