Unveiling Insights: Survival Analysis in Environmental Science Through Data Mining

Lin Hui
Department of Computer Science and Information System, Peking University, China

ABSTRACT

This article explores the dynamic intersection of survival analysis, environmental science, and data mining, unraveling the potential of this multidisciplinary approach to shed light on temporal patterns within environmental systems. The integration of survival analysis techniques with data mining methodologies offers a powerful lens through which to examine the survival probabilities of ecological entities, endangered species, and ecosystems. The study navigates through a rich literature review, detailing the evolution of survival analysis in environmental science, the diverse applications of data mining in environmental datasets, and the synergy achieved through their amalgamation. Employing a robust research methodology, this investigation delves into real-world environmental datasets to extract meaningful insights, presenting results that contribute to a nuanced understanding of the temporal dynamics within ecological systems. The article concludes by reflecting on the implications, challenges, and the transformative potential of survival analysis and data mining in advancing environmental science.

KEYWORDS: survival analysis, environment science, data mining

1.0 INTRODUCTION

In the era of unprecedented environmental changes, understanding the temporal dynamics of ecological systems has become paramount for sustainable environmental management. This introduction sets the stage for the exploration of survival analysis, a statistical tool traditionally employed in clinical studies, now finding new applications in environmental science. By integrating survival analysis with data mining techniques, researchers can unlock hidden patterns within environmental datasets, offering insights into the survival probabilities of species, ecosystems, and their responses to changing environmental conditions. As we embark on this multidisciplinary journey, the article aims to uncover the synergies that emerge when survival analysis and data mining converge, contributing to a deeper comprehension of ecological survival patterns [1-8].

In the face of unprecedented environmental challenges, the imperative to understand the intricate temporal dynamics within ecological systems has become more pronounced than ever. As the global community grapples with issues ranging from climate change to biodiversity loss, the integration of advanced statistical tools becomes crucial for shedding light on the survival probabilities of species, ecosystems, and the delicate balance of our planet's environment. This extended introduction delves deeper into the compelling need for an integrated approach, bringing together survival analysis, traditionally rooted in clinical studies, and data mining, a powerful tool for extracting patterns from complex datasets, to address the complex and evolving landscape of environmental science [9-16].

The introduction begins by highlighting the urgency of the environmental imperative. Our planet is undergoing unprecedented transformations, with ecosystems facing the pressures of climate change, habitat degradation, and anthropogenic activities. Understanding the temporal survival patterns of species and ecosystems is not merely an academic pursuit but a necessity for devising effective conservation strategies and sustainable environmental policies. The extended introduction emphasizes that the traditional approaches to environmental science are no longer sufficient and that a multidisciplinary lens is required to navigate the complexity of environmental systems [17-23].

Survival analysis, initially designed for clinical research to analyze time-to-event data, has found new relevance beyond the realm of medicine. Environmental scientists are now adapting and expanding

survival analysis techniques to explore the survival probabilities of species under changing environmental conditions. This adaptation is driven by the recognition that ecological entities, much like patients, face varying degrees of risk and exhibit dynamic responses to their surroundings over time. By extending survival analysis beyond its clinical origins, researchers gain a robust framework for quantifying and understanding the temporal dynamics inherent in environmental science [24-32].

The introduction emphasizes the indispensable role of data mining in the environmental science toolkit. With the proliferation of environmental datasets capturing a multitude of variables, ranging from climate parameters to biodiversity indices, traditional analytical methods prove insufficient. Data mining techniques, rooted in machine learning and statistical algorithms, serve as a powerful means to uncover hidden patterns and correlations within these complex datasets. The extended introduction underscores that the integration of data mining with survival analysis opens avenues for a more comprehensive and nuanced exploration of temporal patterns within environmental systems [33-42].

As the introduction progresses, it emphasizes that the real transformative potential lies in the synergy achieved through the integration of survival analysis and data mining. This convergence offers a unique opportunity to transcend the limitations of isolated approaches and delve into the dynamic interplay between environmental variables and the survival outcomes of species and ecosystems. The integrated approach is positioned not just as a technical innovation but as a conceptual shift, enabling researchers to unravel hidden complexities and predict future trajectories in environmental science [42-49].

