

# Exploring what makes rock climbing routes good or bad

Dylan Fridman



# Introduction



# Rock Climbing

- Some climbs are fun
- Some climbs are not



# Mountain Project

- Virtual guidebook
- Contains > 300,000 climbing routes
- Each route has a star rating from 0 to 4

The screenshot displays the Mountain Project website interface. At the top, a navigation bar includes links for CLIMB, INFO, HIKS, TRAILRUN, SKI, and BACKCOUNTRY, with a search bar and a 'LIMITED TIME' badge. Below this, a secondary navigation bar features a 'MOUNTAIN PROJECT' logo, a search bar, and links for Route Guide, Gyms, What's New, Partners, Forum, and social media icons. The main content area is titled 'Routes in 4. Moby Grape Area' and includes a 'Show All Routes' dropdown. A list of routes is shown, with 'Moby Grape T 5.8 PG13' highlighted by a red box and a star rating of 4.5. To the right, the route details for 'Moby Grape' are displayed, including its type (Trad, Alpine), length (800 ft), and difficulty (5.8 yds PG13). A red box highlights the star rating of 4.5. Below the route details, there is a section titled 'You & This Route' with 551 opinions, including a 'Your To-Do List' and a 'Your Star Rating' section. A photo of a climber on a rock face is shown on the right. At the bottom, an 'Access Issue' warning is visible, stating that the project is on weathering on Cannon and that users should not disturb the sensors.

CLIMB INFO HIKS TRAILRUN SKI **BACKCOUNTRY** LIMITED TIME **75% OFF** ONE BACKCOUNTRY

**MOUNTAIN PROJECT** Find routes, areas, etc. Route Guide Gyms What's New Partners Forum

Routes in 4. Moby Grape Area

Show All Routes

L R R L A Z

★★★★ Peppy's Face S 5.12a R

★★★★ Moby Grape T 5.8 PG13 ✓ 4

★★★★ Peppys Crack T 5.8 ✓ 2

★ Psyche Dike Bradley Leblanc's variation T 5.8+ R

★★ Tip Trip (formerly 11a) T 5.8+

★★★★ Union Jack T 5.9 ✓ 1

★★★★ Manhdral T 5.12a/b

★★★★ Vertigo T 5.9 A0 R ✓ 2

★★★★ White Iceberg, The T 5.12

★ Dark Hallow T 5.5 A4+ R

★★★★ Moonshadow T 5.9 ✓ 1

Order Wrong? Sort Routes

More About Moby Grape

Printer-Friendly

All Locations > New Hampshire > Cannon Cliff > 4. Moby Grape Area

**Moby Grape** 5.8 yds PG13 ★★★★★ Avg: 3.8 from 551 votes

Type: Trad, Alpine, 800 ft (242 m), 7 pitches, Grade III

FA: Joe Cote, Roger Martin, 1972

Page Views: 144,370 total - 667/month

Shared By: Andy Casler on Nov 8, 2006 - Updates

Admins: Jay Knowler, M Sprague, Jeffrey LeCours, Jonathan S, Robert Hall

Improve This Page Add To Page

Explore this route in 3D

**You & This Route** 551 Opinions

Your To-Do List: Add To-Do View List

Your Star Rating: ★★★★★ Awesome!

Your Difficulty Rating: -none- Change

Your Ticks: Add New Tick

- Oct 27, 2023 - W/ Keegan
- May 27, 2023 - 6 pitches, With Tommy, 4:30 hrs from the base to the top. Good stuff
- May 14, 2023 - With Daniel
- Jun 16, 2022 - 9 pitches, Lead

