

Role of Audio Feature Metadata in Predicting Song Popularity

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Introduction

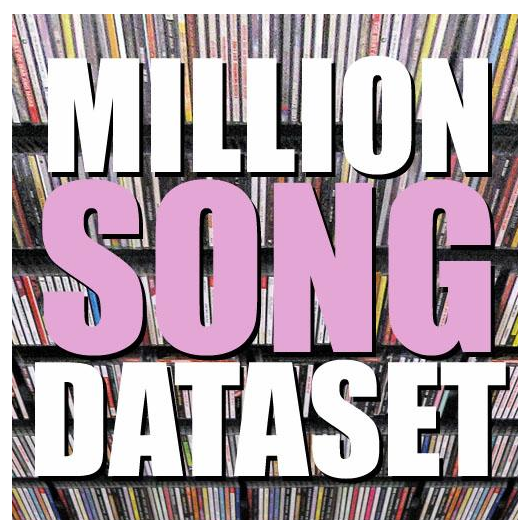
Problem: Determine what factors make songs popular.

Hypothesis: Song popularity is not a chance occurrence, but is some function of the audio features of the song.

Dataset

35000 songs from the Million Song Dataset, containing information about audio features.

The feature song_hotness was used to determine song popularity.



Methodologies

Dataset song files were converted from hdf5 format to csv before loading in sqlite database.

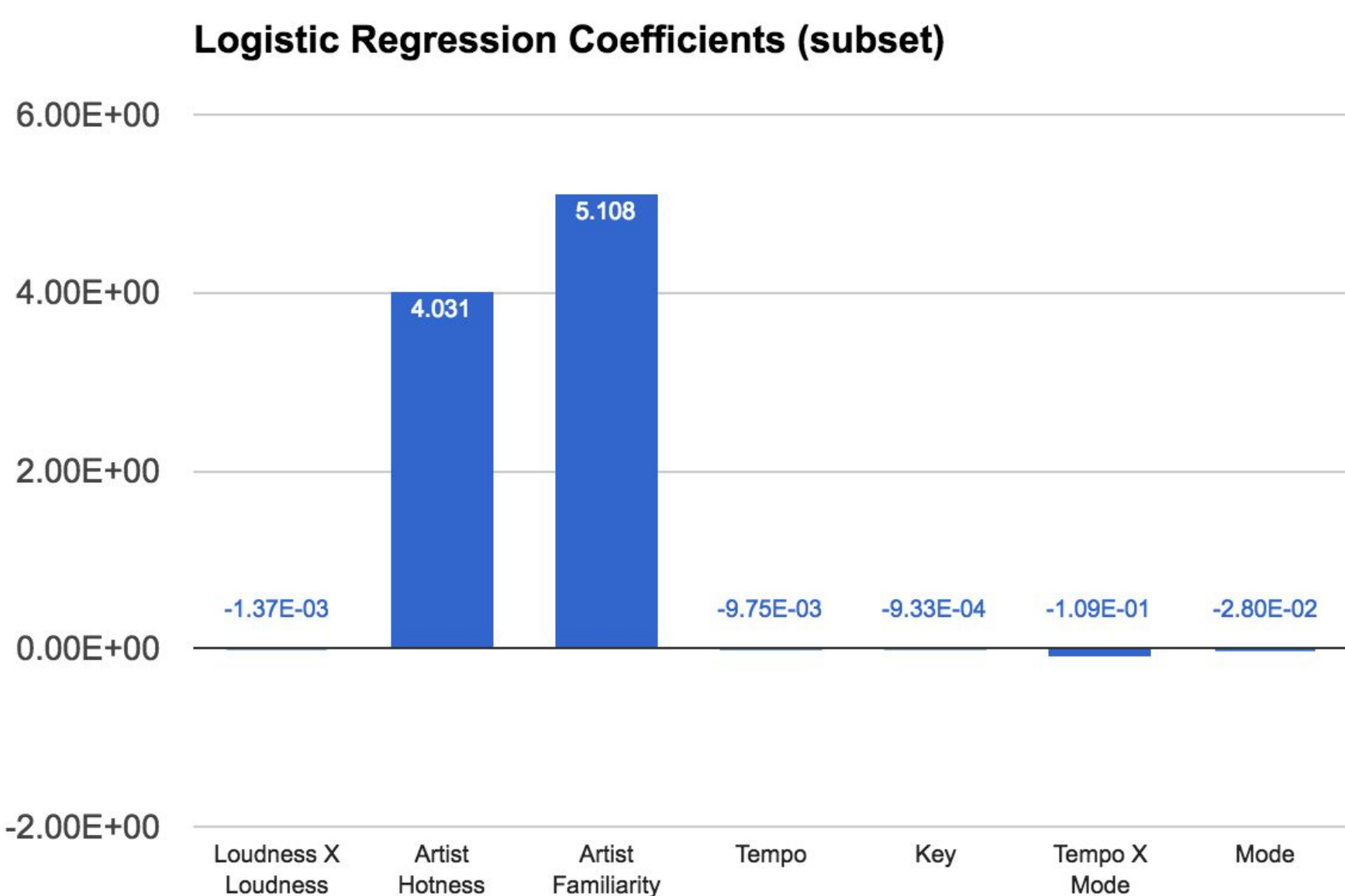
Isolate popular songs from set. A song is labeled popular if its hotness is > 60.

Label: song popularity. **Features:** energy, loudness, tempo, etc. **Classifiers:** Linear SVM, Gaussian SVM, Logistic Regression, Naive Bayes.

Baseline features were squared as well as multiplied to better establish a linear relationship with song hotness.

Genre tags were factored in using a bag-of-words model.

Results and Visualizations



| Model | Precision | Recall | Traiding Accuracy | Cross Validation | Test Data |
|---------------------|-----------|--------|-------------------|------------------|-----------|
| SVM (Linear) | 0.361 | 0.647 | 0.758 | 0.755 | 0.796 |
| SVM (Gaussian) | 0.041 | 0.417 | 0.952 | 0.709 | 0.752 |
| Logistic Reg | 0.352 | 0.606 | 0.754 | 0.753 | 0.786 |
| Baseline Percentage | 28.60% | | | | |

Model Accuracy Results

The results were given based on having a baseline of 28.6% of the songs being classified as popular



Popular Genres in the70s vs 90s

Conclusion

Ultimately, the classifiers failed to make significant gains in classifying songs as popular

One main reason for this is that the sample of popular songs was much lower than unpopular songs.

Additionally, features did not carry linear relationships with the popularity of a song and thus affected the classifiers

Challenges

The initial ‘This Is My Jam’ dataset had sparse data. Further, there was difficulty grabbing related song information from Spotify’s API.

Many Spotify songs do not have genre tags.

Difficulty settling on an appropriately-sized dataset. 10000 → 35000 (happy medium).

Certain features (e.g. pitch, timbre) were given for different segments of the songs. For ease of classification these values were averaged but information was lost.

Certain features had different scales. For example, loudness is logarithmic whereas energy is linear.