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Committee for Student Affairs
Univerza v Ljubljani, Fakulteta za računalništvo in informatiko
Večna pot 113, 1000 Ljubljana

The master's thesis topic proposal
Candidate: Marko Prelevikj

I, Marko Prelevikj, a student of the 2nd cycle study programme at the Faculty of Computer and Information Science, am submitting a thesis topic proposal to be considered by the Committee for Student Affairs with the following title:

Slovenian: **Vodenje projektov na podlagi analize podatkov**
English: **Data Driven Project Management**

This topic was already approved last year: **NO**

I declare that the mentor listed below has approved the submission of the thesis topic proposal described in the remainder of this document.

I would like to write the thesis in English with the following reason: I am a foreigner and therefore have more experience with writing in English.

I propose the following mentor:

Jure Demšar, doc. dr.
University of Ljubljana,
Faculty of Computer and Information Science
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Ljubljana, 25. november 2019.

Proposal of the masters thesis topic

1 The narrow field of the thesis topic

English: project management, task workflow analysis, data analysis

Slovene: vodenje projektov, analiza poteka dela, analiza podatkov

2 Keywords

English: agile project management, project management information system, quantitative data analysis, project success, performance metrics, causality analysis

Slovene: agilno vodenje projektov, informacijski sistemi za podporo vodjenje projektov, kvantitativna analiza podatkov, uspešnost projekta, metrike uspešnosti, analiza vzročnosti

3 Detailed thesis proposal

Past approvements of the proposed thesis topic:
The proposed thesis has not been submitted nor approved in previous years.

3.1 Introduction and problem formulation

Project managers (PMs) are responsible for leading their teams towards successful completion of the project's objectives [1]. Project Management Information Systems (PMIS) are used by PMs to assist their decision making for planning, organizing and controlling projects [2]. PMIS keep the state of the organisation's projects and present it to PMs through various simple reports and visualisations such as Burn-Down Charts and Gantt Charts, which usually offer only high level metrics in the form of story points completed, status of deliverables, etc. [1]. High level overview of the project's progress is usually not satisfactory for PMs and can lead to poor decision making [2]. To increase the quality of their decisions, PMs often need to rely on extra data analysis outside of the PMIS, this however represents additional workload. In this case PMs do not only have to keep the PMIS up to date, but also have to execute the additional analyses which are not supported by the PMIS itself.

3.2 Related work

The use of PMIS is a common and widespread practice across enterprises. It has been shown that PMIS have a direct impact on the project success since they provide a structured overview of the project's state and support the decision making process of PMs [3]. Contemporary PMIS provide organization-wide transparency and their usage is not limited only to PMs, but it is instead widespread over the majority of the organization's members. This is especially important within agile environments where it is crucial for every member to track their own progress. Agile project management has been gaining momentum ever since the appearance of The Agile Manifesto [4] mainly because it has shown its worth in practice, where the success rate of agile projects is usually greater in comparison with more traditional project management approaches [5].

Our aim is to improve the general usability of contemporary PMIS which are used within agile projects. One of the most common agile approaches nowadays is SCRUM, which specializes in achieving software agility [6]. An example of such PMIS is Atlassian's JIRA, one of the most widespread solutions for tracking and managing agile projects, mainly focused on software development. With JIRA, we have the unique advantage of observing the users' habits when using the PMIS by examining the history of the user's actions: how often they interact with the PMIS, what do they edit, which workflow elements are they commonly working on, etc.

By examining the history of the user's interactions with the PMIS we expect that we will be able to perform an analysis of the causality of the user's actions and try to identify the possible bottlenecks which are preventing the projects from moving forward. A concern has been brought up by Serrador et al. [7] that SCRUM projects are susceptible to potential risk due to the fact that they do not have a specific process of risk management application, even though it is vital for the success of the project. A similar research has been performed by Toole [8], where he was able to classify whether a certain performed action had a positive or a negative effect on the project.

3.3 Expected contributions

Our first contribution is the validation of the hypothesis that applying modern data analysis techniques to information generated by a contemporary PMIS can help us extract insights from which the underlying enterprise will benefit.

Under the assumption that our hypothesis is confirmed, our second contribution will be a prototype of a Project Management Support Tool (PMST) which will offer functionalities for optimizing the workflows in the projects and identifying various outlying project elements such as under- and over-performing users, too complex tasks, etc.

3.4 Methodology

To achieve our expected contributions we will have to analyse the data from a contemporary PMIS, in our case it will be Atlassian's JIRA, which has an open API for accessing the underlying raw data which allows us to easily extract it. We will be using anonymized raw data provided by Celtra, where JIRA is used on a daily basis to keep track of the project's progress.

Once the data is exported, we will need to cleanse the it (ECTL pre-processing) to prepare it for further analysis. We intend to validate our hypothesis by applying various methods predominantly from the fields of statistical modelling (life-cycle comparison of different types of tasks) and network analysis (exploring the interconnectedness of users) and their combination (uncovering the causality of the actions). Finally, if we manage to validate our hypothesis, we will develop a prototype PMST in a form of an application which will enable us to use our methodology in real world projects.

3.5 References

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[8] T. M. Toole, A project management causal loop diagram, 2006.