

Major Miner – A Sound Labeling Game For Audio Researchers JavaScript, React.js and Firebase

Author: Xin Liu

Mentor: Professor Michael Mandel Affiliation: Brooklyn College CIS

ABSTRACT

Major Miner is a sound labeling game that aims to train the computer to recognize and identify environmental sounds even with the existence of noise. This game was initially built in 2008 in Ruby on Rails 2.0, which is an outdated version and has certain vulnerabilities. Our goal is to re-implement this project using a modern JavaScript framework React.js and one of the most popular NoSQL database – Firebase.

ABOUT

In northwestern Alaska, residents have realized the size of caribou herds are decreasing every year. According to the Associated Press, "The size of a large Alaska caribou herd has dropped by more than 50 percent over the last three years and government researchers are trying to understand why." (*Central Arctic caribou herd down 50 percent in three years*, 2016) While concerns have been voiced by local hunters about the influence of aircraft and non-local hunters, there are very few studies to analyze how much human activities are affecting those animals.

One of the best ways to study these animals' migrations is to study acoustic recordings from the natural environment. We want to build a machine that can recognize those different sounds.

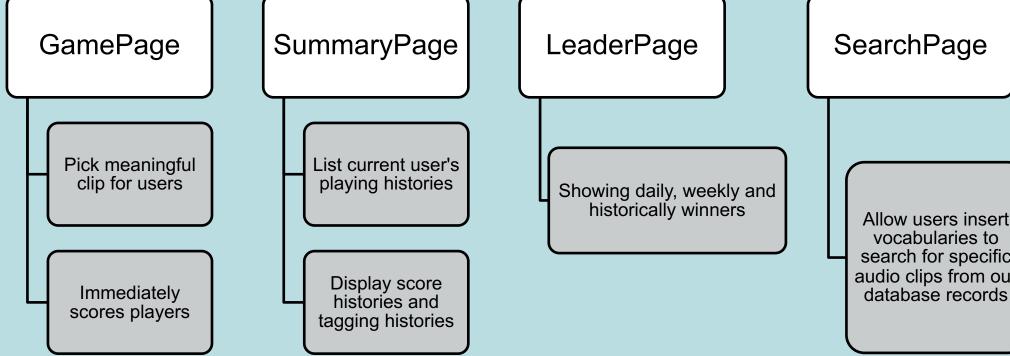


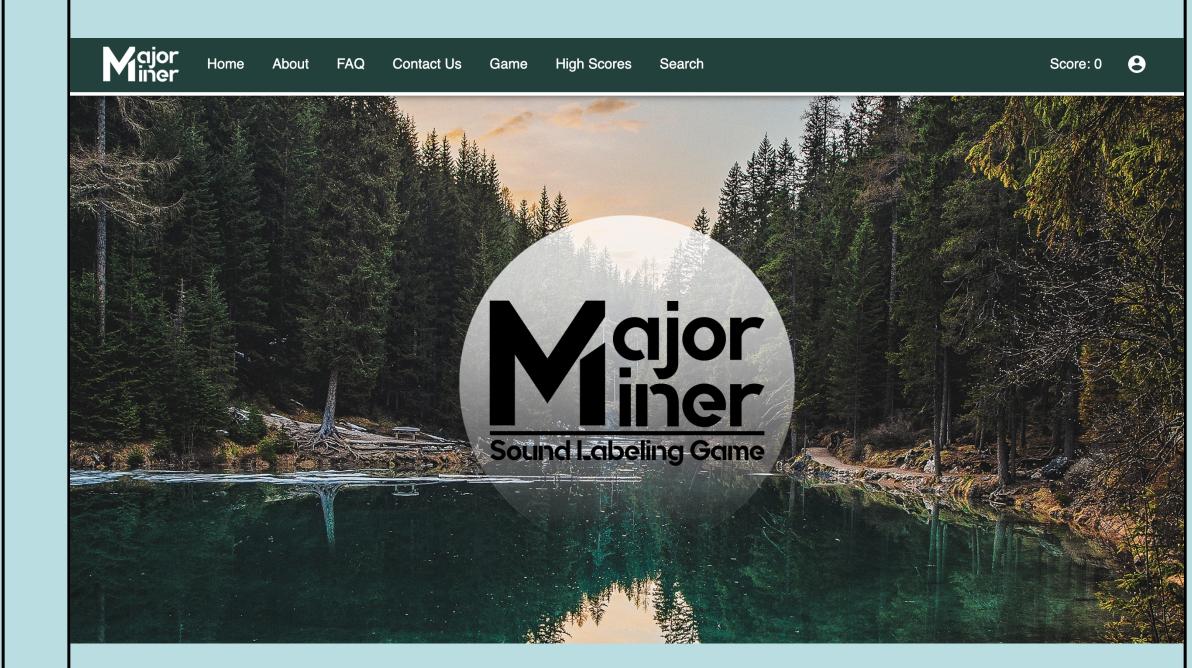
• WHY THIS GAME MATTERS?

