B-VAE Implementation for Disentangled Representations

STD ID: 24081274

Introduction

This project explores the Beta-Variational Autoencoder (β-VAE), a powerful deep learning model designed to learn disentangled latent representations. It demonstrates how controlled regularization improves interpretability of learned features, enabling better manipulation, visualization, and understanding of complex data structures.

Project Overview

This project focuses on implementing the β-VAE architecture to study and demonstrate disentangled representation learning. β-VAE introduces a hyperparameter **β** to strengthen the KL-divergence constraint, encouraging the model to separate hidden factors of variation more clearly than standard VAEs.The project includes

- Complete β-VAE implementation in Python
- Training pipeline with configurable β values
- Visualization of latent traversals to analyze disentanglement
- Easy-to-understand code structure suitable for learners and researchers

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GitHub Repository

The full source code, including model architecture, training scripts, and visualization utilities, is available on GitHub:
GitHub: Vishva2003/B-VAE_Implementation_for_Disentangled_Representations

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Live Webpage

A demonstration webpage showcasing explanations, concepts, and visual outputs of the β-VAE model is accessible here:

 Webpage: beta-vae-tutorial.vercel.app

Conclusion

This β-VAE implementation and tutorial webpage together provide an accessible path to understanding disentangled representation learning. The project is suitable for academic submissions, portfolio use, and deeper exploration of generative models.