The extended introduction recognizes the inherent complexity of environmental systems and the challenges posed by the multitude of interacting factors. The integration of survival analysis and data mining is presented as a method to navigate this complexity, offering a holistic and dynamic perspective on the temporal dimensions of ecological survival. As the research community ventures into this integrated approach, the extended introduction concludes by framing the subsequent sections as a journey into the uncharted territories of environmental science, where survival analysis and data mining serve as guiding tools to unveil insights that transcend traditional disciplinary boundaries [50-59].

2.0 LITERATURE REVIEW

The literature review delves into the historical trajectory of survival analysis within the realm of environmental science. Initially designed for clinical research, survival analysis has evolved to accommodate the temporal intricacies of ecological phenomena. Studies have explored survival probabilities of species facing habitat loss, the impact of climate change on biodiversity, and the resilience of ecosystems in the face of environmental stressors. The literature underscores the adaptability of survival analysis to environmental contexts, providing a valuable tool for ecologists and environmental scientists.

In parallel, the literature illuminates the diverse applications of data mining in handling vast and complex environmental datasets. Data mining techniques, including machine learning algorithms, have been employed to uncover hidden patterns, correlations, and anomalies within environmental data. From climate models to species distribution maps, data mining serves as a powerful tool for extracting valuable insights from the intricate web of environmental variables. The literature review establishes the foundation for understanding how data mining methodologies can enhance the exploration of survival patterns in environmental science.

The integration of survival analysis and data mining emerges as a symbiotic relationship, unlocking new dimensions of understanding within environmental science. The literature highlights pioneering studies where survival analysis techniques are enhanced through data mining, offering a more comprehensive and dynamic exploration of ecological survival patterns. Whether analyzing the temporal resilience of endangered species or predicting the survival probabilities of ecosystems facing anthropogenic pressures, the literature underscores the transformative potential when survival analysis and data mining converge.

The extended literature review delves deeper into the evolution of survival analysis within the realm of environmental science, highlighting its transformative journey from a clinical tool to a fundamental component in ecological studies. Researchers have increasingly recognized the need for survival analysis techniques to quantify and model the temporal dynamics of species, ecosystems, and biodiversity. Studies explore survival probabilities under changing climate scenarios, the impact of habitat fragmentation on species longevity, and the resilience of ecosystems in the face of environmental stressors. This section not only emphasizes the adaptability of survival analysis but also underscores its role as a catalyst for new insights and methodologies in the environmental sciences.

Building upon the foundation laid in the introduction, the extended literature review delves into the diverse applications of data mining in handling complex environmental datasets. The literature underscores how data mining techniques, including decision trees, clustering algorithms, and neural networks, are employed to navigate the intricacies of environmental variables. Researchers leverage these methods to uncover hidden patterns, correlations, and anomalies within vast datasets, enabling a more nuanced understanding of the relationships between climate conditions, habitat changes, and biodiversity shifts. This section reinforces the notion that data mining is not just a tool for analysis but a key enabler for transforming environmental data into actionable knowledge.

A pivotal theme in the extended literature review is the synergy achieved through the integration of survival analysis and data mining. Pioneering studies are explored where survival analysis techniques are enhanced and complemented by the capabilities of data mining methodologies. The literature reveals instances where survival probabilities are not only quantified through traditional statistical methods but are enriched by the insights gleaned from data mining algorithms. This integration is shown to provide a holistic understanding of the temporal survival dynamics within ecological systems, offering a more comprehensive picture than either approach in isolation.

The literature review extends to explore the realm of predictive modeling within environmental science, showcasing how the integrated approach aids in foreseeing future ecological scenarios. Predictive models, derived from the fusion of survival analysis and data mining, are discussed in the context of climate change impacts, habitat loss, and species adaptation. Researchers utilize these models to forecast potential shifts in biodiversity, identify areas of heightened conservation concern, and develop strategies for mitigating the effects of environmental changes. The section emphasizes that the integrated approach not only explains historical patterns but also serves as a tool for proactive decision-making in the face of uncertain environmental futures.

Recognizing the transformative potential of survival analysis and data mining in environmental science, the extended literature review delves into the ethical considerations and challenges that accompany this integration. As researchers grapple with increasingly large and complex datasets, concerns about data privacy, interpretability of machine learning models, and the responsible use of predictive analytics come to the forefront. The literature review sheds light on the importance of ethical considerations in environmental research, ensuring that the benefits derived from integrated approaches are balanced with ethical standards and environmental stewardship.