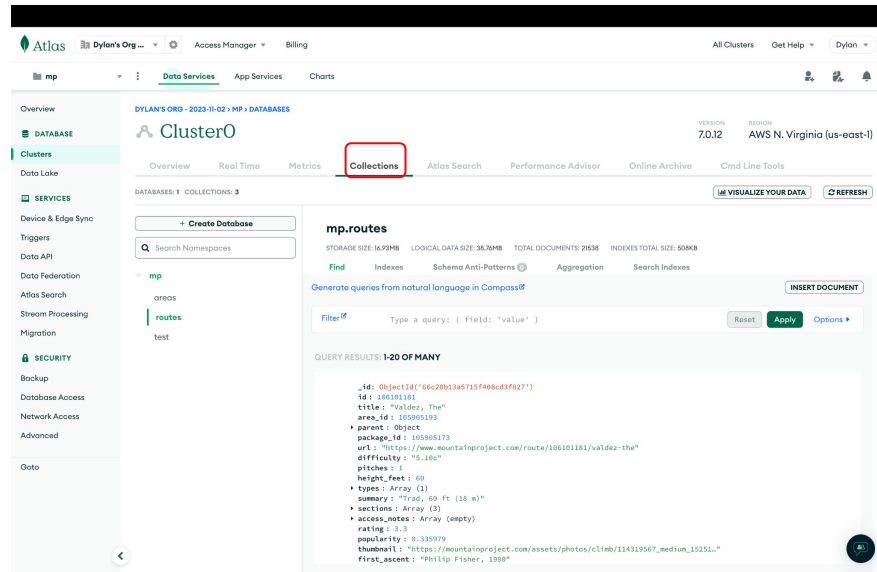
Is this a Classic? or No Opinion

What makes a classic? A classic should have excellent climbing, be exceptionally aesthetic, and have significant climbing history.

**Access Issue:** You may come across small, silver sensors that are part of a research project on weathering on Cannon. Please do not disturb them. Thanks! More details can be found at mountainproject.com/forum/t... Details

