A. Appendix

Table A.1. Full description of classes found in our database along with their taxonomy.

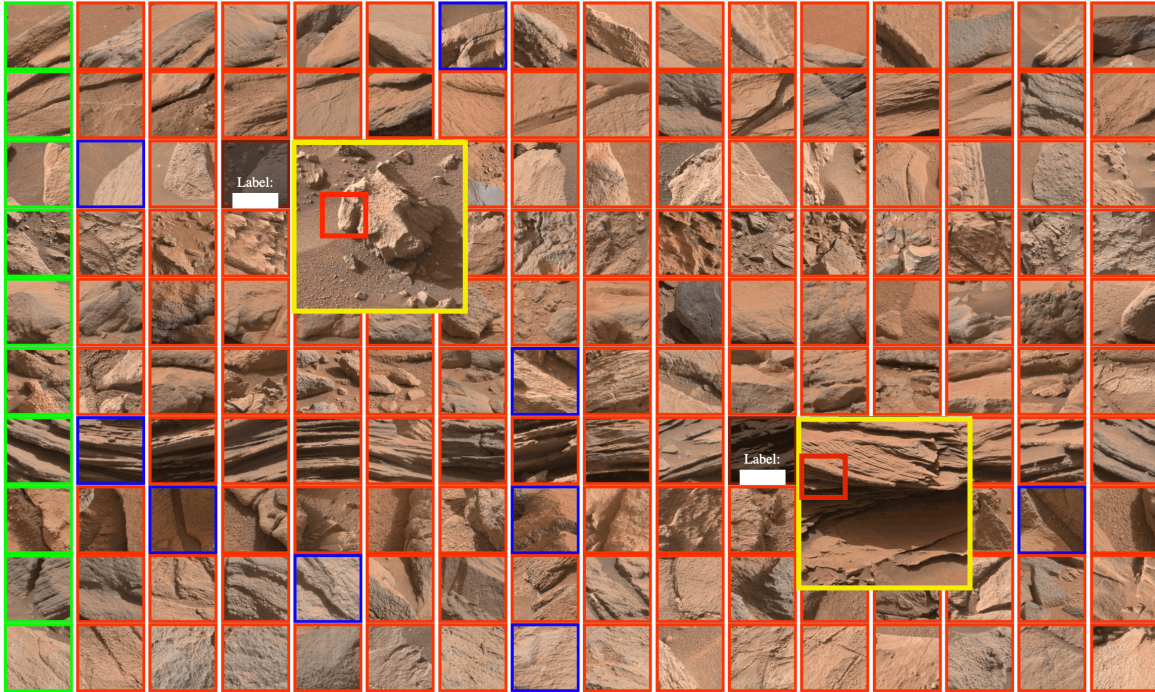| ID	Taxonomy	Class Description
1	A-G1-T2-L3-N1-F1	strongly laminated dark-colored sandstone (grains visible), non-nodular, unfractured
2	A-G2-T1-L3-N1-F1	strongly wavy/non parallel-laminated red mudstone, non-nodular, unfractured
3	A-G2-T1-L3-N1-F1	strongly even/parallel-laminated red mudstone, non-nodular, unfractured
4	A-G2-T1-L3-N1-F3u	strongly laminated red mudstone, non-nodular, pervasively fractured (unfilled)
5	A-G2-T1-L3-N1-F1	strongly laminated red mudstone, non-nodular, unfractured, platy weathered
6	A-G2-T1-L2-N1-F1	weakly laminated red mudstone, non-nodular, unfractured
7	A-G2-T1-L2-N1-F2u	weakly laminated red mudstone, non-nodular, lightly fractured (unfilled)
8	A-G2-T1-L2-N1-F3u	weakly laminated red mudstone, non-nodular, heavily fractured (unfilled)
9	A-G2-T1-L2-N1-F2f	weakly laminated red mudstone, non-nodular, common planar calcium sulfate-filled hairline planar fractures
10	A-G2-T2-L2-N1-F2f	weakly laminated gray mudstone, non-nodular, common planar calcium sulfate-filled hairline planar fractures
11	A-G2-T1-L2-N1-F3f	weakly laminated red mudstone, non-nodular, pervasive planar calcium sulfate-filled chaotic/curviplanar fractures
12	A-G2-T1-L2-N3-F1	weakly laminated red mudstone, pervasively nodular, unfractured
13	A-G2-T1-L2-N3-F3f	weakly laminated red mudstone, pervasively nodular, abundant calcium-sulfate filled hairine fractures
14	A-G2-T1-L1-N1-F2	apparently unlaminated /massive red mudstone, non-nodular, commonly fractured (unfilled)
15	A-G2-T1-L1-N3-F1	apparently unlaminated red mudstone, pervasively nodular, unfractured
16	A-G2-T1-L1-N2-F1	apparently unlaminated red mudstone, common protruding raised nodules, unfractured
17	B1-G2-T1	Red/Light-toned, massive floatrock
18	B1-G2-T2	Dark-toned, massive floatrock
19	C1	Sand
20	C2	Mostly Sand ($> 50\%$), Some Rounded Pebbles ($< 50\%$)
21	C3	Some Sand ($< 50\%$), Mostly Rounded Pebbles ($> 50\%$)
22	D1	Rover Sand Tracks
23	D2	Rover Parts
24	D3	Out of Focus
25	D4	Heavily Shadowed Areas

Figure A.1. Labeling interface with query patches in the first column (green), and top-K nearest neighbors ($K = 15$) in the corresponding rows (red/blue indicates that image was captured from a different/same site). Left click allows user to enter a label as shown in (row 3, col 4), (row 7, col 11). Right click allows user to view the original image (yellow boxes) that the patch was drawn from (patch localized in red box) to verify if it is bedrock/floatrock/unconsolidated. Highlighted in this figure are instances of light-toned massive floatrock (row 3, col 5) and laminated red mudstone bedrock (row 7, col 12). Figure is best viewed in color.