**Topic: Shoe Classification Using Deep Learning**

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**Business Problem**: Shoe classification is critical for retail companies, especially those operating online. Accurately identifying and classifying shoes based on their images can help improve customer satisfaction and optimize inventory management. This project aims to develop a deep-learning model to accurately organize shoes based on their images.

**Datasets**: The Shoe Classification Dataset will be used for this project. It contains over 50,000 images of shoes, including sneakers, boots, sandals, and dress shoes. The dataset is organized into 10 categories and includes color and grayscale images.

**Methods**: The deep learning model will be built using a convolutional neural network (CNN). Transfer learning will be used to fine-tune a pre-trained CNN model to classify the shoe images. The model will be trained and tested using Python and Keras.

**Ethical Considerations**: Using shoe images raises concerns about privacy and consent. All photos will be obtained from public sources to address this issue, and no personal information will be collected or stored. In addition, the project will comply with all relevant data protection laws and regulations.

**Challenges/Issues**: One potential challenge is the limited size of the dataset. While the Shoe Classification Dataset is comprehensive, it may need more samples for each category to train a robust deep-learning model. Another challenge is the potential for bias in the dataset, as it may not represent the full range of shoe types and styles.

**References**: https://vision.cs.utexas.edu/projects/finegrained/utzap50k/

The project will draw on academic papers and published research on deep learning, image classification, and retail inventory management. Some potential sources include "Deep Learning for Visual Recognition" by Krizhevsky et al. and "Improving Inventory Management with Machine Learning" by Agrawal et al.