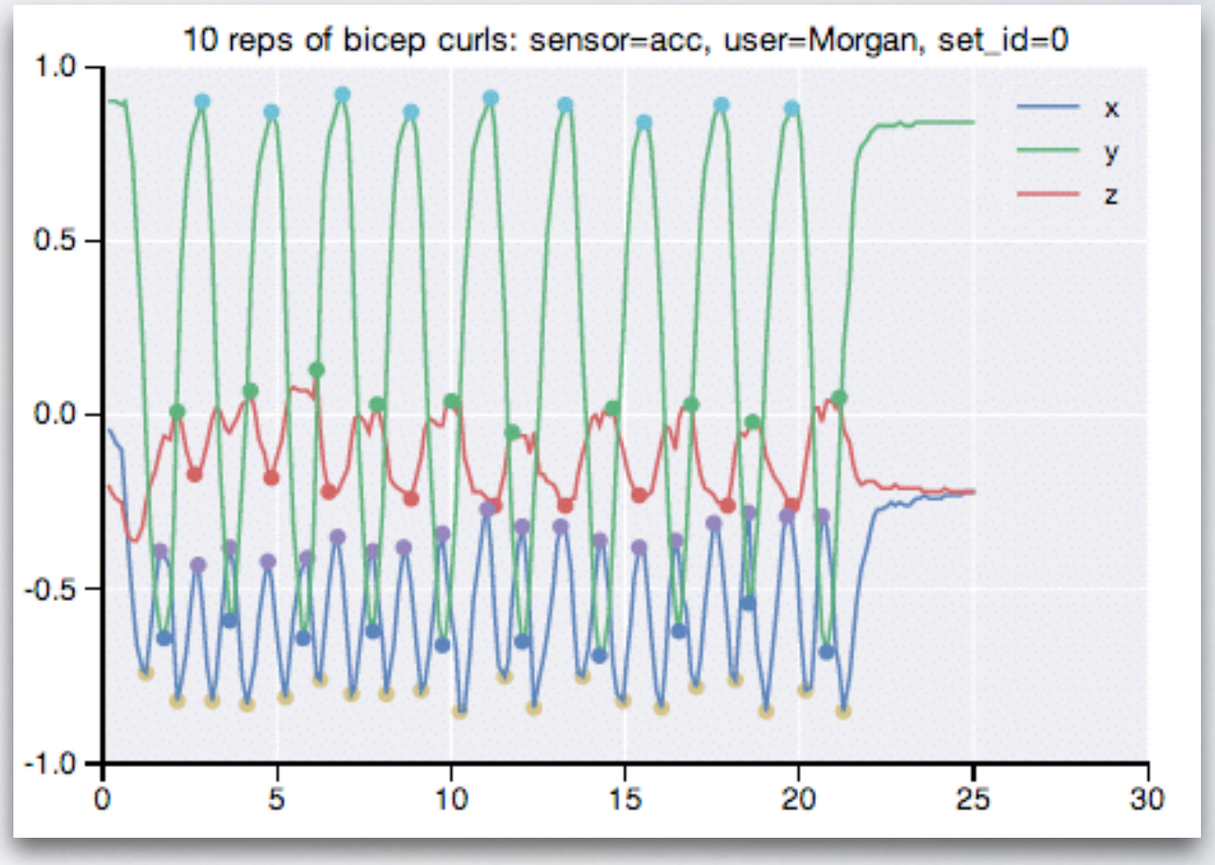
Hercubit

Classifying Exercises in Real-Time

