Deep learning has become a popular tool for medical image analysis, but the limited availability of training data remains a major challenge, particularly in the medical field where data acquisition can be costly and subject to privacy regulations.We provide an overview of the current state of the art in each of these models and discuss their potential for use in different downstream tasks in medical imaging, including classification, segmentation, and cross−modal translation.To address this issue, a growing number of studies have proposed the use of deep generative models to generate more realistic and diverse data that conform to the true distribution of the data.