



Identifying Hand Hygiene with Deep Learning

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Motivation

- ▶ Healthcare
- ▶ Deep Learning

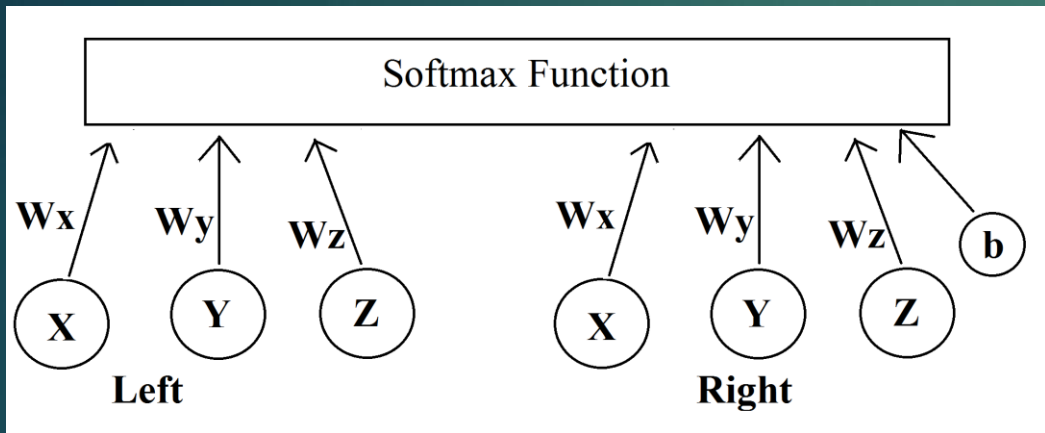
Data

- ▶ X,Y,Z accelerometer data
- ▶ 100 Hz
- ▶ Supersampled

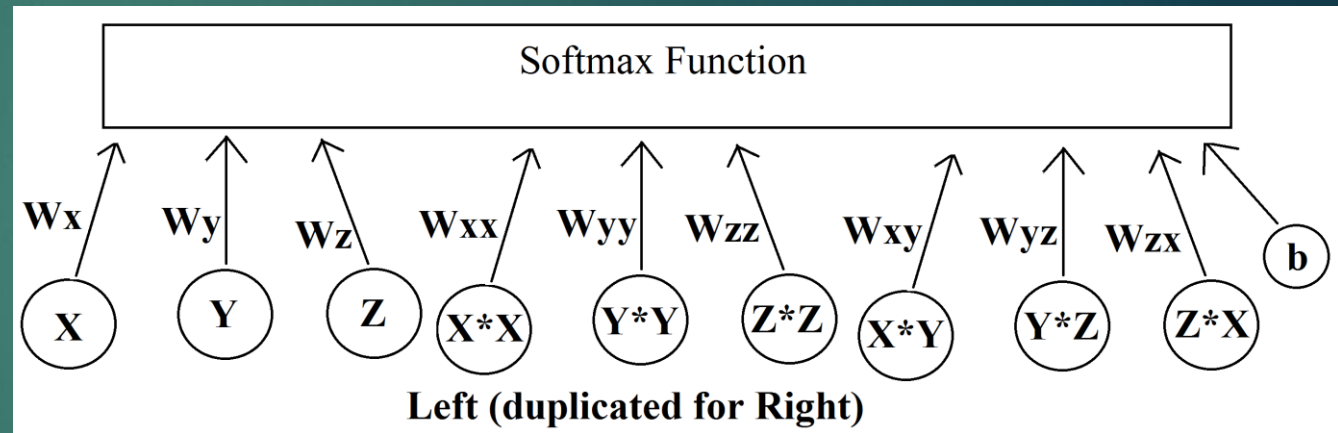
$$\begin{bmatrix} x_1 & x_2 & \dots & x_n \\ x_{n+1} & x_{n+2} & \dots & x_{2*n} \\ \vdots & & \ddots & \end{bmatrix}$$