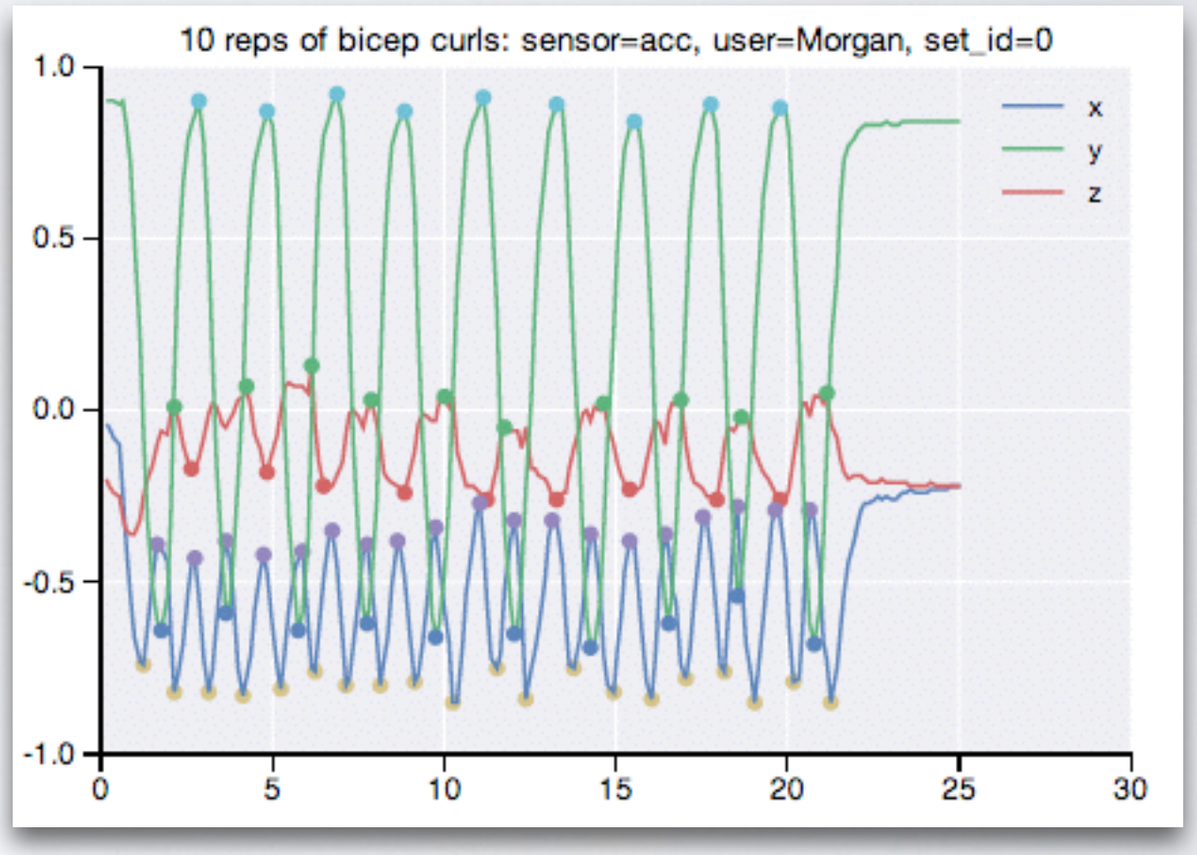
By Morgan Wallace

DATA