# Scraping

- > 21,000 climbing routes
- Used a MongoDB database



# Some background



# Bouldering

- Very short
- Physically very hard
- Pads for protection





# Lead Climbing

- Routes are normally > 50 ft
- Rope and other gear for protection





# Sport Climbing

- Clip bolts as you go up
- Relatively safe



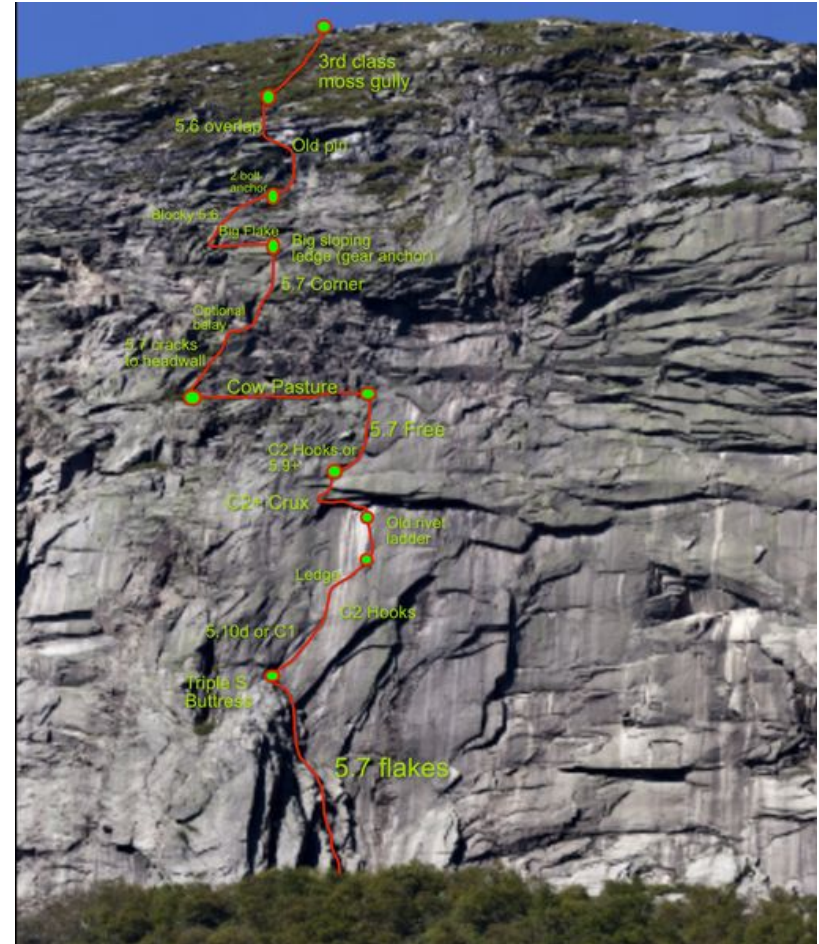
# Trad Climbing

- You place your own protection



# Pitches

- At most one rope-length

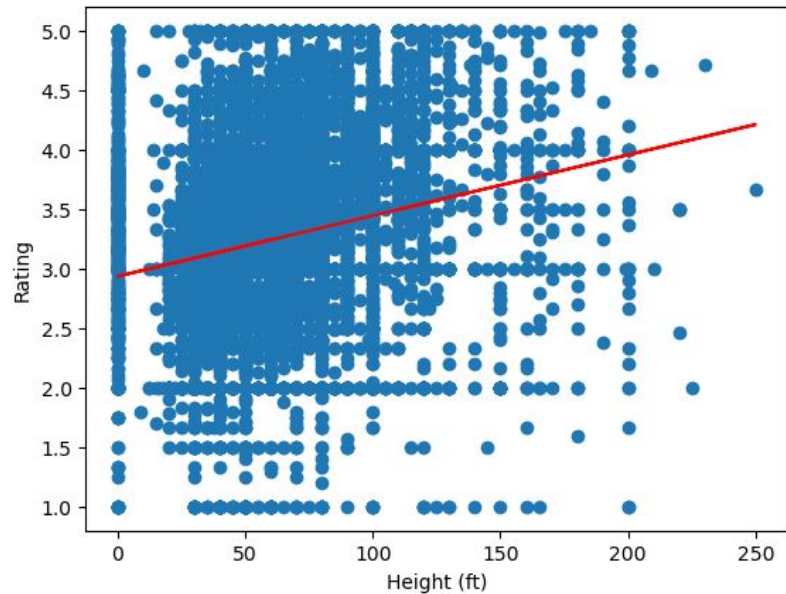


# Height of a climb and star rating



# On single-pitch climbs

- $N = 9602$
- $R^2 = 0.04$

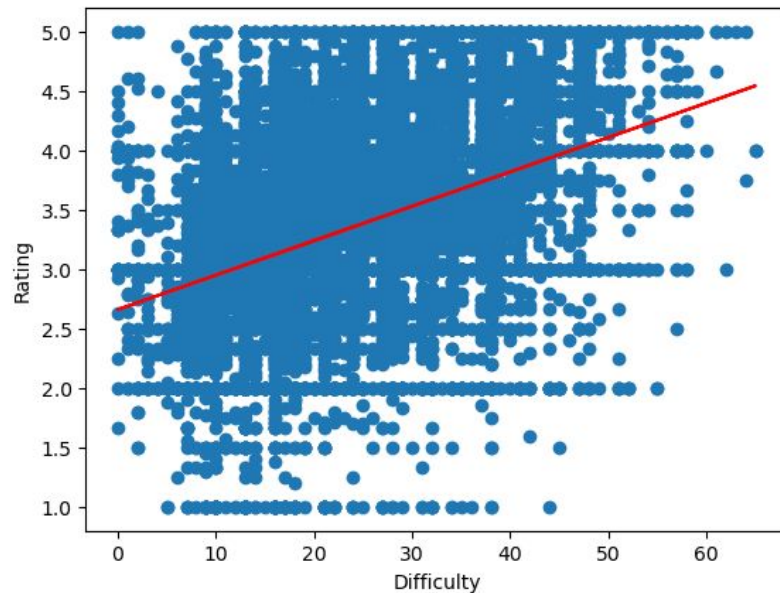