Models

Original

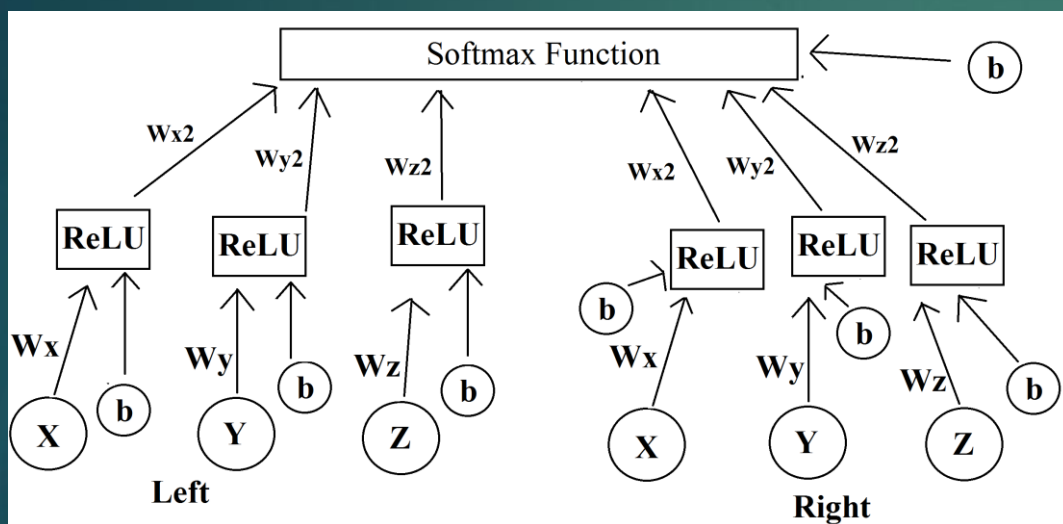


Complex

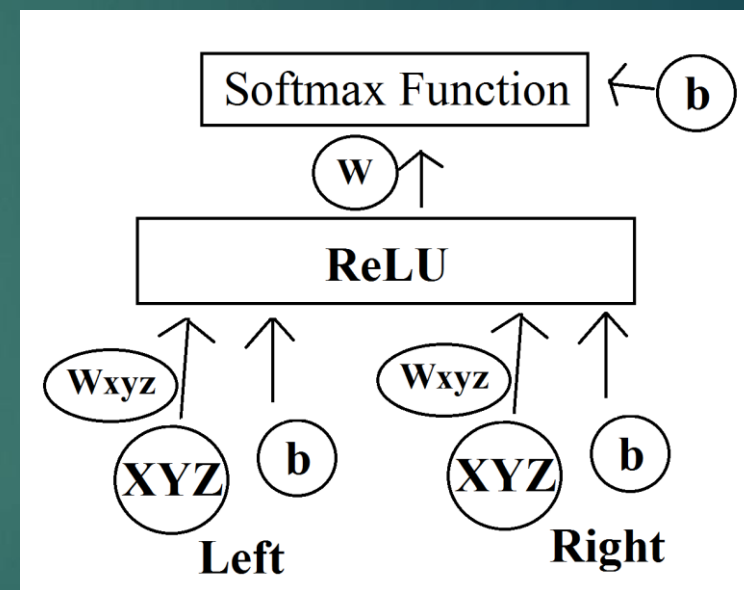


Models

Layered



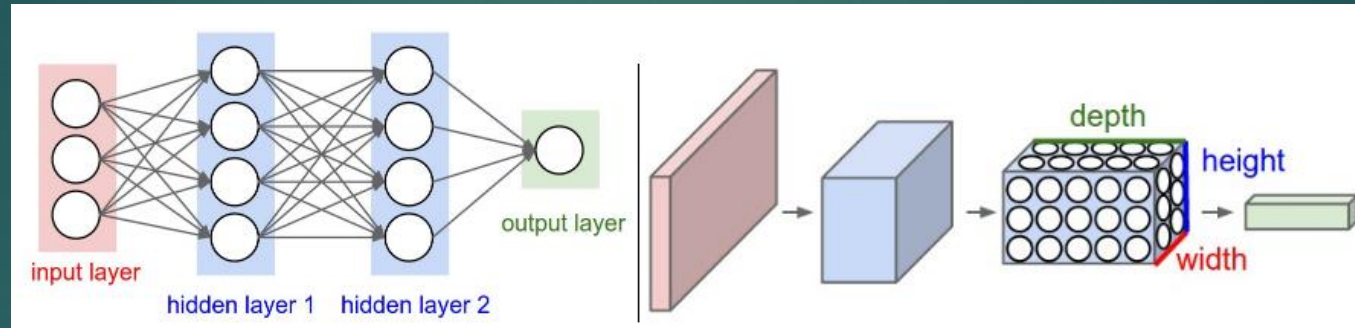
XYZ



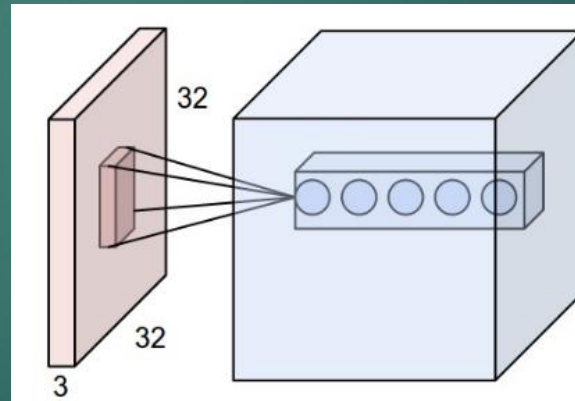
$$\begin{bmatrix} x_1 & y_1 & z_1 & x_2 & \dots & x_{n+1} & y_{n+1} & z_{n+1} & x_{n+2} & \dots & x_{2*n+1} & y_{2*n+1} & \dots & z_{3*n} \\ x_{n+1} & y_{n+1} & z_{n+1} & x_{n+2} & \dots & x_{2*n+1} & y_{2*n+1} & z_{2*n+1} & x_{2*n+2} & \dots & x_{3*n+1} & y_{3*n+1} & \dots & z_{4*n} \\ \vdots & & (previous) & & \vdots & & (now) & & & \vdots & & (next) & & \ddots \end{bmatrix}$$

