Identifying Ivory: The Met Museum Ivory Classification Model

Using neural network-based image recognition to prevent the illegal online sale of elephant ivory

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Agenda

1 | Overview & Context

2 | Data Understanding

3 | The Model

4 | Results & Evaluation

5 | Conclusion & Recommendations

Overview and Context

“Elephants are only extant at our discretion” - Unknown

Keystone Species

From habitat creation to seed dispersal, forest pathway creation, and brush cover management, elephants are critical components of their ecosystems

Dwindling Numbers

Each year poachers kill an estimated 20,000 wild elephants, primarily for their tusks. Only 450,000 elephants remain in the wild

Ivory Trade

56 tons of ivory entered Vietnam between 2009-2018 alone. The rise of online marketplaces has only served to exacerbate the problem

Call to Action

Curbing ivory markets and eliminating the incentive to poach is our top priority. A 2021 study by DICE found that the online ivory trade is thriving in online marketplaces

Data Understanding

All data for this project was obtained from The Met's open-source API

Non-ivory

Non-ivory

Ivory

Non-ivory

Ivory

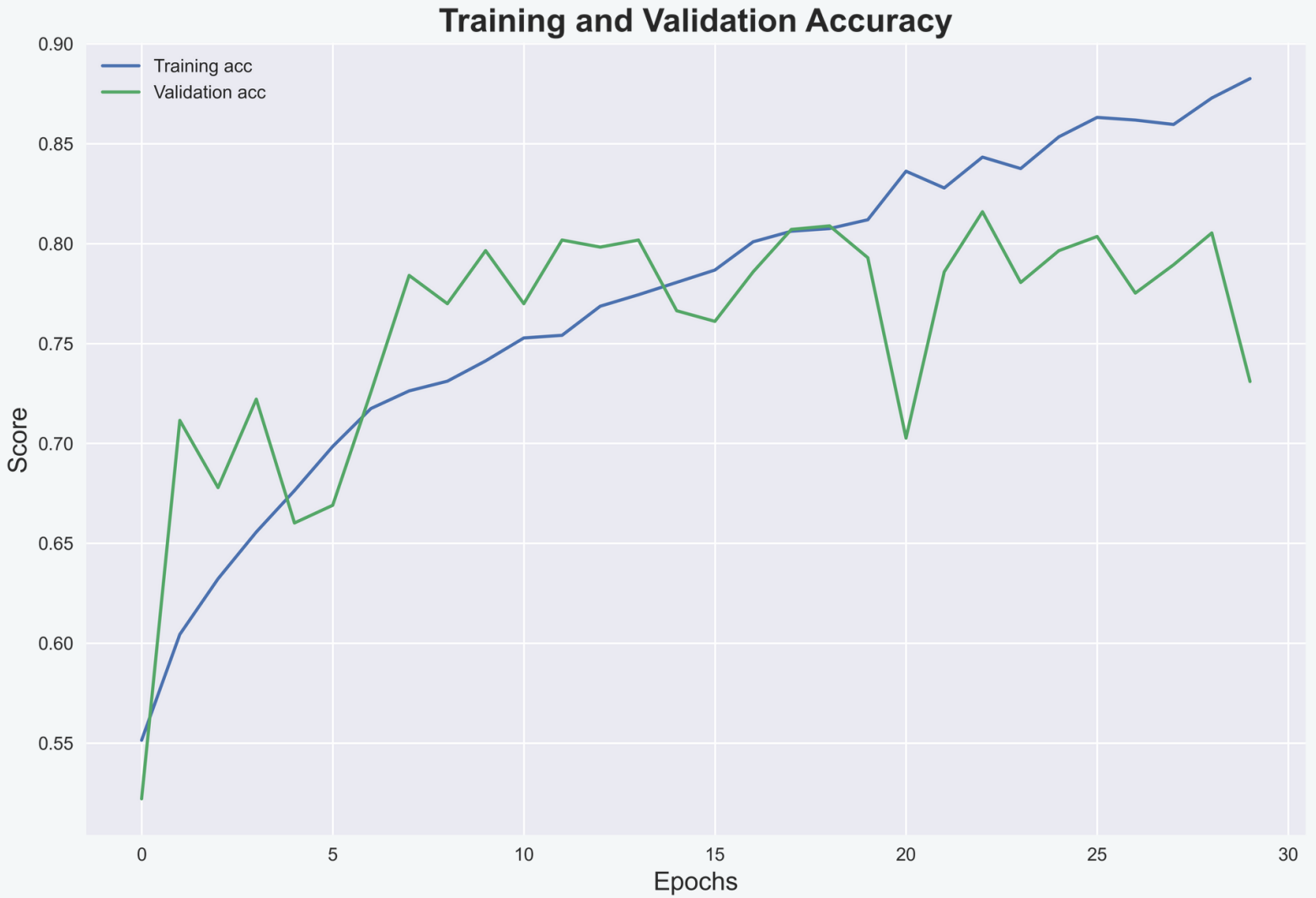
Ivory

A Convolutional Neural Network (CNN)

