

Inteligentna analiza podatkov o zaposlenih v podporo odločanju v podjetjih: Anketa o potrebah uporabnikov

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Raziskovalno vprašanje (RV): Naša raziskava se osredotoča na napovedovanje odsotnosti zaposlenih (kot je bolniška odsotnost in dopust) na podlagi historičnih podatkov, ki jih zbira sistem za evidentiranje delovnega časa MojeUre. Ugotoviti želimo kakšno napovedovanje odsotnosti in na kakšen način bo podjetjem najbolj ustrezalo, da bo reorganizacija zaposlenih stekla čim bolj enostavno in čim bolj učinkovito.

Namen: Za namen raziskave smo izdelali anketo, ki nam bo pripomogla pri razvoju in postavitvi našega analitičnega orodja za napovedovanje odsotnosti zaposlenih z delovnega mesta.

Metoda: Anketni vprašalnik je v osnovi namenjen vsem podjetjem, ki uporabljajo sistem za evidentiranje delovnega časa MojeUre. Na podlagi odgovorov te populacije tako pridobimo relevantne podatke, kakšne funkcionalnosti bi želeli imeti v njihovem primeru ter kaj bi vplivalo na čim boljše napovedovanje v primeru odsotnosti zaposlenih na podlagi historičnih podatkov ter uporabi sistema kot pomoč pri odločanju in organizaciji delovnega procesa.

Rezultati: Napovedovanje odsotnosti z delovnega mesta je zelo priporočljivo in uporabno, saj podjetjem omogoča lažjo organizacijo zaposlenih v primeru nepričakovane odsotnosti. Anketa je bila namenjena vsem uporabnikom sistema MojeUre, ki so podali informacije o tem, kakšne napovedi bi bile primerne za podjetje in na kakšen način bi se te napovedi izvajale. Te

informacije so podjetju pomembne pri razvoju analitičnega orodja, saj imajo povratne informacije direktno od strank, ki podajo svoje mnenje in želje za uporabo tovrstnega analitičnega orodja. Podjetjem bi bilo v interesu, da bi lahko napovedovala odsotnosti tako v primeru bolniške, kot tudi v primeru dopusta. Napovedi odsotnosti bi za podjetja bila uporabna, če bi pridobili to informacijo za en teden vnaprej, kar pomeni, da bi praktično imeli predvidene odsotnosti za nadaljnji teden. Pri napovedovanju odsotnosti zaposlenih en teden vnaprej bi bila spremenljiva napaka pri napovedi do največ dva dni, kar pomeni, da bi bilo število dni odstopanja dva dni glede napovedovanja odsotnosti za naslednji teden. Iz rezultatov ankete je razvidno, da se uporabnikom napovedovanje odsotnosti z delovnega mesta zdi zelo koristno, saj podjetjem omogoča lažjo organizacijo zaposlenih v primeru nepričakovane odsotnosti.

Organizacija: S pomočjo raziskave smo prišli do rezultatov, ki nam omogočajo lažje in bolj smiselno implementacijo določenih funkcionalnosti v za to namenjeno analitično orodje, ki bi pripomoglo pri napovedovanju odsotnosti zaposlenih z delovnega mesta. Orodje bi tako pripomoglo pri lažji reorganizaciji delovnega mesta posameznega zaposlenega, ki bi bil nepredvidoma odsoten.

Družba: Razvito analitično orodje bi podjetjem omogočilo lažje in bolj smiselno reorganiziranje zaposlenih ob predvideni odsotnosti in bi s tem posledično vplivalo na manj izpada opravljenega dela pri zaposlenih.

Originalnost: Trenutno na trgu nismo zaznali podobnega analitičnega orodja, ki bi omogočalo napovedovanje odsotnosti zaposlenih z delovnega mesta na podlagi historičnih podatkov. Orodja za podporo pri odločanju sicer obstajajo vendar ne za namene analiziranja odsotnosti zaposlenih, kar pomeni, da tudi dotična anketa, ki smo jo opravili za namen pridobitve podatkov in okvirjev, kako naj bo naše orodje za analizo razvito.

