

# Complex Pattern Matching Strategies in Image Databases:the Cut-And-Or-Not Approach

Krisztián Veréb

Matching strategies used for retrieving images from the databases of present time does not really support the usage of complex matchings. In other words, searching for a given image in most image databases — general databases suitable for storing and retrieving images — is executed in a way that a pattern has to be given and the following spoken informal question has to be formed by one of the formation technique of the system: “Select the images from the database, where they are similar to the pattern”. The expression ‘similar to’ is defined by the image pattern matching algorithm of the particular systems. However much more complex questions may occur in practice, which are not at all or just to a certain extent supported by legacy systems. It can be realized that in case of a given matching the different regions of the given images do not have the same importance. Moreover, not all regions have to be matched in particular cases. So one can realize that such a question may also occur as the following: “Select all images from the database where blue is not a dominant colour in its upper part (i.e., the image is possibly not a landscape) and the bottom left quarter is similar to this other image, but if the upper part contains the blue colour dominantly then the bottom right part must be similar to another pattern image.” It is supposed to be a rather complex question. To handle such questions, special operations have to be introduced and their examination with logical tools be enabled. In the lecture I present a method (namely the Cut-And-Or-Not method) which is based on fuzzy logics and makes it possible to form and handle such complex questions. In the lecture the formalization needed will be defined, and the whole description of the method, as well. To use the different matchings (shifting invariant, scaling invariant, rotating invariant, etc.) in particular systems the definitions of the most wide-spread invariances and their handling in the Cut-And-Or-Not approach is given. Of course the definition of the fuzzy connectives needed will also be presented using the bases of the Lukasiewicz logics. I introduce the first-order approach of the fuzzy Cut-And-Or-Not method as well, which can be formed and implemented into Database Management Systems much more easily with the help of the relational calculus. Several examples are presented in the lecture about how to form spoken informal questions by the Cut-And-Or-Not method. I also give the steps of realization of the approach in case of a particular Object-Relational database.