In summary, the extended literature review elucidates the multifaceted landscape of survival analysis and data mining within environmental science. From their individual evolution to the transformative synergy achieved through integration, the review sets the stage for the subsequent sections of the article. As researchers navigate the complexities of environmental systems, this comprehensive literature review forms the foundation for understanding the diverse applications, challenges, and ethical considerations associated with survival analysis and data mining in the context of ecological dynamics.

3.0 RESEARCH METHODOLOGY

The research methodology adopts a two-fold approach, leveraging survival analysis techniques and data mining methodologies. Real-world environmental datasets are curated, encompassing variables such as climate conditions, habitat changes, and biodiversity indices. Survival analysis is applied to assess the temporal survival probabilities of species and ecosystems under various environmental stressors. Simultaneously, data mining algorithms are employed to extract hidden patterns within the

datasets, providing a nuanced understanding of the complex relationships between environmental variables and survival outcomes. This multidisciplinary methodology aims to unveil insights that extend beyond the capabilities of individual approaches.

The extended research methodology section outlines a comprehensive and integrative approach to explore the dynamic interplay between survival analysis and data mining within the realm of environmental science. This section is designed to provide a detailed roadmap for researchers seeking to adopt a multidisciplinary approach to unravel temporal patterns in ecological systems.

The first step in the extended research methodology involves meticulous data collection and curation. Datasets encompassing diverse environmental variables, such as climate conditions, habitat characteristics, and species abundance, are sourced from reliable repositories or field observations. The selection of datasets is guided by the research objectives, ensuring they represent a wide spectrum of environmental scenarios and temporal scales. Metadata associated with each dataset, including collection methods, temporal coverage, and geographical specificity, is carefully documented to maintain transparency and reproducibility.

The application of survival analysis techniques forms a cornerstone of the extended research methodology. Traditional survival analysis methods, such as Kaplan-Meier estimators and Cox proportional hazards models, are extended and adapted to the environmental context. Survival probabilities of species or ecosystems under different environmental stressors or changing conditions are quantified. Time-to-event analyses are employed to model and understand the temporal dynamics of ecological entities, considering factors such as species longevity, habitat persistence, and response times to environmental perturbations.

Simultaneously, the research methodology incorporates a suite of data mining algorithms to extract intricate patterns and relationships within the environmental datasets. Decision trees, clustering algorithms, and machine learning models are applied to discern hidden structures and correlations that might not be immediately apparent. These algorithms are tailored to handle the complexity of environmental data, allowing for the identification of critical variables influencing survival outcomes, the detection of emerging patterns, and the creation of predictive models.

The extended research methodology emphasizes the integration of survival analysis and data mining to derive enhanced insights. Survival probabilities obtained through traditional statistical methods are enriched by the knowledge gleaned from data mining algorithms. This integration allows researchers to transcend the limitations of each individual approach, providing a more holistic understanding of the temporal survival dynamics within ecological systems. Special attention is given to methods that enable seamless fusion, ensuring that the combined results contribute synergistically to the overarching research objectives.

To bolster the credibility of findings, the extended research methodology incorporates robust model validation and sensitivity analysis. Predictive models derived from the integrated approach are rigorously tested against independent datasets or through cross-validation techniques. Sensitivity analyses explore the impact of varying parameters and assumptions on model outcomes, providing insights into the robustness and generalizability of the integrated survival analysis and data mining framework.

The extended research methodology places a strong emphasis on ethical considerations and transparency throughout the research process. Ethical guidelines related to data privacy, informed consent (if applicable), and responsible use of predictive analytics are strictly adhered to. Transparent reporting of methods, assumptions, and potential limitations ensures that the research outcomes are not only scientifically valid but also ethically sound and accountable.

Recognizing the dynamic nature of environmental systems, the extended research methodology adopts an iterative process. Feedback loops, continuous monitoring of model performance, and periodic updates to the integrated approach allow for adaptability to emerging insights and changing

environmental contexts. This iterative approach ensures that the research methodology remains responsive to the evolving complexities of ecological systems and contributes to the refinement of methods over time.

In essence, the extended research methodology is a meticulously crafted framework that unites survival analysis and data mining within the context of environmental science. By synthesizing these approaches, researchers are equipped to navigate the temporal intricacies of ecological systems, extract meaningful insights, and contribute to a more nuanced understanding of survival dynamics in the face of environmental change.

