論文題目　Generating Multimodal Explanations of Category Prediction based on Mutual Information Maximization
（相互情報量最大化に基づく複数モダリティによる視覚情報の分類に対する説明）

氏　　名　　兼平　篤志

This study addresses generating multimodal explanations for the categorization of visual information. Although most researches focus on explanation by the single modal information, it can be insufficient when what is explained cannot be completely represented by single modal, or when attempting to output faithful explanation degrades interpretability. Even though an existing work treats multimodality on generating explanations, it requires supervised information of correct explanations for all modalities. Collecting such dataset is costly, and even impossible for some modalities, preventing the application of the explanation system to the real problem. An important aspect of multimodal explanations is complementarity, that is, how one explanation improve the quality of the others. Thus, as well as general requirements for generated explanations: (a) interpretable, (b) fidelity to the target, the system generating multimodal explanations are required to be (c) applicable to modalities regardless of with/without supervised information, and (d) able to generate explanations where different modalities are complemental to each other. To satisfy (a)-(d) simultaneously, we proposed a novel framework based on mutual information maximization. Defining distributions of variables to explain and to be explained, explanations holding high interaction information is selected.
In this thesis, we applied the proposed framework to three explanation tasks in different domains which is differentiated by the difference of the treatment of target, i.e, positiveness/positiveness and negativeness. We proposed practical algorithms corresponding to each case of realistic applications, and demonstrated their effectiveness by conducted experiments.

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