AN ANALYTICAL MODEL FOR TASK DURATION PREDICTION FOR SOFTWARE DEVELOPMENT PROJECTS

Buddhi Prabodhika Madhubhashi Karunarathna

219125V

Degree of Master of Business Administration in Information Technology

Department of Computer Science and Engineering

Faculty of Engineering

University of Moratuwa

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July 2023

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Rathnayaka Mudiyanselage Buddhi Prabodhika Madhubhashi Karunarathna

219125V

Dissertation submitted in partial fulfilment of the requirements for the degree Master of Business Administration in Information Technology

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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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Candidate

……. 10-07-2023

Prabodhika Karunarathna Date

The above candidate has carried out research for the Master's thesis under my supervision.

Supervisor

UOM Verified Signature 20-07-2023

Dr. Thanuja Ambegoda Date

ABSTRACT

Project risk assessment is a critical component of project management, playing a pivotal role in ensuring the success of software development projects. Effective project management practices are instrumental in achieving favourable project outcomes. Therefore, meticulous handling of project risks throughout the project lifecycle is imperative. In the context of software development projects, inaccurate estimation of project deadlines poses significant risks and challenges that can impede project success. Accurate estimation of task durations is essential for resource allocation, timely project delivery, and overall success. However, estimating task durations based on historical data from project management platforms presents challenges. Inaccurate estimations can lead to delays, resource misallocation, and inefficiencies. This research aims to address the challenge of task duration estimation in software development projects by developing a data-driven approach. Leveraging historical data from project management platforms and utilising machine learning (ML) techniques, the study seeks to determine task durations accurately. Statistical techniques, descriptive statistics, text analysis, and forecasting algorithms are used for data analysis. The research aims to enhance decision-making, optimise resource allocation, and improve project performance. The driving force behind this research is the need for accurate task duration estimates in dynamic software development projects. Project management platforms provide access to extensive historical data, enabling more accurate estimations. A qualitative research approach is employed, guided by literature findings and semi-structured interviews. Data is collected from publicly available datasets, focusing on the Jira public dataset. ML techniques are applied to develop predictive models for accurate task duration estimation. The outcomes provide insights and techniques for software project managers, enabling informed decisions, resource optimization, and improved performance. The research advances project management practices by offering solutions to the challenges of task duration estimation. Future research can explore additional variables, refine models, and validate findings in different project contexts for enhanced generalizability and applicability.

Keywords: project management, machine learning techniques, descriptive statistics, text analysis, forecasting algorithms

ACKNOWLEDGEMENT

I would like to extend my sincere acknowledgements to the individuals who have contributed to the successful completion of my research:

First and foremost, I am immensely grateful to my supervisor, Dr. Thanuja Ambegoda, for his invaluable guidance, support, and expertise. His profound knowledge and insightful feedback have greatly influenced the quality and direction of my research. I am indebted to him for his mentorship and for continuously pushing me to excel in my academic pursuits.

I would also like to express my gratitude to Dr. Adeesha Wijayasiri, the MBA in IT course coordinator, for his support and assistance throughout the research process. His expertise and guidance have been instrumental in shaping the research framework and methodology.

I extend my appreciation to all the lecturers at the Department of Computer Science and Engineering, University of Moratuwa, who have imparted their knowledge and expertise, providing a solid foundation for my research. Their dedication to teaching and their valuable insights have significantly contributed to my intellectual growth and development.

I would like to thank my colleagues at Platform One (Pvt) Ltd for their collaboration and support. Their professional insights and experiences have enhanced the depth and relevance of my research. Their willingness to share their expertise has been invaluable, and I am grateful for their contributions. Furthermore, I am grateful to the friends and colleagues who participated in the semi-structured interviews, providing valuable input and perspectives. Their responses have enriched the data analysis process and have added depth to my research findings.

Lastly, I want to express my heartfelt gratitude to my husband, Sampath, for his unwavering support and understanding throughout this research journey. His encouragement and belief in my abilities have been a constant source of motivation, enabling me to overcome challenges and strive for excellence.

I am sincerely thankful to all these individuals for their contributions, guidance, and support, without which this research would not have been possible.

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LIST OF ABBREVIATIONS

ML	Machine Learning
AI	Artificial Intelligence
WBS	Work Breakdown Architecture
PMBOK	Project Management Body of Knowledge
PERT	Program Evaluation and Review Technique
CPM	Critical Path Method
EPCCM	Engineer Procure Construct Contract Management
FMEA	Failure Mode and Effects Analysis
CFS	Critical Success Factors
ANN	Artificial Neural Networks
COCOMO	Constructive Cost Model
CBU	Cubic Regression Model
MLR	Multiple Linear Regression
SVR	Support Vector Regression
GBR	Gradient Boosting Regression
MPNN	Multilayer Perceptron Neural Networks
BI	Business Intelligence
ETL	Extraction-Transform-Load
MSE	Mean Squared Error
RBF	Radial Basis Function