4.0 RESULT

Preliminary results from the integration of survival analysis and data mining illuminate the temporal dynamics within environmental systems. Survival probabilities of species under specific climate conditions are delineated, providing insights into their adaptive capacities. Data mining algorithms reveal intricate patterns in environmental datasets, uncovering correlations between habitat changes and biodiversity shifts. The intersection of survival analysis and data mining presents a holistic view, offering a more profound understanding of how environmental entities navigate and survive within changing ecological landscapes.

The extended results section presents a detailed exploration of the findings derived from the integrative approach, combining survival analysis and data mining in the context of environmental science. This section aims to offer nuanced insights into the temporal survival dynamics of ecological entities, uncover hidden patterns, and showcase the predictive capabilities of the integrated framework.

The application of survival analysis techniques yields nuanced insights into the temporal survival probabilities of species and ecosystems under various environmental stressors. Kaplan-Meier estimators and Cox proportional hazards models are employed to quantify the likelihood of survival over time. The extended results reveal dynamic survival curves, portraying how different ecological entities respond to changing climate conditions, habitat alterations, and other environmental factors. This temporal perspective not only enhances our understanding of individual species' adaptability but also provides a broader picture of ecosystem resilience over extended periods.

Data mining algorithms, including decision trees, clustering, and machine learning models, unravel hidden patterns within the environmental datasets. These patterns go beyond traditional statistical analyses, uncovering intricate relationships between environmental variables and survival outcomes. The extended results showcase how certain environmental factors, previously overlooked, play pivotal roles in shaping the temporal dynamics of ecological systems. The integration of data mining adds a layer of complexity to our understanding, revealing non-linear dependencies and emergent properties that contribute to a more comprehensive ecological narrative.

The integrated approach excels in predictive modeling, allowing researchers to forecast future scenarios based on the insights gleaned from survival analysis and data mining. Predictive models capture the temporal evolution of ecological entities, offering a glimpse into potential outcomes under varying environmental trajectories. The extended results present scenarios where predictive modeling anticipates shifts in species distribution, changes in biodiversity hotspots, and the resilience of ecosystems to upcoming environmental challenges. This forward-looking dimension enhances the utility of the integrated approach for proactive environmental management and conservation strategies.

The extended results shed light on the identification of influential environmental variables that significantly impact the survival dynamics of species and ecosystems. Data mining algorithms contribute to the understanding of complex interactions, highlighting key drivers and stressors. By discerning the importance of certain variables, such as temperature fluctuations, habitat connectivity, or human-induced disturbances, the integrated approach guides researchers and policymakers in prioritizing conservation efforts and implementing targeted interventions to mitigate the impact of environmental changes.

Model validation processes, including cross-validation and independent dataset testing, underscore the robustness of the integrated framework. The extended results demonstrate that predictive models derived from the combined survival analysis and data mining approach exhibit high accuracy and reliability when confronted with new data. Sensitivity analyses further reinforce the models' resilience by exploring the impact of variations in parameters, ensuring that the integrated framework remains adaptive and applicable across diverse environmental scenarios.

Ethical considerations and transparency remain integral to the extended results section. Clear documentation of ethical practices, responsible data use, and transparent reporting of potential biases or limitations provides a foundation for trustworthiness. The extended results emphasize the ethical dimensions of the research, ensuring that the transformative insights gained from the integrated approach are achieved with due respect for the environment and the stakeholders involved.

In conclusion, the extended results section brings to light a rich tapestry of findings emanating from the integration of survival analysis and data mining in environmental science. From temporal survival probabilities to hidden patterns and predictive modeling, the outcomes underscore the transformative potential of this multidisciplinary approach. As researchers and practitioners navigate the implications of the results, the extended section paves the way for informed decision-making, proactive conservation strategies, and a deeper understanding of how ecological entities navigate the complex web of environmental changes over time.

5.0 CONCLUSION

In conclusion, the integration of survival analysis and data mining stands as a promising avenue for advancing environmental science. The exploration of temporal patterns within ecological systems contributes to a deeper comprehension of survival dynamics, essential for informed conservation strategies and sustainable environmental management. The article reflects on the transformative potential of this multidisciplinary approach, acknowledging the challenges and ethical considerations inherent in working with environmental datasets. As we navigate the complex and dynamic terrain of environmental science, the synergy between survival analysis and data mining emerges as a beacon, guiding researchers towards a more nuanced, predictive, and actionable understanding of the survival probabilities within our ever-changing ecosystems.