Models

Deep

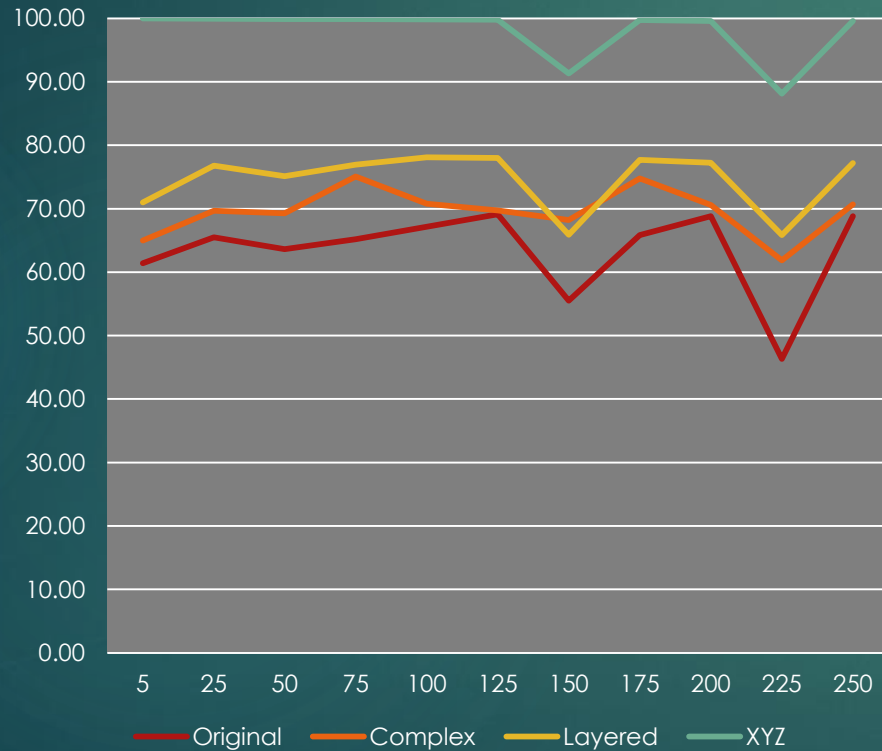


<http://cs231n.github.io/convolutional-networks/>

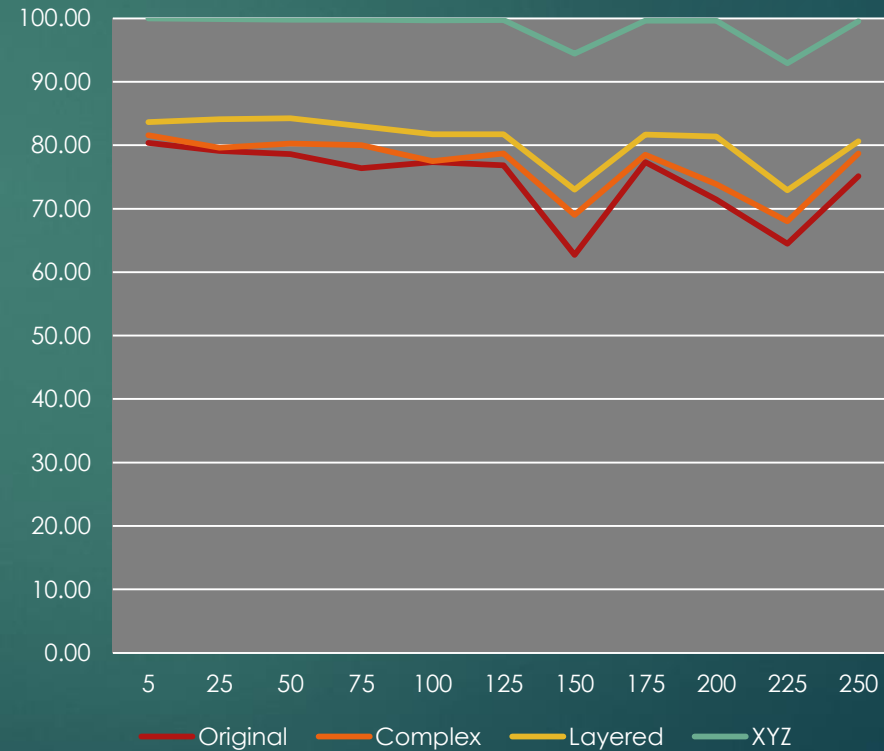