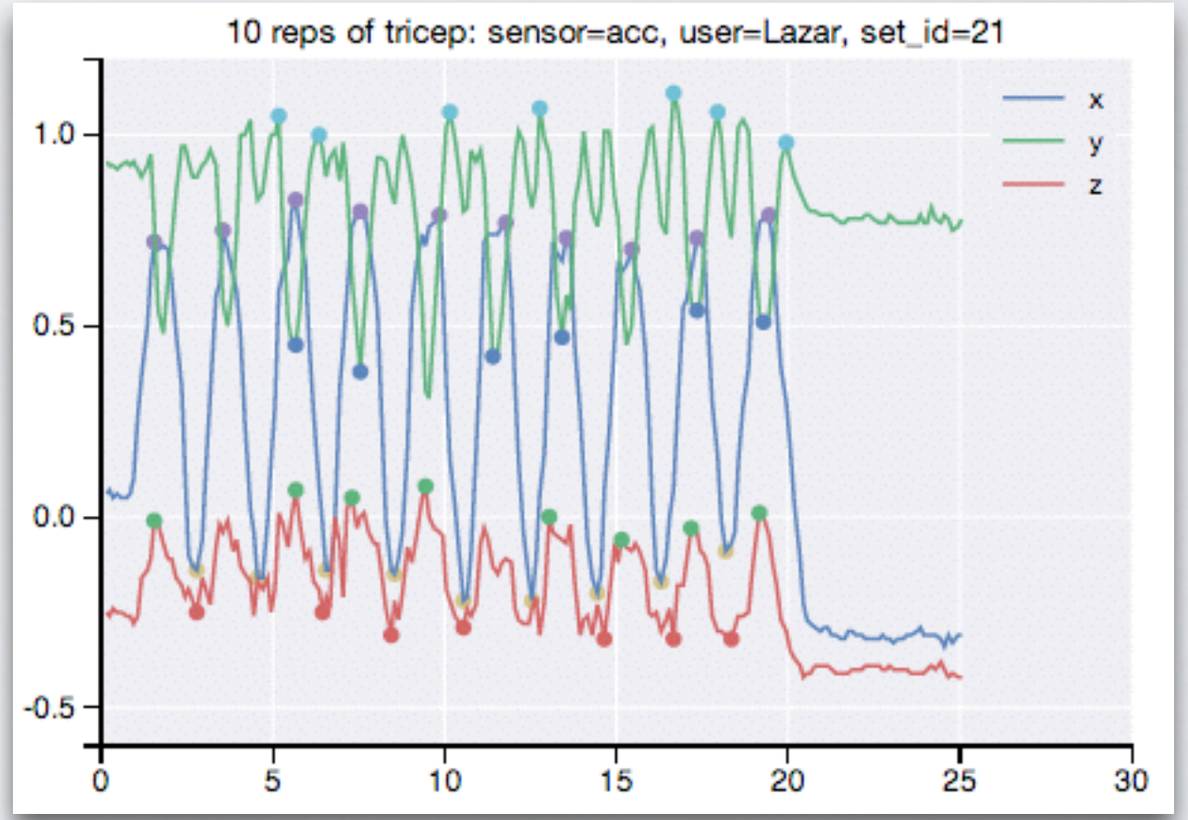
- What does a bicep curl look like to a computer?