# Difficulty and star rating



# On lead climbs

- $N = 13842$
- $R^2 = 0.2$



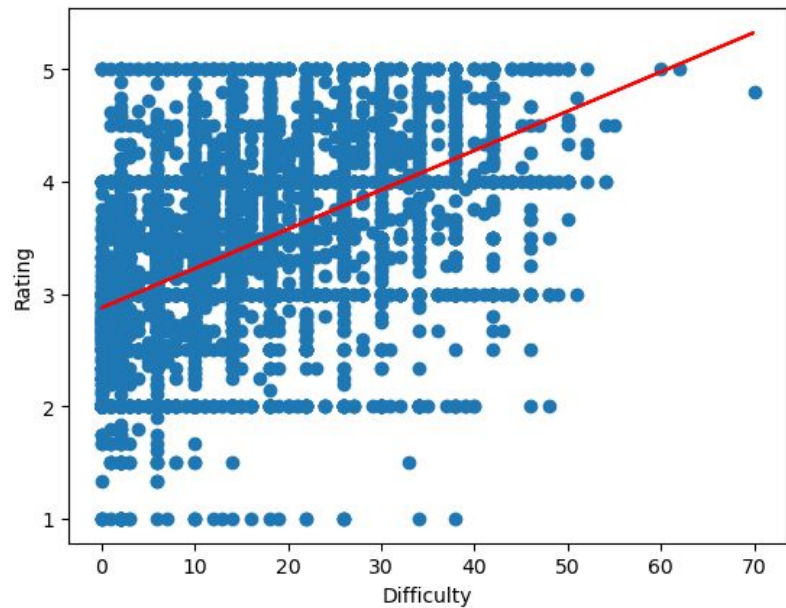
0  $\rightarrow$  3rd;    10  $\rightarrow$  5.7;    20  $\rightarrow$  5.10a/b;

30  $\rightarrow$  5.11a/b;    40  $\rightarrow$  5.12a/b;    50  $\rightarrow$  5.13a/b



# On boulders

- $N = 7219$
- $R^2 = 0.185$



$0 \rightarrow \text{V-easy}; \quad 10 \rightarrow \text{V2}; \quad 20 \rightarrow \text{V4-5};$

$30 \rightarrow \text{V7}; \quad 40 \rightarrow \text{V9-10}$

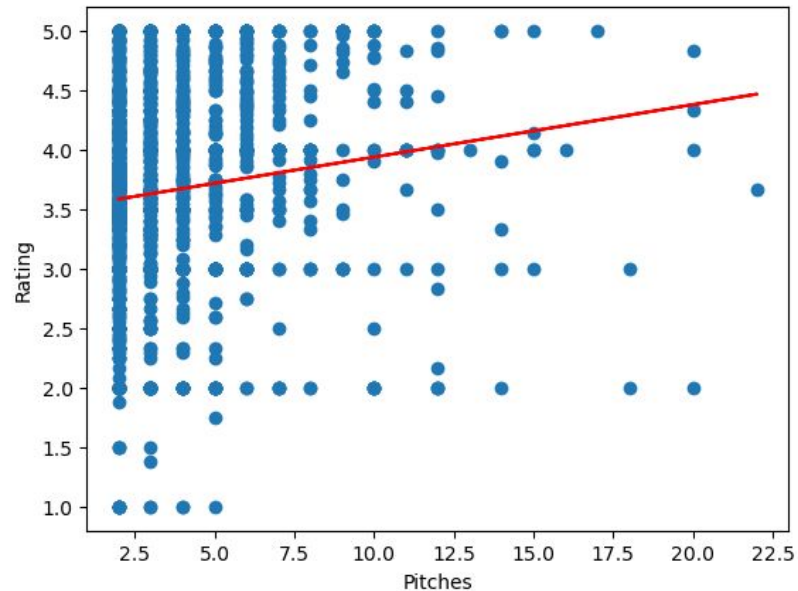
# Number of pitches and star rating



# On multi-pitch climbs

- $N = 1659$
- $R^2 = 0.017$

Negative result might be due to lack of data.