Building a such machine which emulates humans' ability to identify sounds (clips) requires training data in the form of human descriptions (tags) of sounds. Major Miner can tremendously help researchers gather valuable data in a fun and easy way.

DESIGN

This section contains the major pieces and functionalities of Major Miner and database design added in this project.

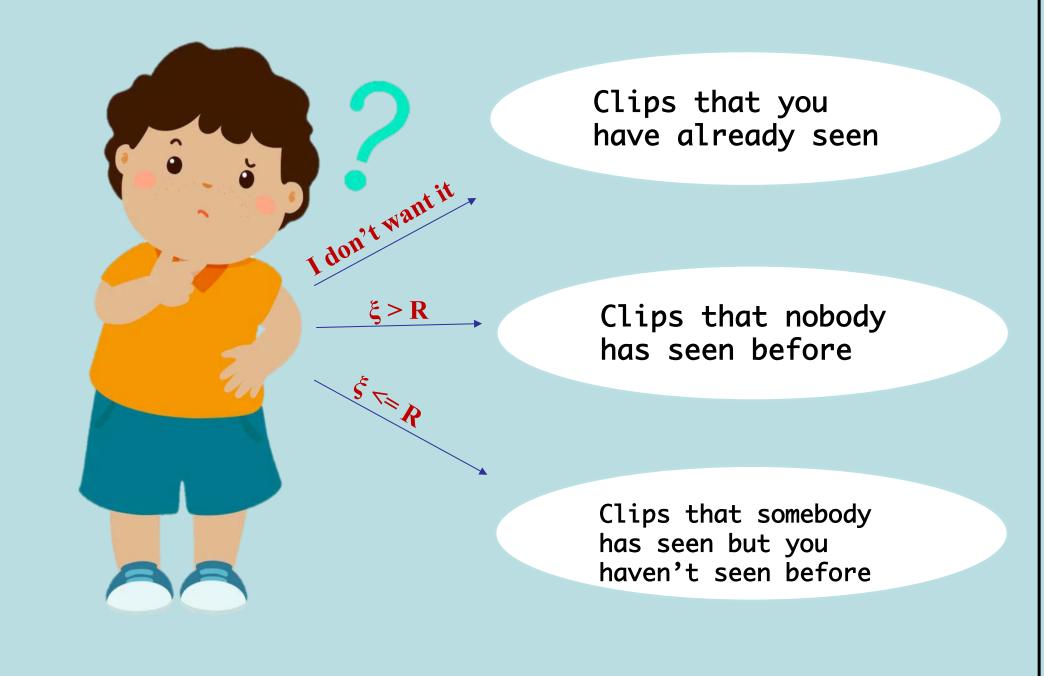


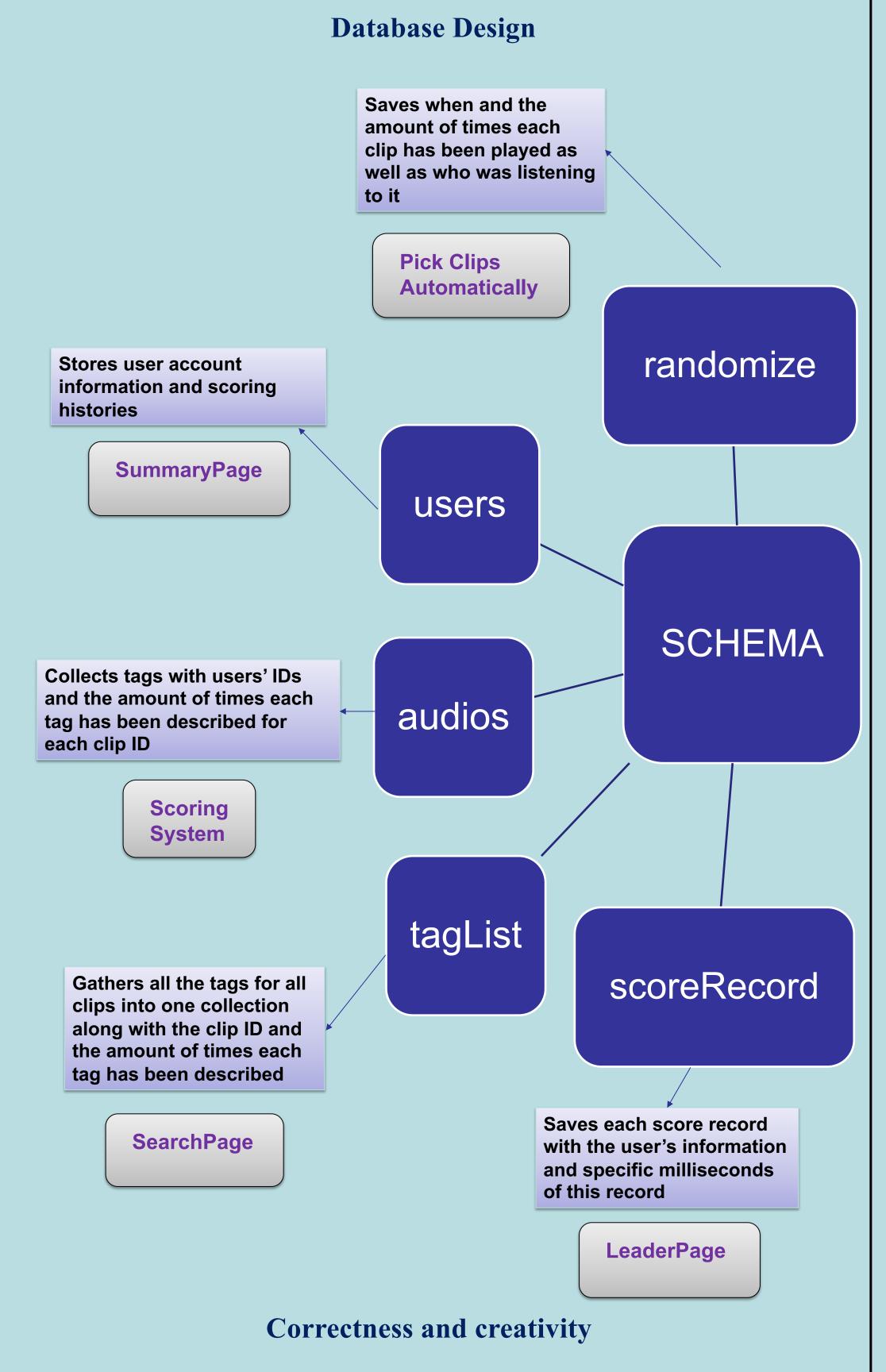


How to Pick Next Clip?

For players to immediately score, our algorithms pick the clips that have been played by other users. In order to help experienced players have the chance to be the first player to tag a clip, we pick the clips that are not seen before. We define a float point ξ which grows as the current player's clip pool grows $(0\sim0.33)$ and a random number \mathbf{R} $(0\sim1.00)$ every time when play requests a new clip to help us randomly choose a clip.

