PyrΔTE: an AI-based pyrite tarnish probability generator

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PyrΔTE is the result of a pilot study conducted to determine whether AI can be used to help identify change in museum specimens. To simplify this proof of concept, numerical colour data were collected from hundreds of pyrite specimens from Oxford University Natural History Museum, National Museum Cardiff, and National Museums Liverpool. Over a dozen volunteers helped to collect thousands of colour data points. They and the collections' curators also assessed whether each specimen was either tarnished or untarnished. This data was then fed into two separate Regression AI modules in Python to identify patterns within the dataset. Here, the AI used the colour data to calculate tarnish likelihood and the overall colour difference (ΔE00).

Multiple iterations of the calculator have been developed, increasing the size of the training dataset and adding new features with each version. The present version allows the user to input their own CIELAB colour values, either individually or as a series of data points in a .csv file. The user can also select either the default untarnished pyrite colour values or enter their own set of values to use in calculating the ΔE00.

Whilst this programme is presently limited in scope to colorimetry and pyrite, PyrΔTE demonstrates that, with further development, similar AI tools can be created to aid identifying and treating visual and material changes to museum objects.