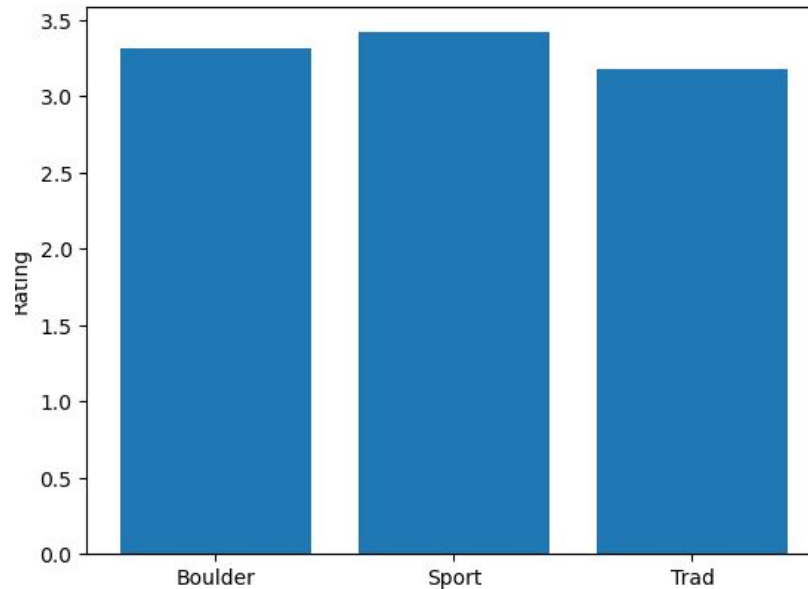


# Type of climbing and star rating

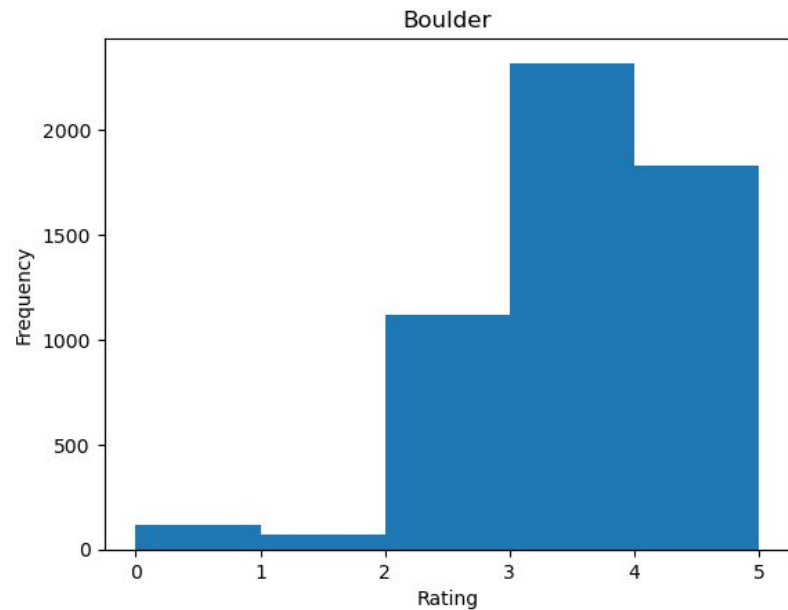


# Average rating

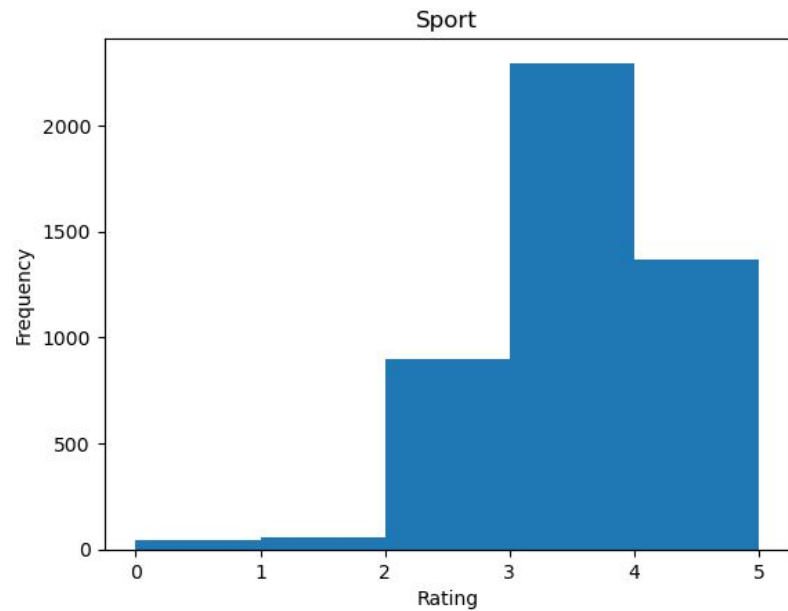
- Boulder → 3.38
- Sport → 3.45
- Trad → 3.24