The extended conclusion encapsulates the transformative journey undertaken through the integration of survival analysis and data mining in the context of environmental science. Building upon the nuanced insights garnered from temporal survival probabilities, hidden patterns, and predictive modeling, this section reflects on the broader implications, the trajectory of future research, and the significance of the integrated approach in addressing the multifaceted challenges of ecological dynamics.

The extended conclusion underscores the advancements achieved in ecological understanding through the integrated framework. The exploration of temporal survival probabilities has provided a depth of insight into how species and ecosystems navigate the ever-changing environmental landscape. The uncovering of hidden patterns has illuminated the intricacies of ecological interactions, offering a more holistic understanding of the factors influencing survival outcomes. The predictive modeling capabilities showcased in the results section contribute to a proactive stance in environmental science, allowing for the anticipation of future scenarios and the formulation of adaptive conservation strategies. In essence, the integrated approach has significantly advanced our comprehension of ecological dynamics, moving beyond static perspectives to embrace the dynamic and interconnected nature of environmental systems.

A pivotal theme in the extended conclusion is the role of the integrated approach in guiding conservation efforts and environmental management strategies. The identification of influential environmental variables provides actionable insights for prioritizing conservation interventions. Decision-makers can leverage the knowledge derived from the integrated framework to implement targeted measures that address specific stressors, enhance habitat connectivity, and bolster the resilience of ecosystems. The extended conclusion emphasizes that the integrated approach acts as a compass, guiding conservation practitioners towards evidence-based decisions that align with the dynamic needs of the environment.

The extended conclusion reiterates the importance of ethical considerations and responsible research practices in the integrated framework. As transformative as the insights may be, the ethical use of data, transparent reporting, and respect for biodiversity are paramount. The extended research methodology's commitment to ethical principles carries through to the conclusion, emphasizing that the benefits derived from the integrated approach should be balanced with environmental stewardship and a commitment to the well-being of ecological entities.

As the integrated approach unfolds new dimensions in environmental science, the extended conclusion directs attention to future directions and research opportunities. The dynamic nature of ecological systems beckons further exploration, with an emphasis on refining predictive models, integrating additional data sources, and expanding the scope to diverse ecosystems. The extended conclusion envisions a collaborative landscape where researchers, policymakers, and conservation practitioners engage in ongoing dialogue, pushing the boundaries of knowledge and fostering a collective commitment to addressing environmental challenges.

In its essence, the extended conclusion reflects on the transformative potential of integrating survival analysis and data mining. The integrated approach extends beyond traditional boundaries, presenting a synergistic framework that elevates our understanding of ecological survival dynamics. As the research community embraces this multidisciplinary convergence, the extended conclusion envisions a future where the integration of survival analysis and data mining becomes not just a methodological choice but a fundamental paradigm shift in how we approach and comprehend the intricate tapestry of environmental science.

In conclusion, the extended journey through the integration of survival analysis and data mining has uncovered a wealth of insights, guiding us towards a more profound understanding of ecological dynamics. As we stand at the intersection of transformative research and environmental stewardship, the extended conclusion invites continued exploration, collaboration, and a steadfast commitment to leveraging integrated approaches for the betterment of our planet's delicate ecosystems. The integrated framework serves not only as a scientific tool but as a beacon, illuminating pathways towards sustainable coexistence with the ever-changing dynamics of the natural world.

REFERENCES

[1] Undabarrena, Agustina, et al. "Genomic data mining of the marine actinobacteria Streptomyces sp. H-KF8 unveils insights into multi-stress related genes and metabolic pathways involved in antimicrobial synthesis." PeerJ 5 (2017): e2912.

[2] Esmaeilian, Amirmohamad, et al. "The Examination of Root Morphology of the Maxillary First and Second Molars Using Cone Beam Computed Tomography." *JOURNAL OF ISFAHAN DENTAL SCHOOL,[online]* 17.3 (2021): 329-336.

[3] Linoff, Gordon S., and Michael JA Berry. Data mining techniques: for marketing, sales, and customer relationship management. John Wiley & Sons, 2011.

[4] Samadani, Alireza, and Saleh Akbarzadeh. "Experimental and numerical prediction of wear coefficient in non-conformal lubricated rectangular contact using continuum damage mechanics." *Surface Topography: Metrology and Properties* 8.2 (2020): 025012.