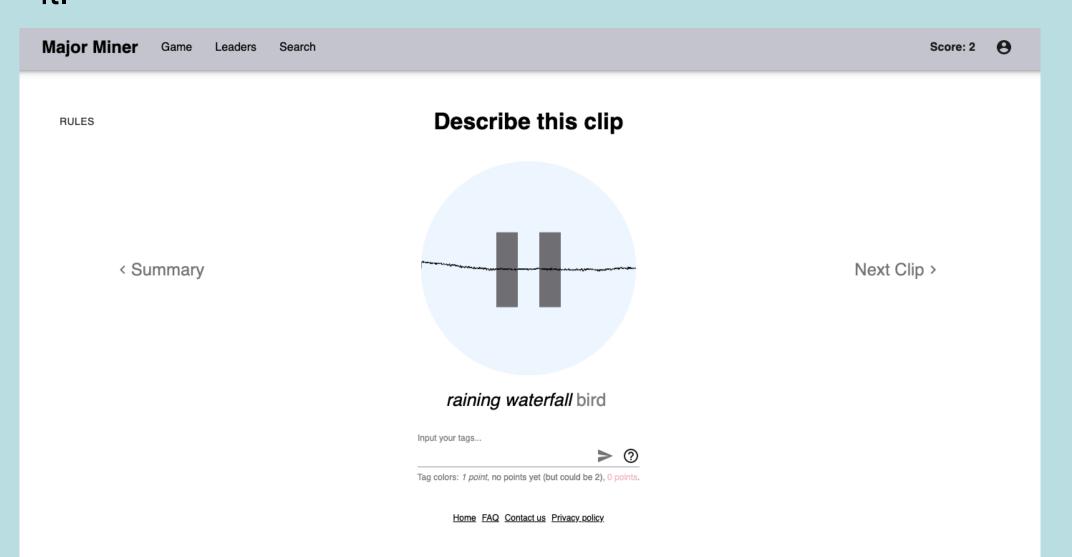
Which clip do I pick





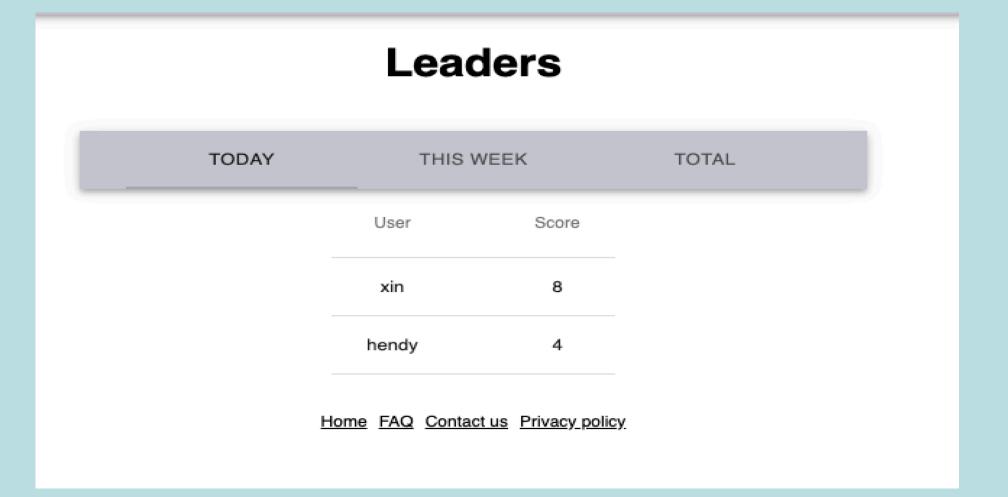
Players need to contribute meaningful and creative tags in order to score. They get scores by having others agree with them.

The picture below shows the player gains two points immediately when he was the second person to contribute *raining waterfall* and has the potential to score two more points for *bird* on this clip when the next player agrees with it.



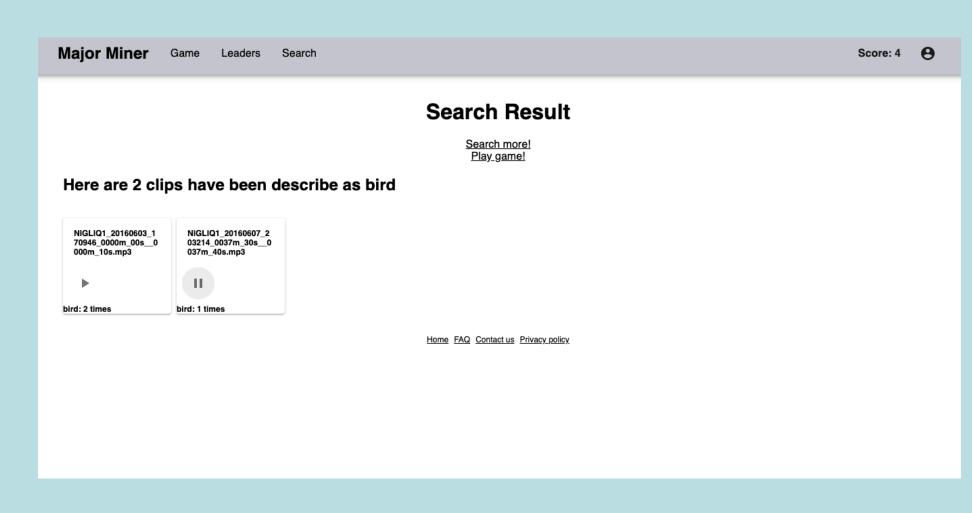
Competition

Check out who is the winner for today!



Other features

You can also search for any specific tags from our database.



Sources

- Explore our current deployed version!
 https://majorminergame.github.io/
- Checkout the repository!
 https://github.com/xinliu50/Major--Miner

REFERENCES

- Mandel, M, I., & Ellis, D, P. (2008). *A Web-Based Game for Collecting Music Metadata*
- Admin Earth.com staff writer. (2016). *Alaska has a new mystery that has some scientists stumped: disappearing caribou*https://www.earth.com/news/alaska-biologists-investigate-mystery-disappearing-caribou/
- Associated Press. (2016). Central Arctic caribou herd down 50
 percent in three years
 https://www.ktuu.com/content/news/Central-Arctic-caribou-herd-down-50-percent-in-three-years-403718716.html
- Fullman, TJ., & Joly, K., & Ackerman, A. (2017). Effects of environmental features and sport hunting on caribou migration in northwestern Alaska