Results

Recall

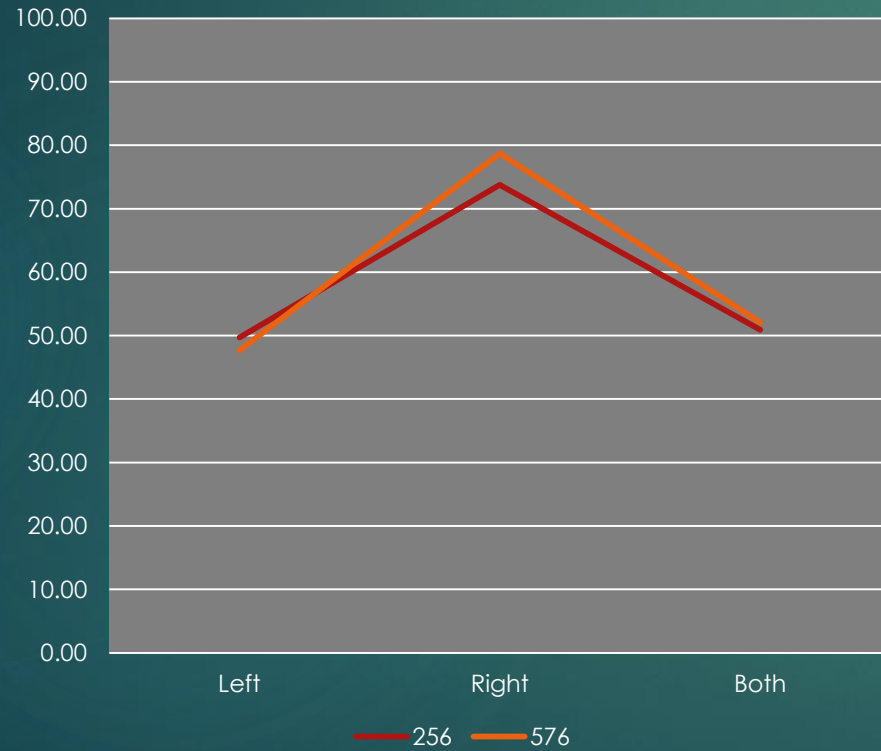


Accuracy



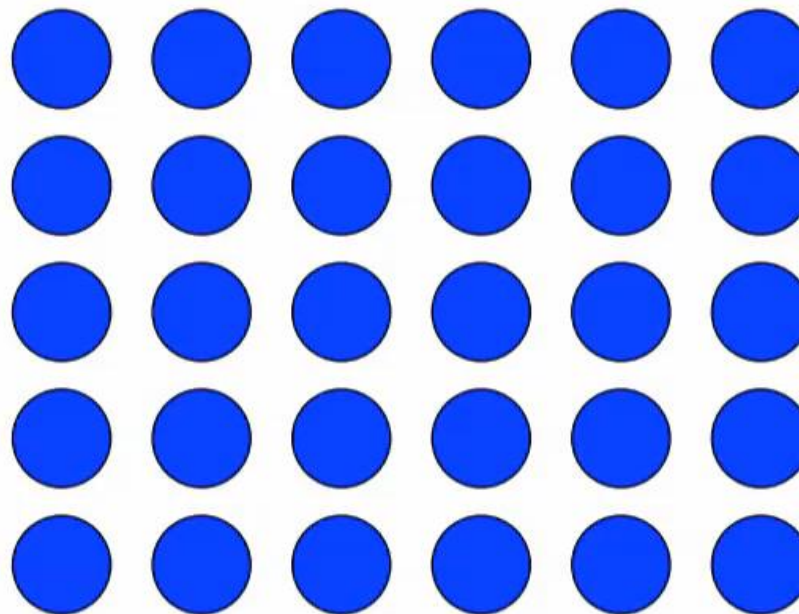
Results

Deep



Next Steps

