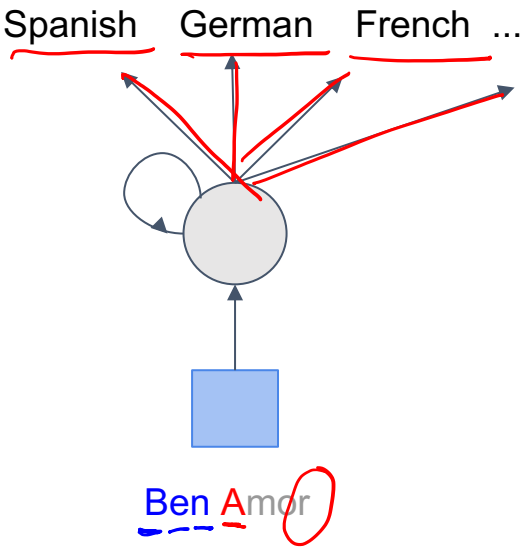
RNN For Name Classification

Heni Ben Amor, Ph.D.
Assistant Professor
Arizona State University

Ira A. Fulton Schools of Engineering
Arizona State University

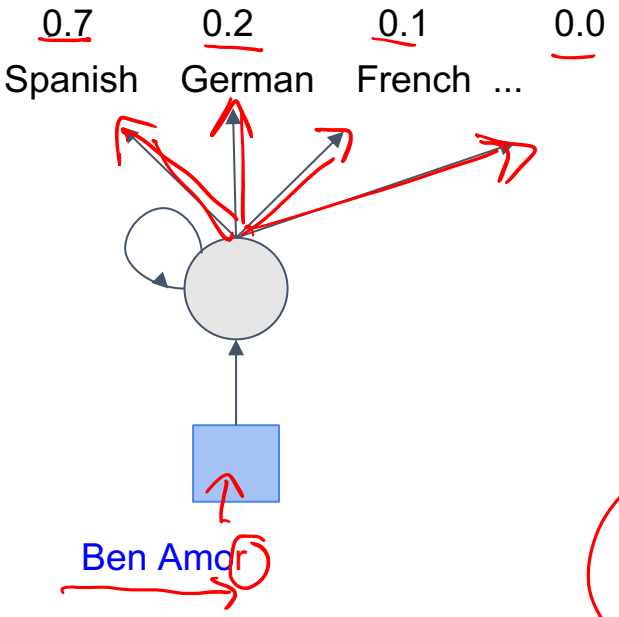
Name Classification Example

- Classify the language of origin of last name
- Treat every character as an input
- Output is the recognized language



Name Classification Example

- Outputs of network should be probabilities
- The sum of the outputs should add up to one
- This can be achieved with **softmax** activation



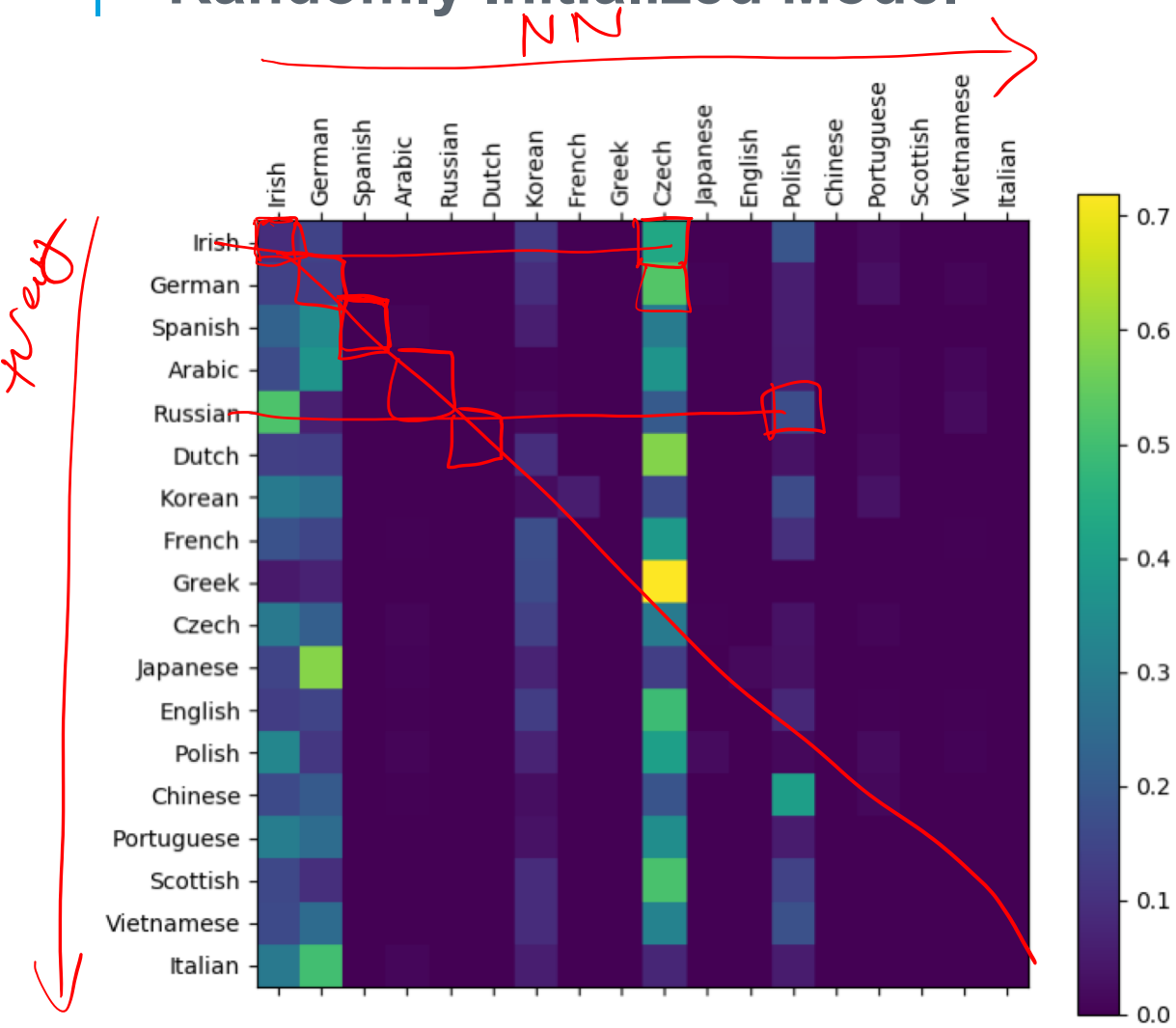
$$\sigma : \mathbb{R}^K \to \mathbb{R}^K$$

