

## **Case Study: Differentiating the Authentic From the Artificial: AI Image Analysis**

### **The Scenario:**

The field of artificial intelligence is rapidly growing; embedding itself into business, governance, academia, and everyday life. AI's influence on society as a whole has never been more pronounced. Investment in generative AI programs is unprecedented, totaling over one hundred billion dollars in the US alone last year, and yields ever increasing capabilities along with promises of higher productivity levels, enhanced decision making, and new forms in innovation across disciplines. However, with these promises and exciting new horizons come equally frienting possibilities, especially in the realm of artificial image generation and so called “deep fakes”.

Recent advances in generative AI models have enabled the creation of highly realistic images that can be nearly indistinguishable from genuine photographs to the human eye. These deep fakes bring into question the historical notion that images serve as reliable records of reality. People's trust in what they see online is rapidly eroding, and AI has already impacted critical real world events such as the recent presidential election. As these technologies become more accessible to the general public, the need for reliable detection methods becomes increasingly critical to deduce whether or not images are authentic or not, ultimately, in order to preserve our collective sense of reality itself and that's where you come in.

### **Your Mission:**

With access to a dataset composed of both real and AI-generated images, your goal as lead analyst will be to create a machine learning model that can distinguish between the two categories. Your model, if effective, can help serve as a bulwark against malicious use of AI and ensure public narratives and perceptions are rooted in reality. See the materials section of the repository for more detailed information about AI's entry into the image space, potential modeling techniques, and the sample project code for inspiration, but don't be afraid to be creative and experiment with different techniques, this is your model and try to make it as efficient as you possibly can.

### **Deliverables:**

You will compile the relevant findings from your exploratory data analysis and model building processes into one final, organized report containing: your overall analysis of the model(s) you create, relevant visualization figures, a reflection of challenges you faced during the process, how you overcame them, and potential next steps you could take to further improve the project. Use a GitHub repository to house a pdf of your report as well as a separate folder containing well labeled code files used in the model building process.

**GitHub Link:** <https://github.com/Jckulp25/DS-4002-Case-Study/tree/main>