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MIN3D dataset: MultI-seNsor 3D mapping with an unmanned ground vehicle for mining applications

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The research potential in the field of mobile mapping technologies, particularly for specific applications, is hindered by several constraints. These include the need for costly hardware to collect data (possibly with automation using mobile platforms such as robots or drones), limited access to target sites with specific environmental conditions, and the establishment of a ground truth model for evaluating developed solutions. To address these challenges, the utilization of open datasets presents a viable solution. However, the availability of datasets that encompass truly demanding mixed indoor-outdoor and subterranean conditions is currently limited within the research community. In response to these requirements, we propose the MIN3D dataset: MultI-seNsor 3D mapping with an unmanned ground vehicle for mining applications. This dataset was gathered using a wheeled mobile robot in two distinct locations: predominantly textureless or dark corridors within a university campus and tunnels of an inactive underground site in Walim. The dataset comprises over 150 GB of raw data, including images captured by multiple co-calibrated monocular and stereo cameras, a thermal camera, 2 LiDARs, and 3 inertial measurement units. Furthermore, reliable ground truth point clouds were obtained using a survey-grade terrestrial laser scanner. By openly sharing this dataset, we aim to support and expedite the efforts of the scientific community in developing robust methods for navigation and mapping in challenging conditions of mining applications. The MIN3D dataset provides an invaluable resource for researchers to test and refine their algorithms, ultimately advancing the field of mobile mapping in demanding environments.