

A current UIUC undergraduate student studying Computer Engineering with concentration on Software Developing, Machine Learning and Computer Vision

# Portfolio

## Zixu Zhao



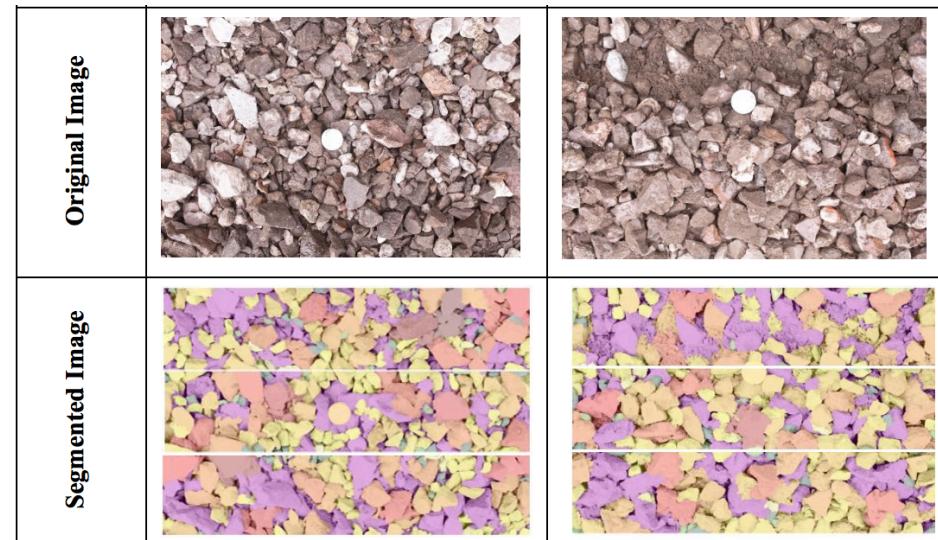
(a) original frames



(b) reconstructed frames

Table 1. Classifier's accuracy comparisons of the manifold dimensions

Dimension	Average	Worst Case	Dimension	Average	Worst Case
1	0.965	0.8	10	0.995	0.95
2	0.94	0.8	20	0.99	0.95
3	0.97	0.85	30	0.975	0.9
4	0.995	0.95	40	0.99	0.95
5	0.99	0.95	50	0.985	0.95
6	0.98	0.9	60	0.995	0.95
7	0.98	0.9	70	0.995	0.95
8	0.98	0.9	80	0.985	0.9
9	0.975	0.95	90	0.995	0.95
10	0.995	0.95	100	1.0	1.0

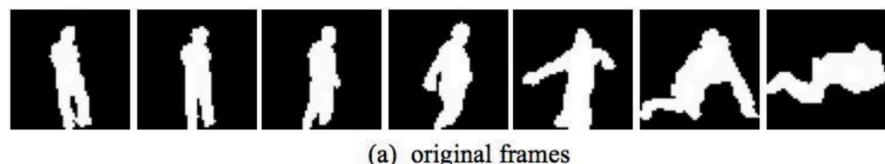
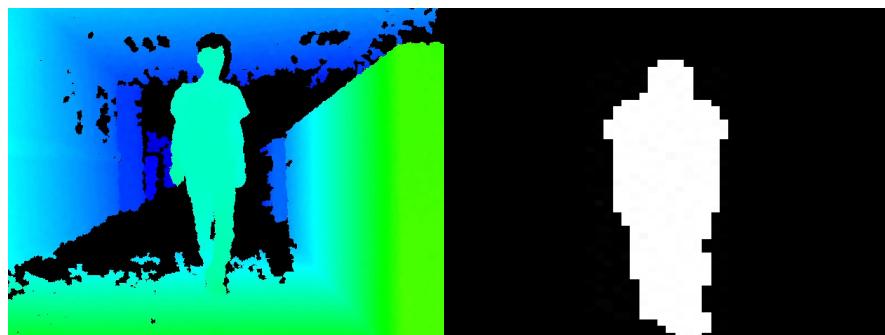


