Discovering Policies using Activity Models of Self Regulated Learners

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ABSTRACT

Self-Initiated Learning Scenarios are environments that enable students to learn on their own without the supervision of a teacher. Self-regulated learners are students who can greatly-benefit from these environments. In this paper, their activities are tracked in order to generate a model for positive learning habits, a set of policies that, if followed can serve as best practices in sustaining motivation. With the use of an annotation tool called *Sidekick*, these learners undergo a process referred to as self-reflection where they reflect and improve on their learning habits and at the same time labelling data for scientific use. Twenty five (25) undergraduate computing students participated in the study immersed themselves in such environments where they were categorized based on their level of self-regulation. A model is created based on their interaction data following a machine learning task. A general model spanning all users and specific models for each category were built based on the interaction logs. These logs were also used to generate a set of rules called policies, employing a profit-sharing algorithm. A set of policies were generated depending on the classification of a student's level of self-regulation which furthermore agree with the generated models. These policies enable the self-regulated learner to discover which among their activities when followed maintain their level of motivation.

CCS Concepts

•**Human-centered computing** → *HCI theory, concepts and models;*

Keywords

Self-Regulated Learners; User Modeling; Behavior Recognition; Profit-Sharing Algorithm

1. INTRODUCTION

Self-regulated learners are students who have established a habit of having initiative of learning on their own even without the need or supervision of a teacher or an agent [25]. As such, personal learning can be considered as part of their personal development, or of educating one's self or even both. These self-regulated learners are better than typical learners because of the need to plan out their schedule on how they will learn - simply managing one's time of learning during the actual learning process. Self-regulated learners have the ability to initiate and plan their learning sessions apart from the learning activity per se. The learning process is therefore extended with the tedious task of managing one's time, schedule and resources. Learning becomes self-oriented which is usually aided by motivation [18].

In this process the learner either enjoys or feels motivated to pursue studying on its own. Motivation encourages the student to continue learning even without the presence of an actual reward system. In such scenario, the task of ensuring motivation and attention is a bigger task in itself aside from learning the actual subject at hand. The activity in itself poses a greater challenge to the learner. The process of managing one's learning activities, reflecting or evaluating a student's previous actions have been considered an integral part of being a self-regulated learner [12]. In this paper, we refer to policies as a set of activities that a learner performs where their motivation levels, in the form of the weight function is captured. This enabled the authors to identify if a certain set of activities contributes to the over-all goals of the learner for a certain learning session.

It also discusses the techniques employed towards discovering these policies. More importantly, it addresses the problem of how can the activities of self-regulated learners be modeled into a set of policies that can best help them learn further. These policies describe how their motivation levels have changed based on a set of activities they have performed across multiple learning sessions. Related work on self-regulated learners are seen followed by the framework in this study. Models and algorithms employed towards discovering policies are mentioned afterwards followed by the results and some future work that need to be tackled.

2. RELATED WORK

Several studies have investigated self-regulated learners: starting from what activities define them [26], how to teach a learner into becoming a self regulated learner [9, 22, 21] and on discovering the natural attributes into becoming a self regulated learner [5, 3]. When self regulated learners are

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