Analysis of the High Latitude Area of the Moon with Spectral Profiler Data : On the Effectiveness of Sunlit - Shade Area Classification by Deep Learning

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The lunar explorer SELENE acquired a large mass of information. Among them, the Spectral Profiler (SP) data of visible to near infrared spectral with high S/N ratio, which was obtained more than 10 million shots at the latitude higher than 80 degrees, contains useful mineralogical information. In practical, all the SP data is usually corrected under the assumption of sunlit condition, which may not be affected so much taken in the low latitude area. However, accurate data correction by sunshine conditions (including secondary reflected) should be done in order to analyze the data properly in the high latitude area. Currently, only spectral with very high S/N ratio in the sunlit area are used for analysis, however, such data is difficult to find in the polar region. For this reason, there are many data remained to be analyzed. Also, "Half-shaded" area at where only the secondary reflected light is exposed should be focused on to search for volatile elements. In this study, we developed a automatic classifier of sunlit and shade area using deep learning. And the overall percentage of correct answer rate was about 98%.
As of now, we completed preliminary calculation and made sunlit-sunshade information data for each spectral data. Further development is under investigation using Pyramid Scene Parsing Network to deduce more accurate result.

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