wellfit

A Deep Learning Model for **Exercise Transcription**

THE **PROBLEM**

Many wearable devices contain micro-electromechanical **(MEM)** sensors, which can be used for activity recognition. Our model **recognizes** and **transcribes** weight-lifting exercises by reading MEM input **sequences** collected during a workout.

MEM Input Sequence → **Exercise** Transcription

OUR **DATASET**

Our **RepKit** data collection app

6 Lifters

Geoff Sabri Pierce
Rooz Claire Sophia

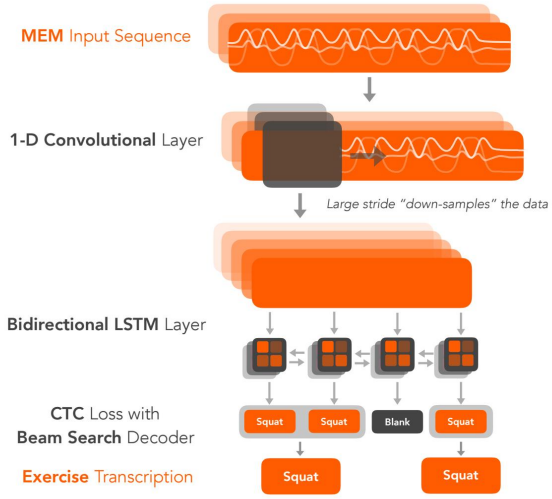
4 Exercises

Curl Squat
Bench Clean

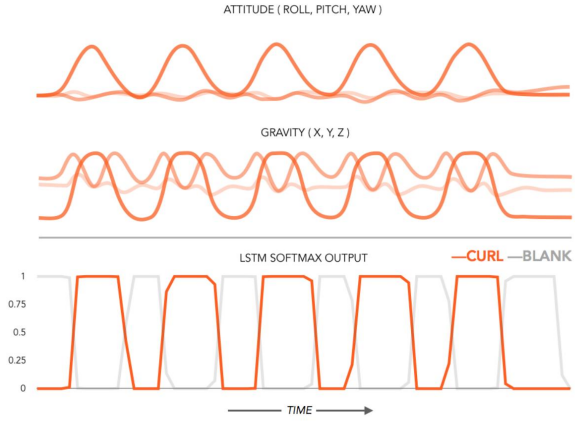
8,000 Reps

2,300 Sets

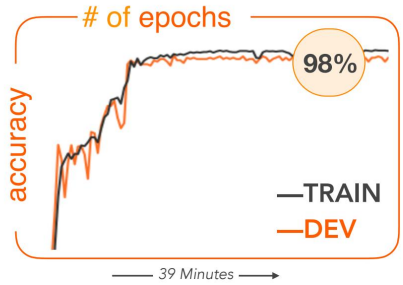
MODEL **ARCHITECTURE**



MODEL **VISUALIZATION**



MODEL **TRAINING**



THE **RESULTS**

Our TRAIN set came from 5 out of the 6 lifters
Our DEV and TEST sets came from the 1 unseen lifter

NOTEWORTHY MODELS	DEV SET **ACCURACY**
BLSTM-50	73.0%
BLSTM-50 (with Rerack*)	78.3%
BLSTM-150 (with Rerack*)	96.5%
CONV-64 **BLSTM**-128 (with Rerack*)	**97.6%**

BLSTM-*k*: Bidirectional LSTM with *k* hidden units.
CONV-*k*: 1-D Convolutional Layer with *k* filters.
Rerack: Added one rerack label to each exercise to detect the rerack

TEST ACCURACY

98% Set Transcription

100% Exercise Recognition

With our model, a smartwatch could **recognize**, **count** and **record** the exercises you perform during a workout, helping you stay on top of your fitness goals. With the appropriate data, our model could also be extended to assess lifting form or track physical therapy prescriptions.

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