

FindD: AI-Driven Insights for Bone and Muscle Deficiencies Across Generations

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Abstract: *This literature review examines a novel strategy for treating vitamin deficiencies, with a focus on vitamin D, vitamin K, and vitamin E. It also highlights the importance of deficiency of the vitamin D&K for bone and the vitamin E for muscle abnormalities in children and adults. The research uses an extensive methodology that combines deep learning-based image processing techniques with machine learning for text-based question-and-answer(Q&A) engagements.*

Through conversation, users are able to provide pertinent details about symptoms. Machine learning algorithms are then used to analyse the collected data. Concurrently, relevant images are processed by deep learning models to uncover subtle patterns that point to certain vitamin deficiencies.

In order to address issues with bone caused by vitamin deficiencies, this research attempts to provide insights into the nexus of machine learning and deep learning for personalized diagnosis of vitamin deficiencies. The comprehensive method takes into account the multiplicity of variables affecting vitamin levels and how they affect bone health across age groups. This study's keywords are deep learning image processing, Q&A-based machine learning, vitamin D, vitamin K, and vitamin E deficiencies, as well as bone abnormalities.

Keywords: Vitamin D, Vitamin K, Vitamin E, Q&A, image processing, Bone abnormalities, Personalized diagnostics.

REFERENCES

- [1] Akram, Ahmed, Nauman Hadi Hasan, AliAyesha Ikram, and Tayyab Mohammad Khan. "Analyzing Causes of Rickets in Children under Five Years and Solutions Available in India." *Journal of Health, Medicine, and Clinical Studies* 1, no. 1 (2022): 12-17.
- [2] Araki, Shunsuke, and Akira Shirahata. "Vitamin K deficiency bleeding in infancy." *Nutrients* 12, no. 3 (2020): 780.
- [3] Eldeen, Ahmed Saif, Mohamed AitGacem, Saifeddin Alghlayini, Wessam Shehieb, and Mustahsan Mir. "Vitamin Deficiency Detection Using Image Processing and Neural Network." In *2020 Advances in Science and Engineering Technology International Conferences (ASET)*, pp. 1-5. IEEE, 2020.
- [4] Gentile, Cristina, and Francesco Chiarelli. "Rickets in children: an update." *Biomedicine* 9, no. 7 (2021): 738.
- [5] Hatun, Sukru, Behzat Ozkan, Zerrin Orbak, Hakan Doneray, Filiz Cizmecioglu, Demet Toprak, and Ali Süha Calikoglu. "Vitamin D deficiency in early infancy." *The Journal of nutrition* 135, no. 2 (2005): 279-282.
- [6] Jiang, Cuiqing, Lan Ma, Zhao Wang, and Bo Chen. "Financial distress prediction using the Q&A text of online interactive platforms." *Electronic Commerce Research and Applications* 61 (2023): 101292.
- [7] Kemnic, Tyler R., and Meghan Coleman. "Vitamin E deficiency." In *StatPearls [Internet]*. StatPearls Publishing, 2023.
- [8] Maruthamuthu, R., and T. Harika. "Vitamin Deficiency Detection Using Image Processing and Neural Network." (2023).
- [9] Mladěnka, Přemysl, Kateřina Macáková, Lenka Kujovská Krčmová, Lenka Javorská, Kristýna Mrštná, Alejandro Carazo, Michele Protti, Fernando Remião, Lucie Nováková, and OEMONOM Researchers and Collaborators. "Vitamin K—sources, physiological role, kinetics, deficiency, detection, therapeutic use, and toxicity." *Nutrition reviews* 80, no. 4 (2022): 677-698.

- [10] Minisola, Salvatore, Luciano Colangelo, Jessica Pepe, Daniele Diacinti, Cristiana Cipriani, and Sudhaker D. Rao. "Osteomalacia and vitamin D status: a clinical update 2020." *JBMR plus* 5, no. 1 (2021): e10447.
- [11] Sambasivam, G., J. Amudhavel, and G. Sathya. "A predictive performance analysis of vitamin D deficiency severity using machine learning methods." *IEEE Access* 8 (2020): 109492-109507.
- [12] Sancar, Nuriye, and Sahar S. Tabrizi. "Machine learning approach for the detection of vitamin D level: a comparative study." *BMC Medical Informatics and Decision Making* 23, no. 1 (2023): 219.
- [13] Sevani, Nina, Iwan Aang Soenandi, and Fajar Saputra. "Implementation of backpropagation artificial neural network for early detection of vitamin and mineral deficiency." In *IOP Conference Series: Materials Science and Engineering*, vol. 847, no. 1, p. 012043. IOP Publishing, 2020.
- [14] Arnav, Walia, and Pandey Rahul. "Vitamin Deficiency and Human Behaviour." *Research & Reviews: A Journal of Immunology (RRJoI)* 12, no. 2 (2023): 43-58.
- [15] Wang, Alex, Kyunghyun Cho, and Mike Lewis. "Asking and answering questions to evaluate the factual consistency of summaries." *arXiv preprint arXiv:2004.04228* (2020).