$$\sigma(\mathbf{z})_i = \frac{e^{z_i}}{\sum_{j=1}^{K} e^{z_j}}$$

for $i = 1, \ldots, K$.

RNN Demo: Name Classification

Randomly Initialized Model



> Ben Amor
1 Spanish
2 English
3 Chinese

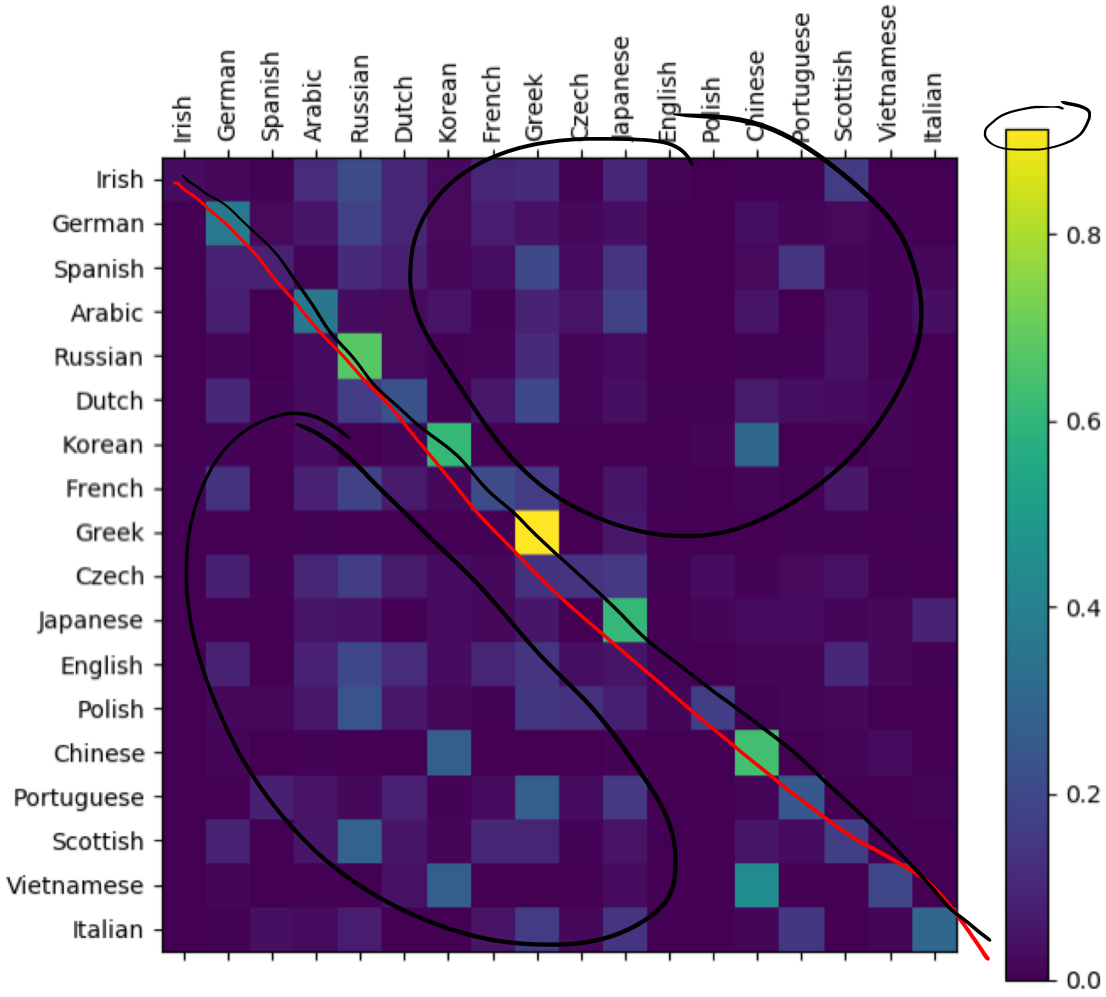
> Stepputtis
1 Spanish
2 English
3 Czech

