141 Landscape-scale insights into recreational activities derived from social media content

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Volunteered geographic information, such as social media and online trip reports, are a promising source of data on the amount and character of recreational use in parks and protected areas. The volume of data is often correlated with on-site measures of park visitation, and the content contains rich descriptions of visitors' experiences. This study presents a novel and generalizable model of public land visitation based on posts to three online social media platforms and two trip reporting platforms from National Forests in Washington, USA. Then, we introduce and apply a convolutional neural network model for accurately classifying these visitors' activities, based on the content of the social media. We find that social media can substantially improve estimates of visitation to public lands. Furthermore, there is also a strong correlation between the number of survey respondents reporting their participation in 14 common recreational activities and the number of social media posts classified as pertaining to the same activity. The models perform nearly as well in novel locations as in the primary location, suggesting that the approaches are broadly applicable, though performance varies by activity. By comparing our maps of recreational participation to the underlying landscape, we find that natural features (such as rivers, lakes, and higher elevations) and some built infrastructure (campgrounds, trails, roads) support a greater diversity of activities, while visitors are less sensitive to features such as picnic areas and wilderness designation. Even while respecting the limitations of the volunteered data and models, these results provide actionable information to land managers by illuminating how recreation varies spatially and according to the recreational activities that are provided.