Omejitve/nadaljnje raziskovanje: Omejili smo se na trenutno število anketirancev, ki so zgolj uporabniki že trenutnega sistema MojeUre, kar pomeni, da nimamo povratnih informacij tudi ostalih podjetij, ki pa bi sicer želeli uporabljati določeno analitično orodje za postavitve napovedovanj odsotnosti zaposlenega. Prvotno smo se orientirali zgolj samo na uporabnike trenutnega sistema zato, da se bo orodje prvotno razvili uporabno trenutno že aktivnim uporabnikom, kasneje pa bomo lahko tudi orodje še dodelali ter ponudili ostalim podjetjem.

Ključne besede: anketni, inteligentna analiza, podatkovno rudarjenje, podpora odločanja, evidenca delovnega časa.

Peter Zupančič je spletni in mobilni razvijalec, ki ima strast tudi do poučevanja o spletnih in mobilnih tehnologijah. Zaključil je dodiplomski in podiplomski študij na Fakulteti za informacijske študije v Novem mestu ter trenutno nadaljuje izobraževanje na doktorskem študiju. Deluje na več različnih projektih, med drugim je razvil imenik gostinskih ponudnikov Malcajt, ki ga je predstavil v svojem magistrskem delu. Poleg tega je razvil evidence delovnega časa MojeUre in razvija omenjeno analitično orodje za napovedovanje odsotnosti zaposlenih. V različnih podjetjih izvaja tečaje o razvoju spletnih strani in aplikacij in tudi predava na fakultetah predmete omenjene tematike.

Panče Panov je diplomiral na Fakulteti za elektrotehniko Univerze Sv. Cirila in Metoda v Skopju leta 2005 in s tem pridobil naziv univerzitetni diplomirani inženir elektrotehnike. Doktorski študij na Mednarodni podiplomski šoli Jožefa Stefana je zaključil leta 2012 in s tem pridobil naziv doktorja znanosti. Od leta 2005 je zaposlen kot raziskovalec na Odseku za tehnologije znanja Instituta Jožef Stefan v Ljubljani, od leta 2017 pa je dopolnilno zaposlen kot docent s področja računalništva in informatike na Mednarodni podiplomski šoli Jožefa Stefana v Ljubljani. Od leta 2013 je zunanji sodelavec Fakultete za informacijske študije v Novem mestu, na kateri poučuje predmete s področja računalništva in informatike.

Jelena Klisara je v letu 2007 diplomirala na Naravoslovno-matematični fakulteti Univerze v Novem Sadu (Srbija), smer Matematika financ. Doktorski študij matematike je uspešno zaključila na Fakulteti za matematiko in fiziko Univerze v Ljubljani, kjer je leta 2016 zagovarjala svojo doktorsko disertacijo z naslovom "Grafovski pristop za analizo kompleksnih omrežij". Znanstveno raziskovalno delo opravlja kot aktivni član Laboratorija za matematične metode v računalništvu in informatiki (FRI UL) ter Laboratorija za kompleksne sisteme in podatkovne znanosti (FIŠ UNM). Njeno raziskovalno delo zajema: uporabo teorije grafov za reševanje problemov na področju analize velikih omrežij ter matematično modeliranje in statistično analizo kompleksnih omrežij.

Intelligent Analysis of Employee Data for Decision Support in Enterprises: A Survey of User Needs

Research Question (RQ): Our research focuses on predicting employee absences (such as sick leave and vacation) based on historical data collected by the MojeUre time tracking system. We want to find out what kind of absence forecast and in what way the company will be most suitable, so that the reorganization of employees will go as easily and as efficiently as possible.

Purpose: For the purpose of the research, we created a survey that will help us in developing and setting up our analytical tool for predicting employee absences from the workplace.