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# Learning-based Human Fall Detection – Internship Project on Machine Learning

## Objective

Design a learning-based system that can automatically detect human fall events for old people



1. Human Silhouette Detection using RGBD camera
2. Data normalization followed by PCA for dimensionality reduction
3. Training SVM Classifier
4. K-fold Cross-Validation
5. System evaluation on the testing sets

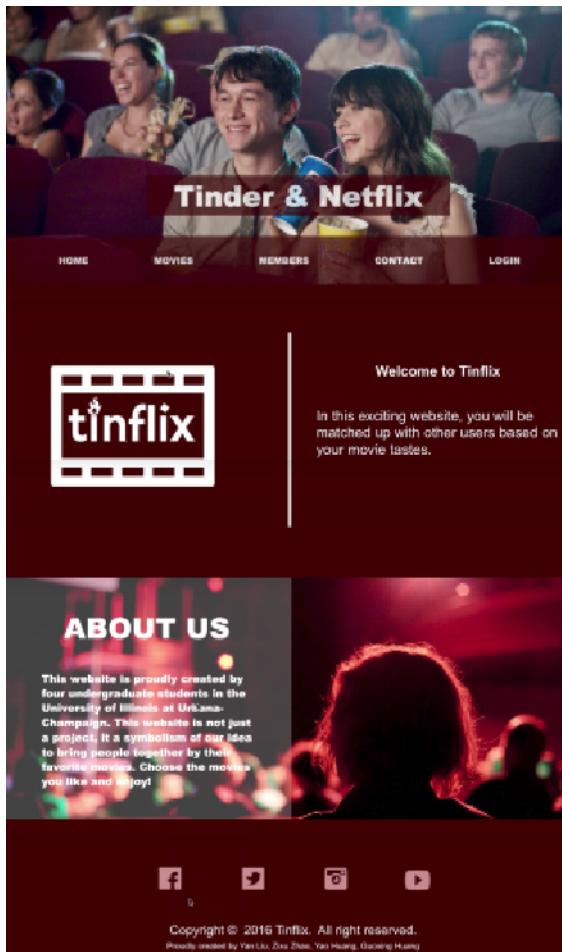
Skills used:  
Python; scikit-learn; OpenCV



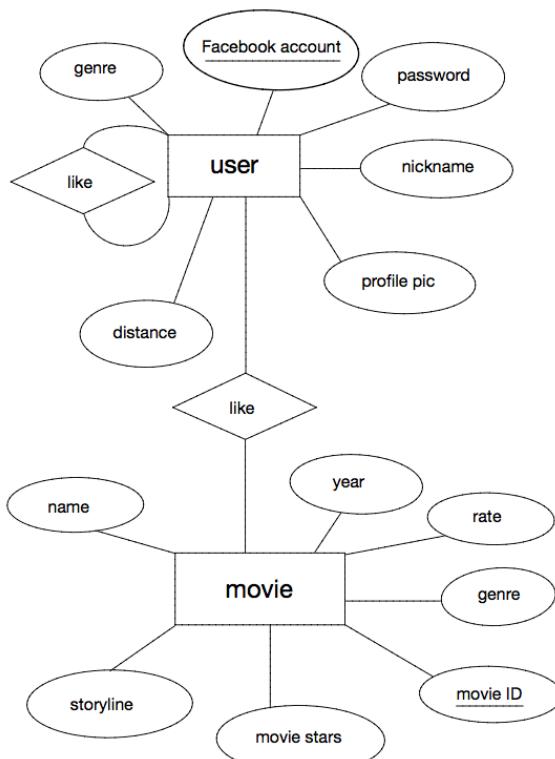
# Matchmaking Website – Database Driven Web Application Project

## Objective

Developed a web-based matchmaking web application that connects users with similar movie tastes