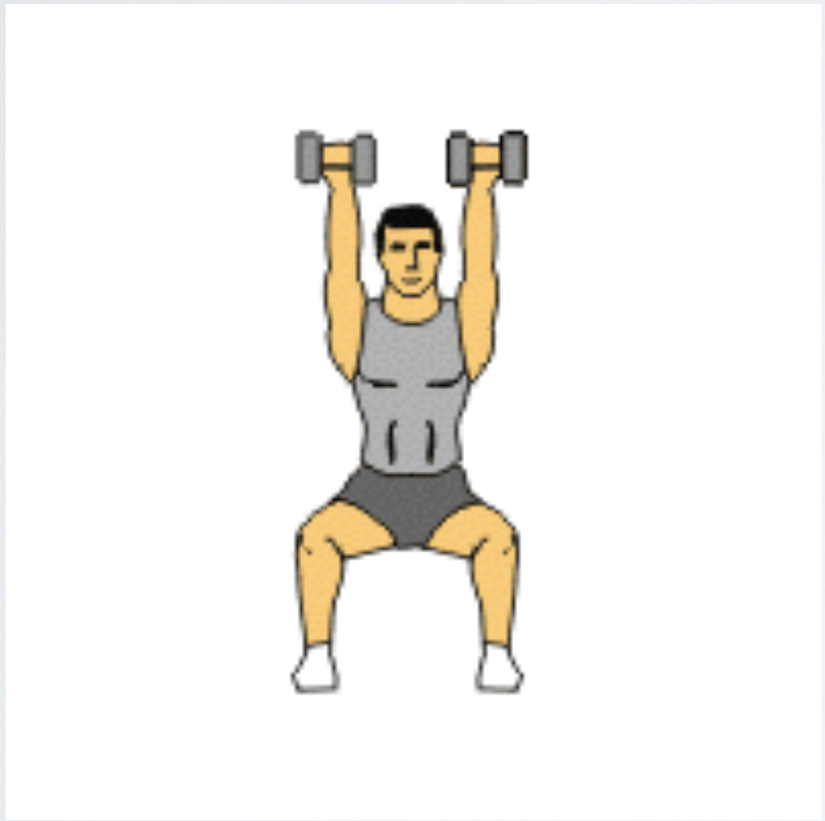
BICEP CURLS

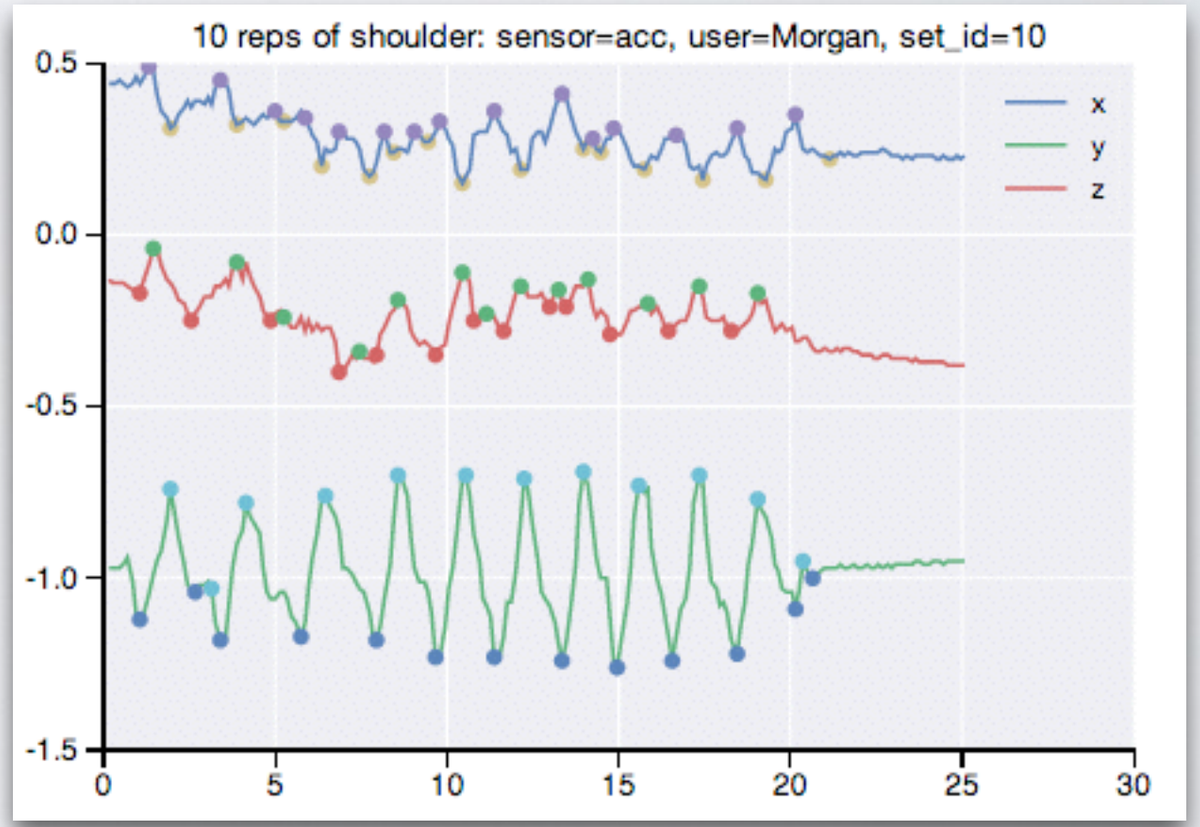

10 reps of bicep curls: sensor=acc, user=Morgan, set_id=0
1.0
0.5
0.0
-0.5
-1.0
0
5
10
15
20
25
30
x
y
z