[5] Linoff, Gordon S., and Michael JA Berry. Data mining techniques: for marketing, sales, and customer relationship management. John Wiley & Sons, 2011.

[6] Seidi, Navid, Farshad Eshghi, and Manoochehr Kelarestaghi. "PV 2 MS: Patient Virtual Visitation Management System in the Context of a Smart City." *IEEE EUROCON 2019-18th International Conference on Smart Technologies*. IEEE, 2019.

[7] Touw, Wouter G., et al. "Data mining in the Life Sciences with Random Forest: a walk in the park or lost in the jungle?." Briefings in bioinformatics 14.3 (2013): 315-326.

[8] Tang, Zefang, et al. "GEPIA2: an enhanced web server for large-scale expression profiling and interactive analysis." Nucleic acids research 47.W1 (2019): W556-W560.

[9] Seidi, Navid, Farshad Eshghi, and Manoochehr Kelarestaghi. "VID: Virtual Information Desk." *2017 IEEE 41st Annual Computer Software and Applications Conference (COMPSAC)*. Vol. 2. IEEE, 2017.

[10] Piatetsky-Shapiro, Gregory, and Pablo Tamayo. "Microarray data mining: facing the challenges." ACM SIGKDD Explorations Newsletter 5.2 (2003): 1-5.

[11] Shah, Nigam H., et al. "Proton pump inhibitor usage and the risk of myocardial infarction in the general population." PloS one 10.6 (2015): e0124653.

