

Review on Poisonous Plants Detection Using Machine Learning

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Abstract: *Poisonous plants pose a significant threat to human and animal health, leading to various adverse effects ranging from mild discomfort to severe toxicity. Early identification of these harmful plants is crucial for preventing accidental ingestions and minimizing the associated risks. This project focuses on developing an efficient and accurate system for the detection of poisonous plants using machine learning techniques. The proposed solution leverages a comprehensive dataset comprising images of various plant species, categorized into poisonous and non-poisonous classes. Convolutional Neural Networks (CNNs) are employed for image feature extraction, allowing the model to discern subtle visual patterns indicative of poisonous plant characteristics. Transfer learning is applied using pre-trained models, enhancing the system's ability to generalize and adapt to diverse plant species.*

Keywords: Detection, Identification of plants, Leaf patterns, Poisonous plants classification.

REFERENCES

- [1] Hassoon, Israa Mohammed, and Shaymaa Akram Hantoosh. "CFNN for Identifying Poisonous Plants." Baghdad Science Journal 20, no. 3 (Suppl.) (2023): 1122-1122.
- [2] Regatte Sahithi Reddy, N. Ankitha, M. Lokesh, M. Anji Reddy. "Plant identification system using machine learning." IJCRT volume.11(2013): 2320-2882
- [3] Bhatt, Eera, and Clayton Greenberg. "Plant Toxicity Classification by Image." Journal of Student Research 12, no. 1 (2023).
- [4] Noor, Talal H., Ayman Noor, and Mahmoud Elmezain. "Poisonous Plants Species Prediction Using a Convolutional Neural Network and Support Vector Machine Hybrid Model." Electronics 11, no. 22 (2022): 3690.
- [5] Zuhri, Mohammad Faishol, S. Kholidah Rahayu Maharani, Affandy Affandy, Aris Nurhindarto, Abdul Syukur, and Moch Arief Soeleman. "Classification of Toxic Plants on Leaf Patterns Using Gray Level Co-Occurrence Matrix (GLCM) with Neural Network Method." Journal of Development Research 6, no. 1 (2022): 1-5
- [6] Picek, Lukáš, Milan Šulc, Yash Patel, and Jiří Matas. "Plant recognition by AI: Deep neural nets, transformers, and kNN in deep embeddings." Frontiers in Plant Science (2022): 2788
- [7] Hridoy, Rashidul Hasan, Fatema Akter, and Maisha Afroz. "An Efficient Computer Vision Approach for Rapid Recognition of Poisonous Plants by Classifying Leaf Images using Transfer Learning." In 2021 12th International Conference on Computing Communication and Networking Technologies (ICCCNT), pp. 01-07. IEEE, 2021.
- [8] Malarvizhi, K., M. Sowmithra, D. Gokula Priya, and B. Kabila. "Machine learning for plant species classification using leaf vein morphometric." Int J Eng Res Technol (IJERT) 10, no. 04 (2021).
- [9] Dissanayake, D. M. C., and W. G. C. W. Kumara. "Plant leaf identification based on machine learning algorithms." (2021).
- [10] Gawli, Kiran S., and Ashwini S. Gaikwad. "Deep learning for plant species classification." JETIR 7, no. 11 (2020): 99-105.
- [11] Swu Vikaho, Dibya jyoti bora," Identification of Different Plants through Image Processing Using Different Machine Learning Algorithms" ResearchGate (2020)

- [12] Ahmed, Ali, and Sherif E. Hussein. "Leaf identification using radial basis function neural networks and SSA based support vector machine." (2020): e0237645
- [13] Kaur, Surleen, and Prabhpreet Kaur. "Plant species identification based on plant leaf using computer vision and machine learning techniques." *Journal of Multimedia Information System* 6, no. 2 (2019): 49-60.
- [14] Cho, Jaeseong, Suyeon Jeon, Siyoung Song, Seokyeong Kim, Dohyun Kim, Jongkil Jeong, Goya Choi, and Soongin Lee. "Identification of toxic herbs using deep learning with focus on the *sinomenium acutum*, *aristolochiae manshuriensis caulis*, *akebiae caulis*." *Applied Sciences* 9, no. 24 (2019): 5456.
- [15] Sun, Yu, Yuan Liu, Guan Wang, and Haiyan Zhang. "Deep learning for plant identification in natural environment." *Computational intelligence and neuroscience* 2017 (2017).
- [16] AlAsadi, Abbas H. Hassin, Eman Qais Anduljalil, and Amal Hameed Khaleel. "Leaf Recognition based on Neural Network Feed-Forward and Support Vector Machine Classifiers." (2017).
- [17] Yalcin, Hulya, and Salar Razavi. "Plant classification using convolutional neural networks." In *2016 Fifth International Conference on Agro-Geoinformatics (Agro-Geoinformatics)*, pp. 1-5. IEEE, 2016.
- [18] Rojas-Hernández, Rafael, Asdrúbal López-Chau, Valentín Trujillo-Mora, and Carlos A. Rojas-Hernández. "Plant identification using new geometric features with standard data mining methods." In *2016 IEEE 13th International Conference on Networking, Sensing, and Control (ICNSC)*, pp. 1-4. IEEE, 2016.
- [19] Zhou, Hong, Chenjun Yan, and Huahong Huang. "Tree species identification based on convolutional neural networks." In *2016 8th International Conference on Intelligent Human-Machine Systems and Cybernetics (IHMSC)*, vol. 2, pp. 103-106. IEEE, 2016.
- [20] Siravenha, Ana C., and Schubert R. Carvalho. "Plant classification from leaf textures." In *2016 International Conference on Digital Image Computing: Techniques and Applications (DICTA)*, pp. 1-8. IEEE, 2016
- [21] Lee, Sue Han, Chee Seng Chan, Paul Wilkin, and Paolo Remagnino. "Deep-plant: Plant identification with convolutional neural networks." In *2015 IEEE international conference on image processing (ICIP)*, pp. 452-456. IEEE, 2015.
- [22] Priyankara, HA Chathura, and D. K. Withanage. "Computer assisted plant identification system for Android." In *2015 Moratuwa engineering research conference (MERCon)*, pp. 148-153. IEEE, 2015.
- [23] Patil, Bhagya, Anupama Pattanshetty, and Suvarna Nandyal. "Plant classification using SVM classifier." In *Third International Conference on Computational Intelligence and Information Technology (CIIT 2013)*, pp. 519-523. IET, 2013.
- [24] Wang, Bin, Douglas Brown, Yongsheng Gao, and John La Salle. "Mobile plant leaf identification using smart-phones." In *2013 IEEE International Conference on Image Processing*, pp. 4417-4421. IEEE, 2013.
- [25] Zhang, Hang, Paul Yanne, and Shangsong Liang. "Plant species classification using leaf shape and texture." In *2012 International Conference on Industrial Control and Electronics Engineering*, pp. 2025-2028. IEEE, 2012
- [26] Kumar, Neeraj, Peter N. Belhumeur, Arijit Biswas, David W. Jacobs, W. John Kress, Ida C. Lopez, and João VB Soares. "Leafsnap: A computer vision system for automatic plant species identification." In *Computer Vision—ECCV 2012: 12th European Conference on Computer Vision, Florence, Italy, October 7-13, 2012, Proceedings, Part II* 12, pp. 502-516. Springer Berlin Heidelberg, 2012.