TRICEP KICKBACKS



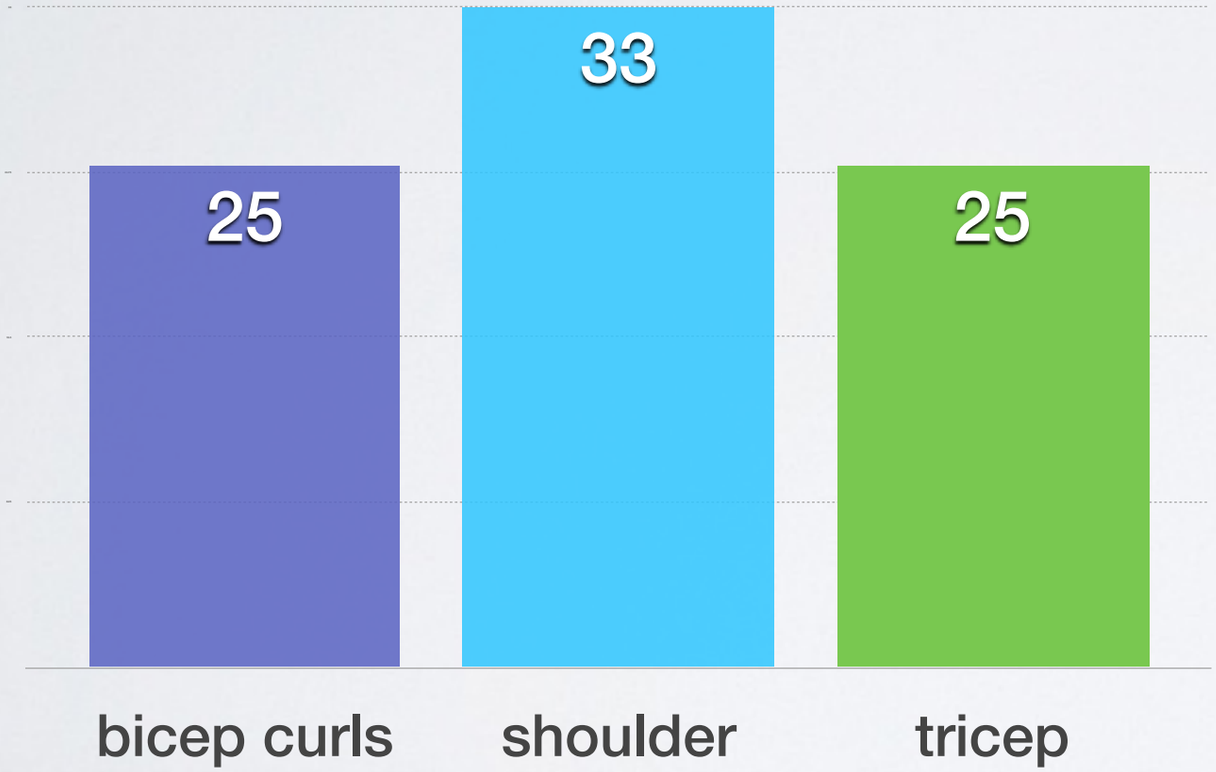
SHOULDER PRESS





DATA DESCRIPTION

83 Total Sets of Repetitions



9.5 average repetitions per set;

15 different people;
Overall- 16733 samples of raw sensor data

{'magnet': (127.88, 559.36, -168.36), 'gyro': (2011, 2612, 1406), 'accel': (-0.19, -0.84, -0.27), 'time': 1399510477.63}