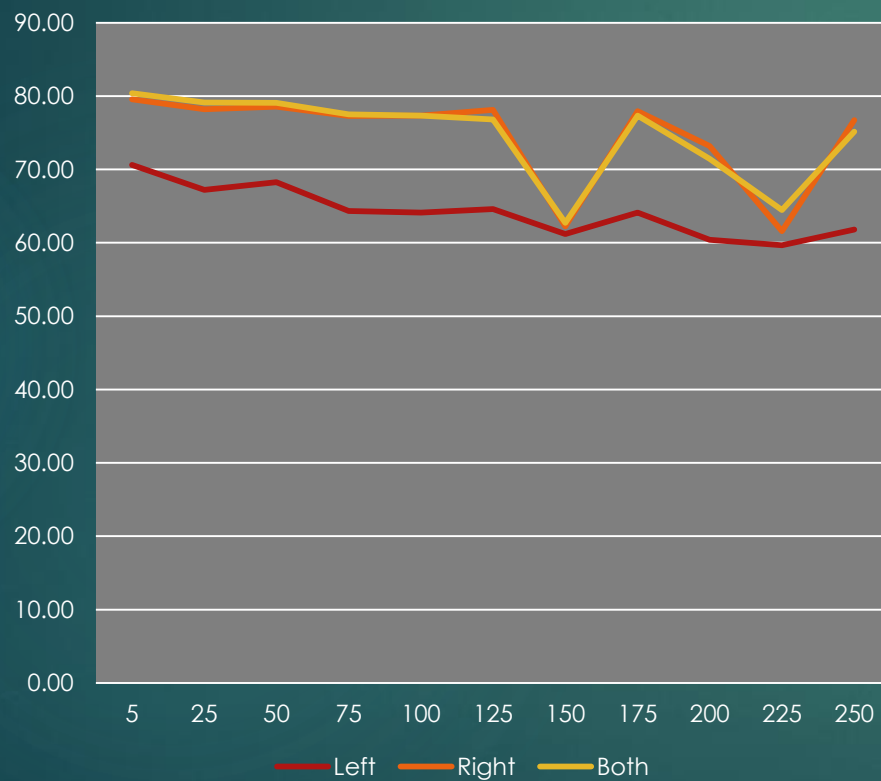
- ▶ Improve Models, Training
- ▶ Unlabeled Data
- ▶ Literature Review



Questions?

Handedness

Original Model



Complex Model

