Quantifying snow water equivalent (SWE) on a global scale has posed a long-standing challenge. SWE can be calculated if the snowpack depth and density measurements are known. However, these products are only available in selected locations worldwide. The forthcoming NASA-ISRO Synthetic Aperture Radar (NISAR) mission offers a new horizon for snow monitoring, with its global coverage and frequent revisit cycles. The data from this mission can be used to estimate changes in snow depth and SWE. Our work uses NISAR-like data from the NASA JPL Uninhabited Aerial Vehicle Synthetic Aperture Radar (UAVSAR) sensor to estimate total snow depth using machine learning (ML) algorithms. We demonstrate the potential of combining advanced radar technology with machine learning algorithms to produce snow depth maps. Our findings are a step towards developing a global snow depth prediction system that will provide valuable information for water resource management, flood forecasting, and avalanche hazard assessment, provided that accurate and representative training data is available. By showcasing the effectiveness of UAVSAR data in snow depth estimation, our research highlights a path forward for snow monitoring in anticipation of the capabilities that the NISAR mission will further expand upon.