# Boulder Distribution



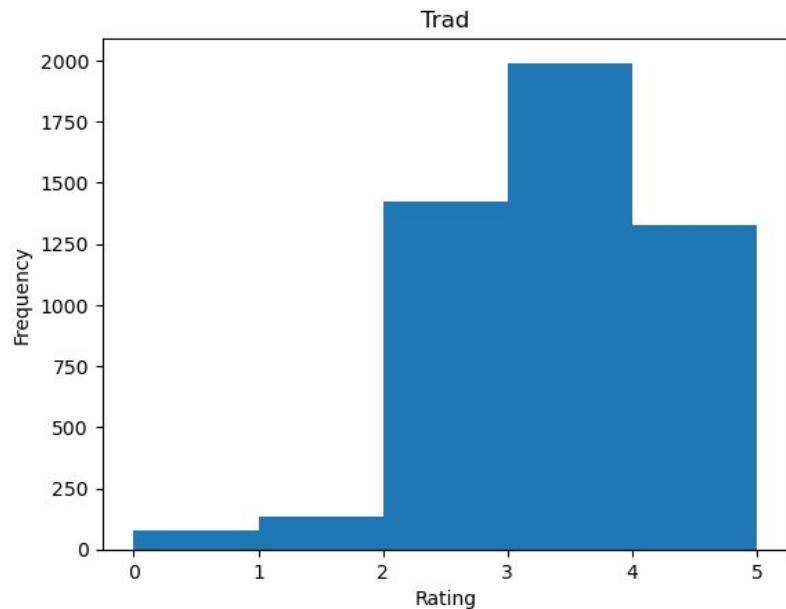
# Sport Distribution





# Trad Distribution


The distribution of stars for trad climbing is more spread, which makes intuitive sense



# Climbing style and star rating



# tf-idf

- Uses the description of the route
  - Using 5-fold cross validated linear model
  - Mean RMSE: 2.1094
- 

# Bag-of-words

## Top keywords

- kneebar → 0.56
- splitter → 0.54
- dynos → 0.48
- fingers → 0.44
- dyno → 0.42
- heel → 0.4
- mantels → 0.35
- toe → 0.34
- crimp → 0.31
- slopers → 0.31

```
styles = [  
    'crack',  
    'cracks',  
    'jam',  
    'jamming',  
    'layback',  
    'lieback',  
    'offwidth',  
    'overhang',  
    'overhung',  
    'roof',  
    'slab',  
    'slabby',  
    'steep',  
    'vertical',  
    'arete',  
    'aretes',  
    'corner',  
    'corners',  
    'diagonal',  
    'dihedral',  
    'face',  
    'hand',  
    'hands',  
    'fingers',  
    'fist',  
    'fists',  
    'off-width',  
    'kneebar',  
    'crimp',  
    'crimps',  
    'jug',  
    'jugs',  
    'pocket',  
    'pockets',  
    ...  
]
```

# Bag-of-words

## Worst keywords

- choss  $\rightarrow -0.14$
- chossy  $\rightarrow -0.22$

```
styles = [  
    'crack',  
    'cracks',  
    'jam',  
    'jamming',  
    'layback',  
    'lieback',  
    'offwidth',  
    'overhang',  
    'overhung',  
    'roof',  
    'slab',  
    'slabby',  
    'steep',  
    'vertical',  
    'arete',  
    'aretes',  
    'corner',  
    'corners',  
    'diagonal',  
    'dihedral',  
    'face',  
    'hand',  
    'hands',  
    'fingers',  
    'fist',  
    'fists',  
    'off-width',  
    'kneebar',  
    'crimp',  
    'crimps',  
    'jug',  
    'jugs',  
    'pocket',  
    'pockets',  
    ...  
]
```

Thanks!  
Questions?