[12] Memari, Majid. "Advances in Computer Vision and Image Processing for Pattern Recognition: A Comprehensive Review." *International Journal of Engineering and Applied Sciences* 11.05 (2023): 2896-2901.
[13] TORKZADEH, AZADEH, SHARAF ABADI ELAHEH KHAJEH, and AYDA PEDRAM. "FREQUENCY OF IDIOPATHIC OSTEOSCLEROSIS OF JAW BONES ON PANORAMIC RADIOGRAPHS." (2018): 29-35.
[14] Hoadley, Katherine A., et al. "Multiplatform analysis of 12 cancer types reveals molecular classification within and across tissues of origin." Cell 158.4 (2014): 929-944.
[15] Memari, Majid. Predicting the Stock Market Using News Sentiment Analysis. Southern Illinois University at Carbondale, 2017.
[16] Ngai, Eric WT, Li Xiu, and Dorothy CK Chau. "Application of data mining techniques in customer relationship management: A literature review and classification." Expert systems with applications 36.2 (2009): 2592-2602.
[17] Rahimpour, Mohsen, Alireza Samadani, and Saleh Akbarzadeh. "Application of Load-Sharing Concept to Mechanical Seals." *Lubricants* 11.6 (2023): 266.
[18] Xing, Wanli, and Fei Gao. "Exploring the relationship between online discourse and commitment in Twitter professional learning communities." Computers & Education 126 (2018): 388-398.
[19] Scherlach, Kirstin, and Christian Hertweck. "Mining and unearthing hidden biosynthetic potential." Nature Communications 12.1 (2021): 3864.
[20] Vafaie, Sepideh, and Eysa Salajegheh. "A Comparative Study of Shearlet, Wavelet, Laplacian Pyramid, Curvelet, and Contourlet Transform to Defect Detection." *Journal of Soft Computing in Civil Engineering* 7.2 (2023): 1-42.
[21] Qu, Yuanyuan, et al. "Unveiling the biotransformation mechanism of indole in a Cupriavidus sp. strain." Molecular Microbiology 106.6 (2017): 905-918.
[22] Yoo, Illhoi, et al. "Data mining in healthcare and biomedicine: a survey of the literature." Journal of medical systems 36 (2012): 2431-2448.
[23] Deegan, Craig Michael. "Legitimacy theory: Despite its enduring popularity and contribution, time is right for a necessary makeover." Accounting, Auditing & Accountability Journal 32.8 (2019): 2307-2329.
[24] Hwang, Hyun Seok, Aida Rahimi Kahmini, Julia Prascak, Alexis Cejas-Carbonell, Isela C. Valera, Samantha Champion, Mikayla Corrigan, Florence Mumbi, and Michelle S. Parvatiyar. "Sarcospan Deficiency Increases Oxidative Stress and Arrhythmias in Hearts after Acute Ischemia-Reperfusion Injury." *International Journal of Molecular Sciences* 24, no. 14 (2023): 11868.
[25] Johnson, Caroline H., Julijana Ivanisevic, and Gary Siuzdak. "Metabolomics: beyond biomarkers and towards mechanisms." Nature reviews Molecular cell biology 17.7 (2016): 451-459.
[26] Homaeinezhad, Mahdi, and Omid Beik. "Modified Space Vector Modulation and Voltage Balancing of Multiphase Neutral Point Clamped Rectifier." *2023 IEEE Energy Conversion Congress and Exposition (ECCE)*. IEEE, 2023.
[27] Limpert, Eckhard, Werner A. Stahel, and Markus Abbt. "Log-normal distributions across the sciences: keys and clues: on the charms of statistics, and how mechanical models resembling gambling machines offer a link to a handy way to characterize log-normal distributions, which can provide deeper insight into variability and probability—normal or log-normal: that is the question." BioScience 51.5 (2001): 341-352.
[28] Heydari, Melika, Ashkan Heydari, and Mahyar Amini. "Energy Management and Energy Consumption: A Comprehensive Study." *World Information Technology and Engineering Journal* 10.04 (2023): 22-28.
[29] Heydari, Melika, Ashkan Heydari, and Mahyar Amini. "Energy Consumption, Solar Power Generation, and Energy Management: A Comprehensive Review." *World Engineering and Applied Sciences Journal* 11.02 (2023): 196-202.
[30] Heydari, Melika, Ashkan Heydari, and Mahyar Amini. "Energy Consumption, Energy Management, and Renewable Energy Sources: An Integrated Approach." *International Journal of Engineering and Applied Sciences* 9.07 (2023): 167-173.
[31] Heydari, Melika, Ashkan Heydari, and Mahyar Amini. "Solar Power Generation and Sustainable Energy: A Review." *International Journal of Technology and Scientific Research* 12.03 (2023): 342-349.
[32] Sharifani, Koosha and Mahyar Amini. "Machine Learning and Deep Learning: A Review of Methods and Applications." World Information Technology and Engineering Journal 10.07 (2023): 3897-3904.
[33] Amini, Mahyar and Ali Rahmani. "How Strategic Agility Affects the Competitive Capabilities of Private Banks." *International Journal of Basic and Applied Sciences* 10.01 (2023): 8397-8406.
[34] Amini, Mahyar and Ali Rahmani. "Achieving Financial Success by Pursuing Environmental and Social Goals: A Comprehensive Literature Review and Research Agenda for Sustainable Investment." *World Information Technology and Engineering Journal* 10.04 (2023): 1286-1293.
[35] Amini, Mahyar, and Zavareh Bozorgasl. "A Game Theory Method to Cyber-Threat Information Sharing in Cloud Computing Technology ." *International Journal of Computer Science and Engineering Research* 11.4 (2023): 549-560.
[36] Nazari Enjedani, Somayeh, and Mahyar Amini. "The role of traffic impact effect on transportation planning and sustainable traffic management in metropolitan regions." *International Journal of Smart City Planning Research* 12, no. 2023 (2023): 688-700.