Method: The survey questionnaire is basically intended for all companies that use the MojeUre working time recording system. Based on the responses of this population, we thus obtain relevant data, what kind of functionality they would like to have in their case, and what would affect the best possible prediction in case of employee absence based on historical data, and the use of the system as an aid in decision-making and organization of the work process.

Results: Predicting absence from the workplace is highly recommended and useful, as it enables companies to organize employees more easily in case of unexpected absence. The survey was intended for all users of the MojeUre system, who provided information about what forecasts would be suitable for the company and how these forecasts would be implemented. This information is important for the company when developing an analytical tool, as it has feedback directly from customers who give their opinion and wishes for using this type of analytical tool. It would be in the interest of companies to be able to predict absences both in the case of sick leave and in the case of vacation. Absence forecasts would be useful for companies if they obtained this information one week in advance, which means that they would practically have predicted absences for the following week. When predicting employee absences one week in advance, the variable forecast error would be up to a maximum of two days, which means the number of days of deviation would be two days in predicting absences for the following week. From the results of the survey, it can be seen that users find predicting absences from the workplace very useful, as it enables companies to organize employees more easily in the event of unexpected absences.

Organization: With the help of the research, we came to results that allow us to more easily and meaningfully implement certain functionalities in the analytical tool intended for this purpose, which would help in predicting the absence of employees from the workplace. The

tool would thus help to facilitate the reorganization of the workplace of an individual employee who was unexpectedly absent.

Society: The developed analytical tool would enable companies to re-organize employees more easily and more meaningfully in case of anticipated absence and would consequently have an impact on less downtime among employees.

Originality: Currently, we have not detected a similar analytical tool on the market that would allow predicting the absence of employees from the workplace based on historical data. Decision support tools do exist, but not for the purpose of analyzing employee absences, which means that the survey in question, which we conducted for the purpose of obtaining data and frames, how our analysis tool should be developed.

Limitations / further research: We limited ourselves to the current number of respondents who are only users of the current MojeUre system, which means that we do not have feedback from other companies that would otherwise like to use a certain analytical tool to set up forecasts of employee absences. We originally focused only on users of the current system, so that the tool will initially be developed to be useful to currently active users, but later we will be able to refine the tool and offer it to other companies.

Keywords: survey, intelligent analysis, data mining, decision support, working time record.

Peter Zupančič is a web and mobile developer who also has a passion for teaching about web and mobile technologies. He completed his undergraduate and postgraduate studies at the Faculty of Information Studies in Novo Mesto and is currently continuing his doctoral studies. He works on several different projects, among other things he developed the directory of catering providers Malcajt, which he presented in his master's thesis. In addition, he developed the MojeUre working time records and is developing the aforementioned analytical tool for predicting employee absences. In various companies, he conducts courses on the development of websites and applications and also teaches courses on the aforementioned topics at colleges.

Panče Panov graduated from the Faculty of Electrical Engineering of the University of St. Cyril and Methodius in Skopje in 2005 and thereby obtained the title of Bachelor of Electrical Engineering. He completed his doctoral studies at the Jožef Stefan International Postgraduate School in 2012, earning the title of Doctor of Science. Since 2005, he has been employed as a researcher at the Department of Knowledge Technologies of the Jožef Stefan Institute in Ljubljana, and since 2017 he has been additionally employed as an assistant professor in the field of computer science and informatics at the Jožef Stefan International Postgraduate School in Ljubljana. Since 2013, he has been an external associate at the Faculty of Information Studies in Novo Mesto, where he teaches subjects in the field of computer science and informatics.

Jelena Klisara graduated from the Faculty of Science and Mathematics of the University of Novi Sad (Serbia), majoring in Mathematics and Finance. She successfully completed her doctoral studies in mathematics at the Faculty of Mathematics and Physics of the University of Ljubljana, where in 2016 she defended her doctoral dissertation entitled "Graphical approach to the analysis of complex networks". He performs scientific research work as an active member of the Laboratory for Mathematical Methods in Computing and Informatics (FRI UL)

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