ALLPATT: Patterns and Beyond

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Alexander G. Mirnig
Center for Human-Computer Interaction & Department of Computer Sciences
University of Salzburg, Salzburg, Austria
Email: firstname.lastname@sbg.ac.at

Abstract—**Patterns have, over time, evolved into a powerful and versatile knowledge collection and transfer means. By providing solutions to specific but also reoccurring problems, their focus on reproducibility and contextual factors allows them to capture solutions to very specific problems and extends the reach of pattern solutions to not only experts, but also to individuals with less expertise in their respective field. Even though their origins lie in the field of architecture, patterns and pattern approaches have seen their most extensive use and development in computing and software engineering domains. The goal of ALLPATT is to further explore the potential of patterns and extend their reach as a method beyond their „home" domains. Since patterns are a method to collect and transfer knowledge, they are not discipline-dependent a priori and any discipline could conceivably draw benefits from using patterns to capture problem solutions in their discipline or even adapt pattern solutions from other disciplines, as problems are not always exclusive to only one field or discipline.**

Keywords-patterns; knowledge transfer; study setup refinement; costume design; cloud computing; automated application deployment.

I. INTRODUCTION

The goal of ALLPATT is to provide a platform for dissemination and discussion of patterns as a knowledge transfer method, which is not limited to certain domains or disciplines.

Patterns, understood as a knowledge transfer method, were introduced by Christopher Alexander [1][2], originally for the domain of architecture. While the term 'patterns' might seem unintuitive, he had intended these solutions to be small building blocks, that could be used and combined on an as-needed basis. So in a way, a building could be seen as nothing more than a pattern of individual solutions. Such pattern solutions address problems that occur over and over again in practice. Thus, if a particular solution is found once, its documentation as a pattern allows it to be reapplied whenever it reoccurs, eliminating the need to find solutions for the same problems again and again.

But Alexander aimed even higher, towards greater accessibility of such solutions. In [2] he writes, "You can use it [the pattern language] to work with your neighbors, to improve your town and neighborhood. You can use it to design a house for yourself, with your family- or to work with other people to design an office or a workshop or a public building like a school. And you can use it to guide you in the actual process of construction."

While this perspective seems perhaps a bit too optimistic, it illustrates Alexander's idea of opening up problem solutions to not only experts, but all kinds of individuals. And while Alexander might have been unrealistically optimistic with his original idea, two potentials of patterns very much in line with this idea have been recognized. First, patterns can render "implicit knowledge explicit"[3]. What this means is that, since a pattern focuses on one single problem, it can go more in-depth than a guideline or textbook would. This allows a pattern to capture parts of the solution that might usually be gained after years of experience, or small knacks or tricks, which are only particular to that problem and too specific to write down in any other format. This brings us to the second potential of patterns – their capability of facilitating communication between novices and experts. Patterns contain as much detail as possible pertaining to the problem they describe. In the ideal case, a pattern can, if necessary, be applied by following the solution description step-by-step, making it suitable for novice users. A pattern also contains information about the problem context and additional sources influencing the problem or its solution. This, apart from the solution itself, might help even an expert gain a deeper understanding of the problem or aid the novice in learning more about the problem beyond blindly applying a solution that works.

These potentials are the basis of, and inspiration for, ALLPATT. Documenting solutions to reoccurring problems is valuable for any discipline for as long as there are problems to be solved in that discipline. A method, which provides such a means of documentation and further provides a way to capture additional information (often called "things not found in a book"), is of great value to the scientific community as a whole. This is especially true for the patterns' potential of easing communication between novices and experts. But it need not stop there. In today's inter- and multidisciplinary world, this could easily be extended to a communication tool between disciplines as well, as an expert in one discipline might well be considered a novice in most other disciplines.

II. SUBMISSIONS

The first paper is titled "A Study Setup Optimization – Providing Solutions with Patterns". This paper uses a pattern

approach to collect lessons learned from several iterations of a study setup for collecting biometric image data. The results are presented as three patterns, one that talks about the right choice of light source for optimal image quality, one that provides instructions for a self-made lens holder, and one that assists in choosing a questionnaire appropriate to the research goal(s). The paper is an interesting example of using patterns to collect practical knowledge for research and study design as a practice-oriented supplement to what is found in textbooks and taught in theory classes. Further work in this direction could help in reducing typical "beginner errors" or aid those working in interdisciplinary fields to pick up the basics of other disciplines more easily. While the work done in this paper could use more refinement, even at this stage, it is an important step forward and a good example of the patterns' potential to transmit practice-relevant knowledge in an easily digestible format.

The second submission takes a broader perspective and applies patterns as a means to lend more objectivity, confirmability, and replicability to the Humanities as a whole. The paper compares patterns to formulas in the Natural Sciences and argues that the steps taken to arrive at a final or usable formula is similar in structure to a pattern. Formulas, also referred to as *laws* in the paper, are seen as a desirable and objective outcome of the Natural Sciences, which the Humanities, however, are usually unable to provide. By seeing patterns as analogues to formulas, the authors argue for the use of patterns in the Humanities, in order to reach a similar level of confirmability and replicability in the Humanities. The authors further illustrate this idea by providing the example of a research project, in which patterns are used to document costume design solutions for films. While the authors' idea is a very grand one, it relies on a very simplified view of both Humanities and Natural Sciences; the search for more objectivity is an ever-present issue in the less empirical sciences. The idea that patterns can lend more objectivity to these fields is an interesting one and worth investigating further. Finally, the applying patterns to films is a novel approach and provides insight into how patterns can be employed in what is usually considered to be a very creative area with a lot of room for alternatives and improvisation.

The third submission takes us back to a more concrete view and provides solutions to problems in the cloud-computing domain as two patterns. Unlike regular computing patterns, these do not contain snippets of code or even more high-level instructions on how to complete a certain programming task. Instead, the authors decided to address an information need in the field of cloud-computing regarding which cloud standards and providers to choose, based on the individual capabilities of each. The authors provide one pattern per deployment model – the imperative and declarative deployment models. These patterns instruct on how to handle the automated deployment of cloud applications and aid in choosing the right workflow language, runtime environment, etc. The paper is not only of value to those working in the cloud computing domain, but also shows a case of a new application of the pattern approach in a domain in which patterns are already well-established.

III. CONCLUSION

The ALLPATT special track contains a broad range of topics and applications of patterns to further knowledge transfer both within and across disciplines. ALLPAT wants to encourage exploration of potential application domains for patterns and novel pattern approaches, as well as refine existing approaches and related knowledge transfer methods.

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