PROCESS

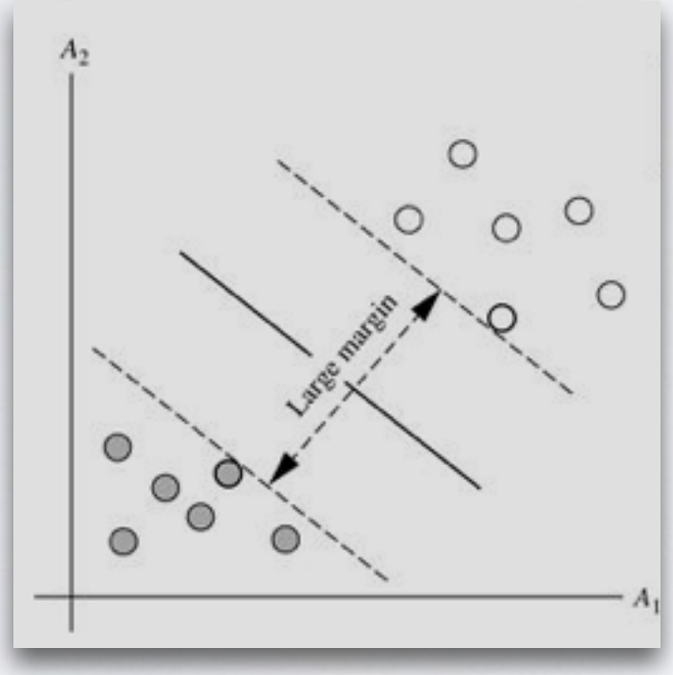
One-step Build

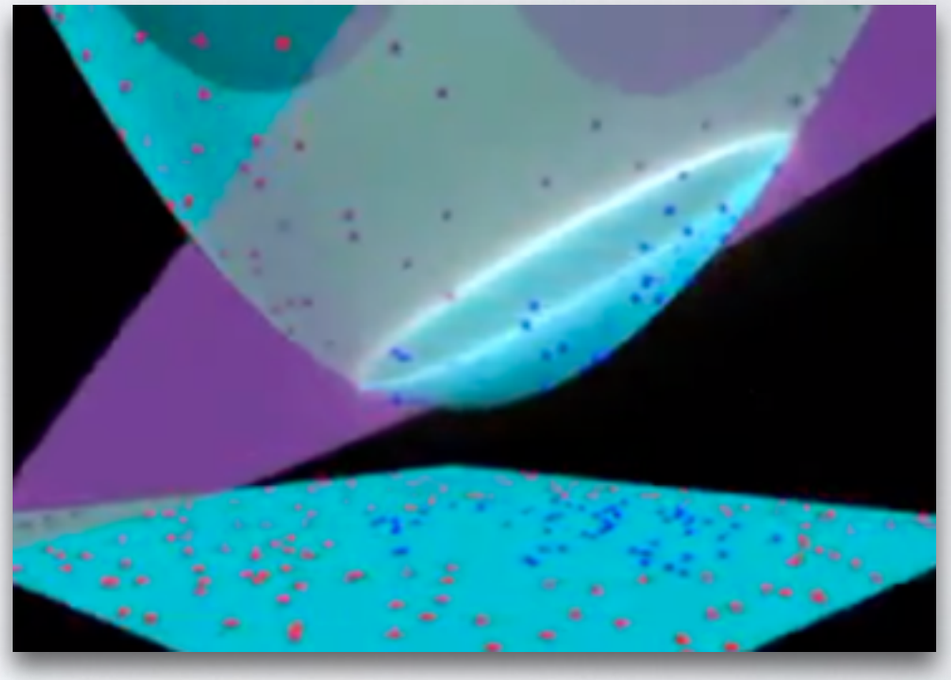
1. Import data
2. Clean data
3. Label it
4. Train classifier
5. Test classifier
6. Save for Hercubit

MY CLASSIFIER

SVM with linear & polynomial kernels

27 features and growing…





RESULTS

Linear Kernel

	precision	recall	f-1	support
Bicep	1.00	0.97	0.99	38
Shoulder	1.00	0.97	0.98	63
Tricep	0.94	1.00	0.97	47
avg/total	0.98	0.98	0.98	148

VS holdout set

	precision	recall	f-1
avg	0.88	0.88	0.88

IMPLEMENTATION

In real-time, there are new challenges:

1. Unknown start and end of repetition
2. Noisy data

FUTURE WORK

1. Explore new features & optimize
2. Add more types of exercise
3. Integrate training with Hercubit front-end