Towards a New Requirement-Driven Style-Based Approach to Heterogeneous-Architectural Design

Due to the increase in size and complexity of software systems, choosing suitable software architecture is a fundamental issue. One of the most effective ways for designing and evaluating software architectures is to adopt architectural styles. An architectural style is an approach for reaping the benefits of similarities that exist between various architectures. Adoption of architectural styles in the design process of a software system assures the employment of strength points of specifications that belong to each architectural style. However, selecting a suitable architectural style depends on different criteria. Therefore it makes the problem of selecting architectural styles to be considered as a multi-criteria problem. Since one style cannot meet all the requirements in most cases, one of the common solutions is to make use of heterogeneous styles (i.e. composition of styles). In other words, in order to cover the problem domain and achieve better performance, different kinds of architectural styles are combined. On the other hand, composing different styles and assuring their compatibility and performance are added to the issues of the multi-criteria problem.

In the suggested approach, a decision support system is proposed to take advantage of all the existing features and information of the architectural styles and to make it possible to compose different styles. This system is able to cooperate with tools and techniques that are designed for selection and evaluation of architectural styles while integrating decision processes. By using this system, the system architect does not need to compose styles or codify architecture but just needs to introduce restrictions define, situations and elicit the special requirements of the system at hand; the decision support system will then offer him the most suitable architectural style by using its knowledge base.

In this thesis, we have focused on architectural styles, specially the heterogeneous ones, to apply them on software engineering processes and monitor their behaviors. To do so, we have applied data mining techniques to complete and recognize the specifications of each style and complete the knowledge-base of the decision support system. For the middle inference of the decision support system and considering the interaction between quantity attributes and overcoming existing ambiguities and uncertainties in the evaluation of styles, we have proposed a strategy by using fuzzy logic and existing tools.

**KEYWORDS:**