The Model

Train accuracy: 86.8%

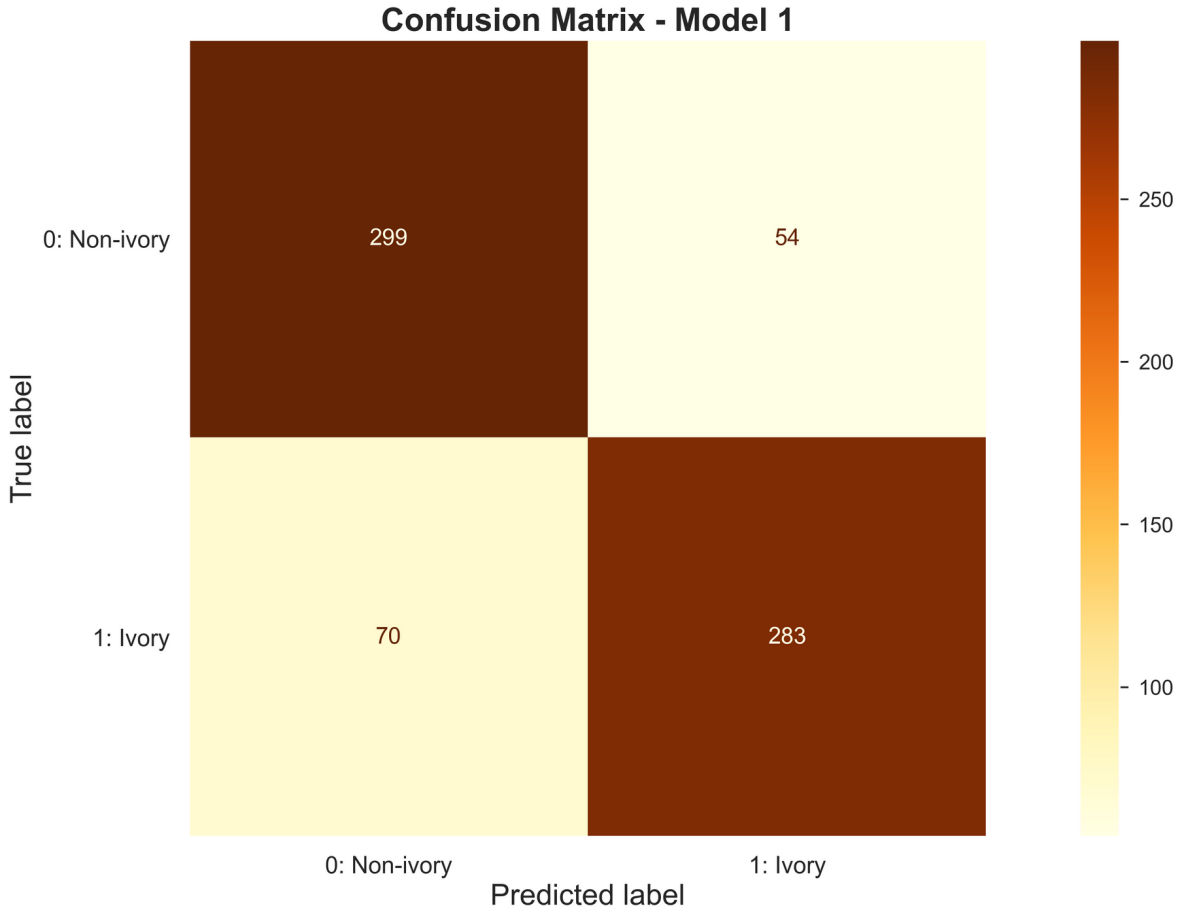
Test accuracy: 82.4%



Results and Evaluation

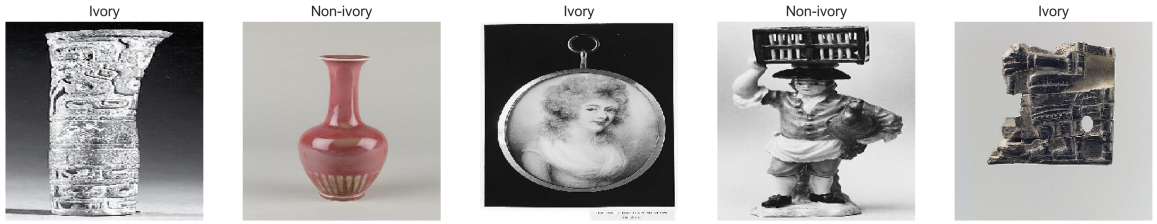
Precision: 85%

Recall: 80%



Correctly Classified

Incorrectly Classified



Conclusions and Recommendations

1. Successful classification of ivory is possible

2. Be aware of limitations: (1) not fully representative dataset, (2) also detects non-elephant ivory

3. Consider which forms of ivory are used to train the model, and the trade-off between precision and recall

4. Next steps: (1) obtain more and more recent data, (2) experiment with other NNs, tuning, preprocessing

Thank You

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