Exploring the relationship between rotational and magnetic cycles in Sun-like stars using NRES

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The dynamo effect, which modulates the magnetic field of stars, is a topic of active research. While there are many dynamo models, most only work for a small subgroup of stars and may be specifically designed for the Sun. We have monitored the S-Index, a magnetic proxy, for a sample of bright stars with known rotation rates($P_{\text{rot}} < 22$ days), to discover short magnetic activity cycles($P_{\text{cyc}} < 5$ years) that are precursors of the 11-year solar cycle. This study adds additional constraints to current and future dynamo models by producing data for stars whose cycles are unknown. Las Cumbres Observatory's Network of Robotic Echelle Spectrographs(NRES) has a large archive of data for many stars. NRES is a global telescope system with six sites whose main purpose is to study exoplanets. We have developed an automated pipeline in Python to pull the intensity of the Ca II H and K emission features from the NRES spectra which are used to find the S-Index. With our pipeline, we have seen evidence of magnetic cycles in stars whose activity is known through previous studies. Our study demonstrates that the NRES system is sensitive enough to discover magnetic activity in stars. We can now probe these stars deeper for unknown underlying activity which may help understand their dynamo process. The open-source pipeline is highly extendable and allows users to add features to find additional information from NRES data.