ER Model for Tinflix



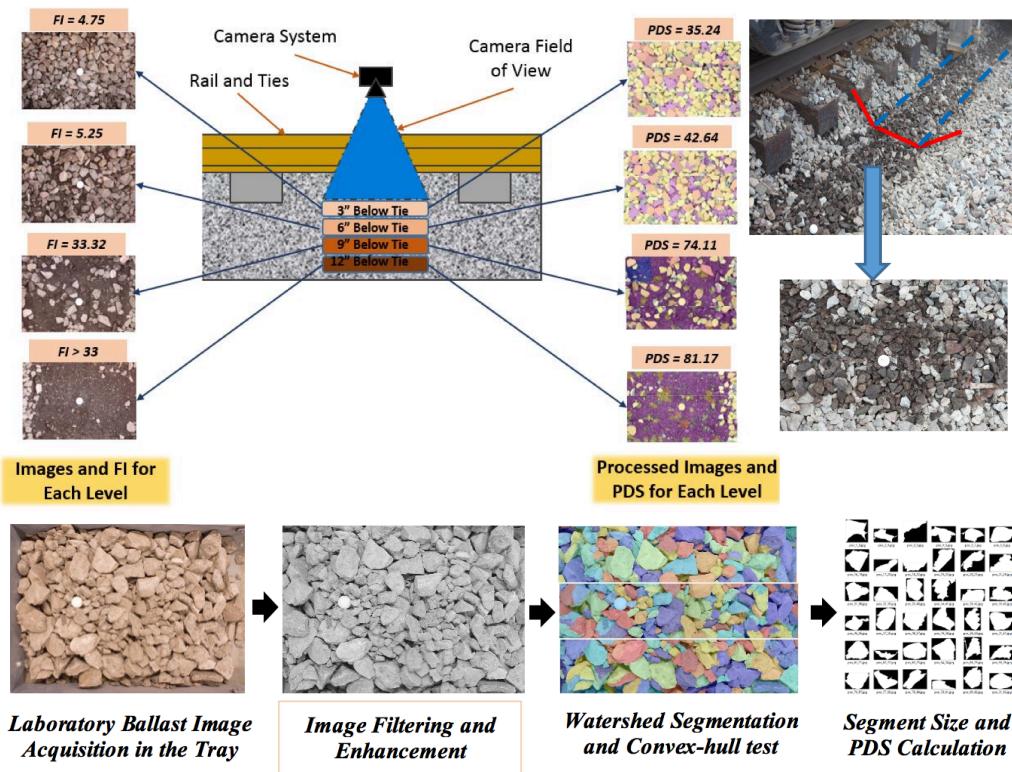
1. UI design and frontend with HTML/CSS
2. UI design for main page, user profile page and movie search page
3. Data base design with ER Model and MySQL

Skills:  
Java; HTML5; CSS

# Vision-based Track Ballast Evaluation – On Campus Research Project

## Objective

Design a cost-effective software program that quantifies the level of track ballast degradation, and makes railroad maintenance in America much more efficient.



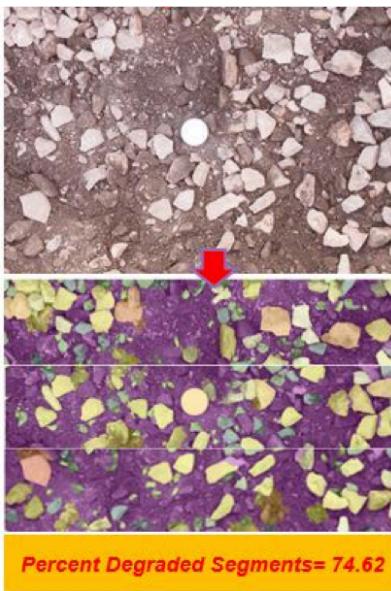
1. Image data collection
2. Image enhancement and filtering
3. Watershed Segmentation
4. Machine Learning algorithm for selecting rock segments
5. Degradation level calculation

Skills used:  
Matlab; C++; OpenCV; Machine Learning; Research Skills & Project Management



## Vision-based Track Ballast Evaluation – On Campus Research Project

- Improves more than 60% working efficiency in railway maintenance and saves countless operational costs and labors.
- Research paper confirmed for publication under IDEA Program, the National Academy of Sciences in late 2017.



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