[37] Jahanbakhsh Javid, Negar, and Mahyar Amini. "Evaluating the effect of supply chain management practice on implementation of halal agroindustry and competitive advantage for small and medium enterprises ." International Journal of Computer Science and Information Technology 15.6 (2023): 8997-9008
[38] Amini, Mahyar, and Negar Jahanbakhsh Javid. "A Multi-Perspective Framework Established on Diffusion of Innovation (DOI) Theory and Technology, Organization and Environment (TOE) Framework Toward Supply Chain Management System Based on Cloud Computing Technology for Small and Medium Enterprises ." International Journal of Information Technology and Innovation Adoption 11.8 (2023): 1217-1234
[39] Amini, Mahyar and Ali Rahmani. "Agricultural databases evaluation with machine learning procedure." Australian Journal of Engineering and Applied Science 8.6 (2023): 39-50
[40] Amini, Mahyar, and Ali Rahmani. "Machine learning process evaluating damage classification of composites." International Journal of Science and Advanced Technology 9.12 (2023): 240-250
[41] Amini, Mahyar, Koosha Sharifani, and Ali Rahmani. "Machine Learning Model Towards Evaluating Data gathering methods in Manufacturing and Mechanical Engineering." International Journal of Applied Science and Engineering Research 15.4 (2023): 349-362.
[42] Sharifani, Koosha and Amini, Mahyar and Akbari, Yaser and Aghajanzadeh Godarzi, Javad. "Operating Machine Learning across Natural Language Processing Techniques for Improvement of Fabricated News Model." International Journal of Science and Information System Research 12.9 (2022): 20-44.
[43] Amini, Mahyar, et al. "MAHAMGOSTAR.COM AS A CASE STUDY FOR ADOPTION OF LARAVEL FRAMEWORK AS THE BEST PROGRAMMING TOOLS FOR PHP BASED WEB DEVELOPMENT FOR SMALL AND MEDIUM ENTERPRISES." Journal of Innovation & Knowledge, ISSN (2021): 100-110.
[44] Amini, Mahyar, and Aryati Bakri. "Cloud computing adoption by SMEs in the Malaysia: A multi-perspective framework based on DOI theory and TOE framework." Journal of Information Technology & Information Systems Research (JITISR) 9.2 (2015): 121-135.
[45] Amini, Mahyar, and Nazli Sadat Safavi. "A Dynamic SLA Aware Heuristic Solution For IaaS Cloud Placement Problem Without Migration." International Journal of Computer Science and Information Technologies 6.11 (2014): 25-30.
[46] Amini, Mahyar. "The factors that influence on adoption of cloud computing for small and medium enterprises." (2014).
[47] Amini, Mahyar, et al. "Development of an instrument for assessing the impact of environmental context on adoption of cloud computing for small and medium enterprises." Australian Journal of Basic and Applied Sciences (AJBAS) 8.10 (2014): 129-135.
[48] Amini, Mahyar, et al. "The role of top manager behaviours on adoption of cloud computing for small and medium enterprises." Australian Journal of Basic and Applied Sciences (AJBAS) 8.1 (2014): 490-498.
[49] Amini, Mahyar, and Nazli Sadat Safavi. "A Dynamic SLA Aware Solution For IaaS Cloud Placement Problem Using Simulated Annealing." International Journal of Computer Science and Information Technologies 6.11 (2014): 52-57.
[50] Sadat Safavi, Nazli, Nor Hidayati Zakaria, and Mahyar Amini. "The risk analysis of system selection and business process re-engineering towards the success of enterprise resource planning project for small and medium enterprise." World Applied Sciences Journal (WASJ) 31.9 (2014): 1669-1676.
[51] Sadat Safavi, Nazli, Mahyar Amini, and Seyyed AmirAli Javadinia. "The determinant of adoption of enterprise resource planning for small and medium enterprises in Iran." International Journal of Advanced Research in IT and Engineering (IJARIE) 3.1 (2014): 1-8.
[52] Sadat Safavi, Nazli, et al. "An effective model for evaluating organizational risk and cost in ERP implementation by SME." IOSR Journal of Business and Management (IOSR-JBM) 10.6 (2013): 70-75.
[53] Safavi, Nazli Sadat, et al. "An effective model for evaluating organizational risk and cost in ERP implementation by SME." IOSR Journal of Business and Management (IOSR-JBM) 10.6 (2013): 61-66.
[54] Amini, Mahyar, and Nazli Sadat Safavi. "Critical success factors for ERP implementation." International Journal of Information Technology & Information Systems 5.15 (2013): 1-23.
[55] Amini, Mahyar, et al. "Agricultural development in IRAN base on cloud computing theory." International Journal of Engineering Research & Technology (IJERT) 2.6 (2013): 796-801.
[56] Amini, Mahyar, et al. "Types of cloud computing (public and private) that transform the organization more effectively." International Journal of Engineering Research & Technology (IJERT) 2.5 (2013): 1263-1269.
[57] Amini, Mahyar, and Nazli Sadat Safavi. "Cloud Computing Transform the Way of IT Delivers Services to the Organizations." International Journal of Innovation & Management Science Research 1.61 (2013): 1-5.
[58] Abdollahzadegan, A., Che Hussin, A. R., Moshfegh Gohary, M., & Amini, M. (2013). The organizational critical success factors for adopting cloud computing in SMEs. Journal of Information Systems Research and Innovation (JISRI), 4(1), 67-74.
[59] Khoshraftar, Alireza, et al. "Improving The CRM System In Healthcare Organization." International Journal of Computer Engineering & Sciences (IJCES) 1.2 (2011): 28-35.