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AN INNOVATIVE APPROACH TO EVALUATE SEMANTIC CONTEXT AWARENESS FOR ROI SELECTION

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Abstract. *This paper describes a novel method for evaluating semantic context awareness for Region of Interest (ROI) selection in a visual scene. ROI selection is very important as it bears significant information about the theme of the visual scene. However, ROI selection remains an unsolved task for its notion of semantic attribute and its evaluation in a context. Therefore, this research proposes a new innovative approach to tackle this problem. In this approach, context is considered as the relevant object that has high probability of occurrence and is semantically relevant for the evidential object. To recognize meaningful objects of interest in an uncertain situation, Bayesian Network theory is applied. Objects and their interactions with other objects are modeled by mutual supplement as a simplest approach in natural language processing. In this model, we introduce an object-verb-function dependability for estimation of mutual supplement as prior information. For semantic evaluation of context awareness, our method formalizes the concept of semantic stability based on the functional relevance of the objects confined by ROIs. Experimental results show that the proposed method is innovative as it generates multiple inferences for context awareness without sufficient information.*
Keywords: Semantic context awareness, Region of Interest (ROI) selection, Mutual supplement model

1. **Introduction.** Context awareness is regarded as a key technology for ubiquitous computing systems. It is used to design innovative user interfaces, and is often used as a part of ubiquitous and wearable computing. The term context-awareness was introduced in [1] and used by [2] with different definitions. Several methods are available for context modeling [3], recognition [4] and scene description [5]. The main objectives of this research are to compute context or describe events. However, it is also important to select the contextual region intelligently for reducing the complexity and evaluating a description. There is still no unique solution to this issue because of its notion of subjective nature, awareness, semantic attributes and completeness of expression in relation to context. In this research, we call this contextual area Region of Interest (ROI) in the visual scene. As ROI selection involves all the above-mentioned issues, we would like to relate this work to these important terms. In our previous work [6], we selected the ROI based on visual awareness [7] based on cognitive psychology [8] and neuro-science [9]. However, it is also useful to extract the meaning of the selected region alternatively and select the regions, which are meaningful. That is why we need to redefine the ROI as semantically connected objects. Semantics are useful for object segmentation [10], text classification and matching [11-13], similarity measure [14,15], meaning stability representation [16-18] as well as completeness evaluation [19]. Moreover, neuro-scientific research revealed that there