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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 have 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 more experienced 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, 17. november 2019.

Proposal of the masters thesis topic

1 The narrow field of the thesis topic

English: agile project management, task workflow analysis, data analysis

2 Keywords

English: agile project management, project management support tool, quantitative data analysis, project success, performance metrics

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) have the role leading the team towards the achieving of the project objectives [1]. Project Management Information Systems (PMIS) are used by PMs to assist their decision making for planning, organizing and controlling projects [3]. PMIS contain the state of the organization's projects and are visualizing it with Burn-Down Charts, Gantt Charts, or other basic visualisations which provide merely a high-level overview of metrics such as work completed, story points completed, deliverable status [1], etc. As such, PMIS do not provide enough useful information to PMs [3].

The value of PMIS drops due to their elementary reporting abilities. This leads to PMs having to do double the work: keeping the PMIS up to date and analysing the data separately to support the decision making.

3.2 Related work

The use of PMIS is a common and widespread practice across enterprises. It has been shown that they have a direct impact on the project success [4], as they provide a structured overview of the project state and support the decision making process of PMs.

Contemporary PMIS provide organization-wide transparency and their use is not limited to PMs, but their usage is by the majority of organization members. This is especially important within agile [2] environments. An example of such PMIS used for agile project management is JIRA.

The order of the following articles is very important, it explains the flow of the story:

1. [3]: why we need PMIS (Project Management Information Systems), how do we benefit from it. We can use it to motivate the usage of PMIS
2. [4]: An old overview of PMIS. It is often cited. This is related just so we can identify what kinds of PMIS there are and what we are going to work with.
3. [5]: a quantitative analysis of whether or not agile works. Why we are sticking with agile and how we can exploit it the most.
4. [6]: has a good point about setting priorities and the causality of the actions. What actions we take and how they affect the final outcome
5. [7]: This has a good point as well, how is risk handled in SCRUM projects. It fits well in the story because we'd like to minimize the risk and maximize the output/throughput of the project

The problem that I have is how do I state that this is relevant to what I want to work on.

The task at hand is not actually deeply connected to project management, but it is rather making the project management easier: we want to perform analysis of the usage data of a particular PMIS (JIRA) and identify the potential risks (e.g. outliers) based on the analysis.

For example, we would be able to identify what are the bottlenecks of the workflow: is it a person? Is it the workflow itself? Can we make a workaround? Can we make a recommendation to the PM/developer on how to proceed? Who to assign the task to next?

3.3 Expected contributions

We hypothesize that applying modern data analysis techniques to PMIS data will help us extract insights, which PMs can use to identify the bottlenecks of their PMO flows.

The final outcome of the research is expected to be a *Project Management Support Tool* (*PMST*) which offers targeted benefits to both project managers and developers which

are not yet offered as such.*PMST* helps project managers in optimizing the enterprises' projects' workflows, identifying outliers within the organization, and identifying implicit shift of priorities of tasks. On the other hand, the *PMST* offers developers a tool for maximizing the productivity within their existing workflow.

3.4 Methodology

This is pretty vague as well, I am having difficulties identifying the things I can do with the data, let alone identifying the methodology of how I'm going to do that. The goal is to achieve some degree of **life-cycle analysis of the tasks**.

For example, there are a couple of ideas of what we can do to achieve it:

- analyse the time spent in a certain state of the workflow
- identify the people that are halting the process and recommend replacements
- create distributions of different meta-data of the tasks: #comments, #changes, # labels, ... All in order to find the correlation of some of the attributes (meta data fields): e.g. high priority cards have a high rate of state change in a very narrow time span.
- ...

All of these are ideas which seem like they do not require any complicated analysis in order to achieve.

The approach should be iterative: first do some šhallow"analysis in order to find something interesting, and then once we verify we bring out the "big guns".

3.5 References

[1] P. Institute, A Guide to the Project Management Body of Knowledge (PMBOK® Guide)–Sixth Edition, PMBOK® Guide, Project Management Institute, 2017.
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[2] A. Alliance, Agile manifesto 6 (1).
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[3] M. C. Caniëls, R. J. Bakens, The effects of project management information systems on decision making in a multi project environment, International Journal of Project Management 30 (2) (2012) 162 – 175. `doi:https://doi.org/10.1016/j.ijproman.`

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

[7] B. G. Tavares, C. E. S. da Silva, A. D. de Souza, Risk management analysis in scrum software projects, International Transactions in Operational Research 26 (5) (2019) 1884–1905.