













of technology-related keywords such as "artificial intelligence" and "machine learning" starting around 2015 and peaking significantly in recent years. This indicates an increasing integration of advanced computational techniques into malaria research. Keywords like "deep learning," "diagnosis," "plasmodium," and "convolutional neural network" also show a rising trend, suggesting a multidisciplinary approach that combines traditional biological research with modern technological advancements. The prominence of these keywords illustrates the evolving landscape of malaria research, where innovative methodologies are being employed to enhance diagnostic accuracy and disease understanding, ultimately aiming to improve malaria control and eradication strategies.

#### IV. CONCLUSION

In the context of research on the integration of artificial intelligence in species identification and automatic malaria detection in mosquitoes, it can be concluded that the use of advanced technologies such as artificial intelligence and machine learning has significantly contributed to malaria research. With a multidisciplinary approach that combines traditional biological sciences with modern technological advances, malaria research is increasingly progressing towards improved diagnostic accuracy and disease understanding, with the ultimate goal of enhancing malaria control and eradication strategies.

Thus, the integration of artificial intelligence in malaria research not only aids in species identification and automatic detection in mosquitoes but also reflects the evolving landscape of malaria research, where innovative methodologies are used to enhance diagnostic accuracy and disease understanding, aiming to improve malaria control and eradication strategies.

The knowledge gained from this research can provide strategic guidance for researchers and policymakers in identifying key focus areas and research gaps in the existing literature. By understanding collaboration trends among researchers and institutions, we can strengthen the global research network and enhance effectiveness in addressing malaria challenges.

Finally, it is crucial to continue developing this research to expand knowledge on the integration of artificial intelligence in malaria research, thereby making a significant contribution to global efforts to control and eradicate this disease.

#### REFERENCES

- [1] "World Health Organization (2021)".
- [2] S. Bhatt et al., "The effect of malaria control on *Plasmodium falciparum* in Africa between 2000 and 2015.," *Nature*, vol. 526, no. 7572, pp. 207–211, Oct. 2015, doi: 10.1038/nature15535.
- [3] D. Menard and A. Dondorp, "Antimalarial drug resistance: a threat to malaria elimination," *Cold Spring Harb Perspect Med*, vol. 7, no. 7, 2017, doi: 10.1101/cshperspect.a025619.
- [4] C. Linard, M. Gilbert, R. W. Snow, A. M. Noor, and A. J. Tatem, "Population distribution, settlement patterns and accessibility across Africa in 2010," *PLoS One*, vol. 7, no. 2, 2012, doi: 10.1371/journal.pone.0031743.
- [5] N. Donthu, S. Kumar, D. Mukherjee, N. Pandey, and W. M. Lim, "How to conduct a bibliometric analysis: An overview and guidelines," *J Bus Res*, vol. 133, pp. 285–296, Sep. 2021, doi: 10.1016/j.jbusres.2021.04.070.
- [6] N. J. Van Eck and L. Waltman, "VOSviewer Manual version 1.6.10," *CWTS Meaningful metrics*, no. January, 2019.
- [7] L. Oesper, D. Merico, R. Isserlin, and G. D. Bader, "WordCloud: A Cytoscape plugin to create a visual semantic summary of networks," *Source Code Biol Med*, vol. 6, 2011, doi: 10.1186/1751-0473-6-7.
- [8] J. Nunez-Iglesias, R. Kennedy, S. M. Plaza, A. Chakraborty, and W. T. Katz, "Graph-based Active Learning of Agglomeration (GALA): A python library to segment 2D and 3D neuroimages," *Front Neuroinform*, vol. 8, no. APR, 2014, doi: 10.3389/fninf.2014.00034.
- [9] M. E. Falagas, E. I. Pitsouni, G. A. Malietzis, and G. Pappas, "Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses," *The FASEB Journal*, vol. 22, no. 2, 2008, doi: 10.1096/fj.07-9492lsf.
- [10] V. Balakrishnan, Y. Kehrabi, G. Ramanathan, S. A. Paul, and C. K. Tiong, "Machine learning approaches in diagnosing tuberculosis through biomarkers - A systematic review," *Progress in Biophysics and Molecular Biology*, vol. 179, 2023. doi: 10.1016/j.pbiomolbio.2023.03.001.
- [11] I. Zupic and T. Čater, "Bibliometric Methods in Management and Organization," *Organ Res Methods*, vol. 18, no. 3, 2015, doi: 10.1177/1094428114562629.
- [12] R. Vallat, "Pingouin: statistics in Python," *J Open Source Softw*, vol. 3, no. 31, 2018, doi: 10.21105/joss.01026.
- [13] M. Waskom, "Seaborn: Statistical Data Visualization," *J Open Source Softw*, vol. 6, no. 60, p. 3021, 2021, doi: 10.21105/joss.03021.
- [14] J. D. Hunter, "Matplotlib: A 2D Graphics Environment," *Comput Sci Eng*, vol. 9, no. 3, pp. 90–95, May 2007, doi: 10.1109/MCSE.2007.55.