> Kelly
1 Spanish
2 Czech
3 Russian

Full Demo Available at PyTorch Website

RNN Demo: Name Classification

After training for 10 epochs



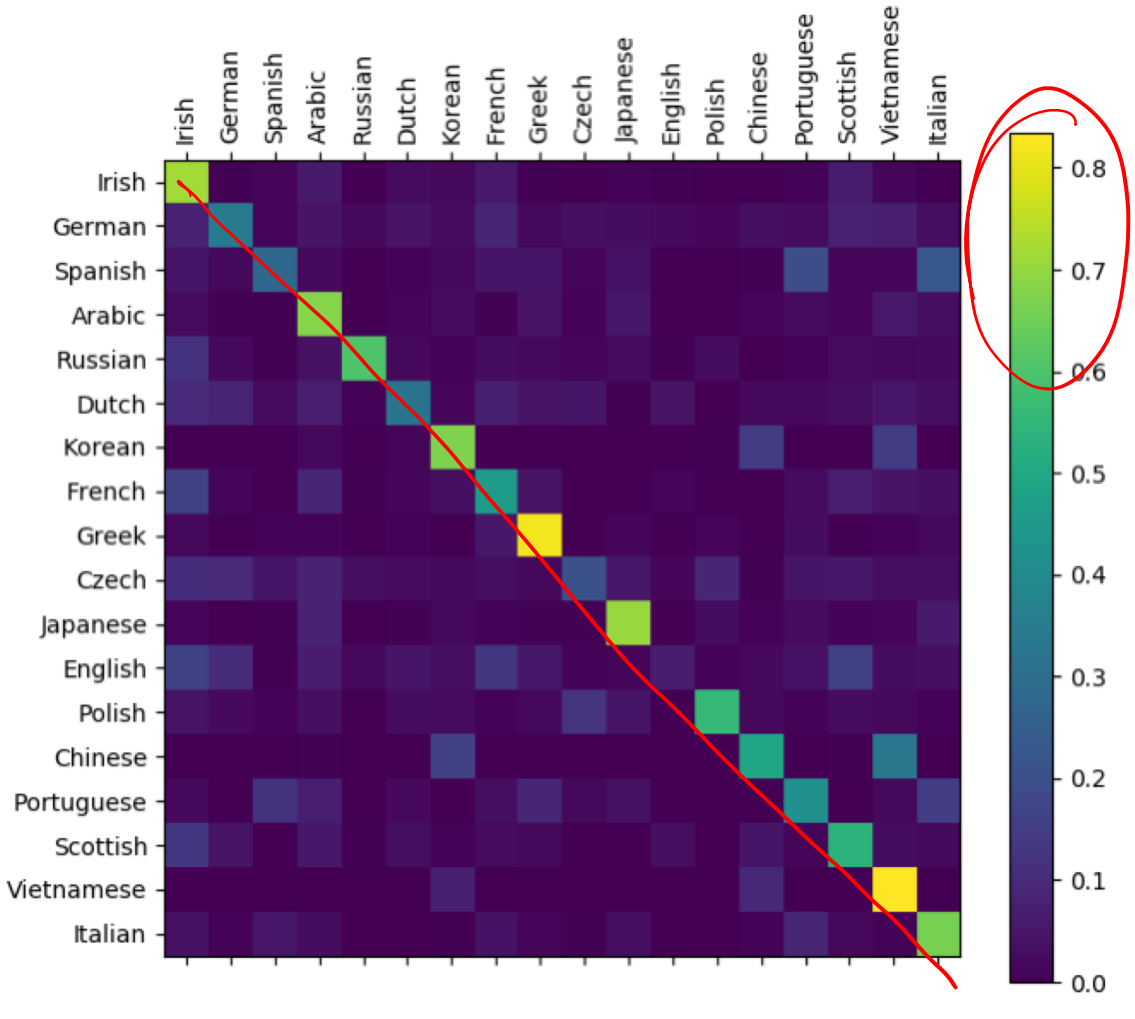
> Ben Amor
1 Russian
2 German
3 Greek

> Stepputtis
1 Greek
2 Russian
3 Dutch

> Kelly
1 Scottish
2 English
3 Dutch

RNN Demo: Name Classification

After training for 50 epochs



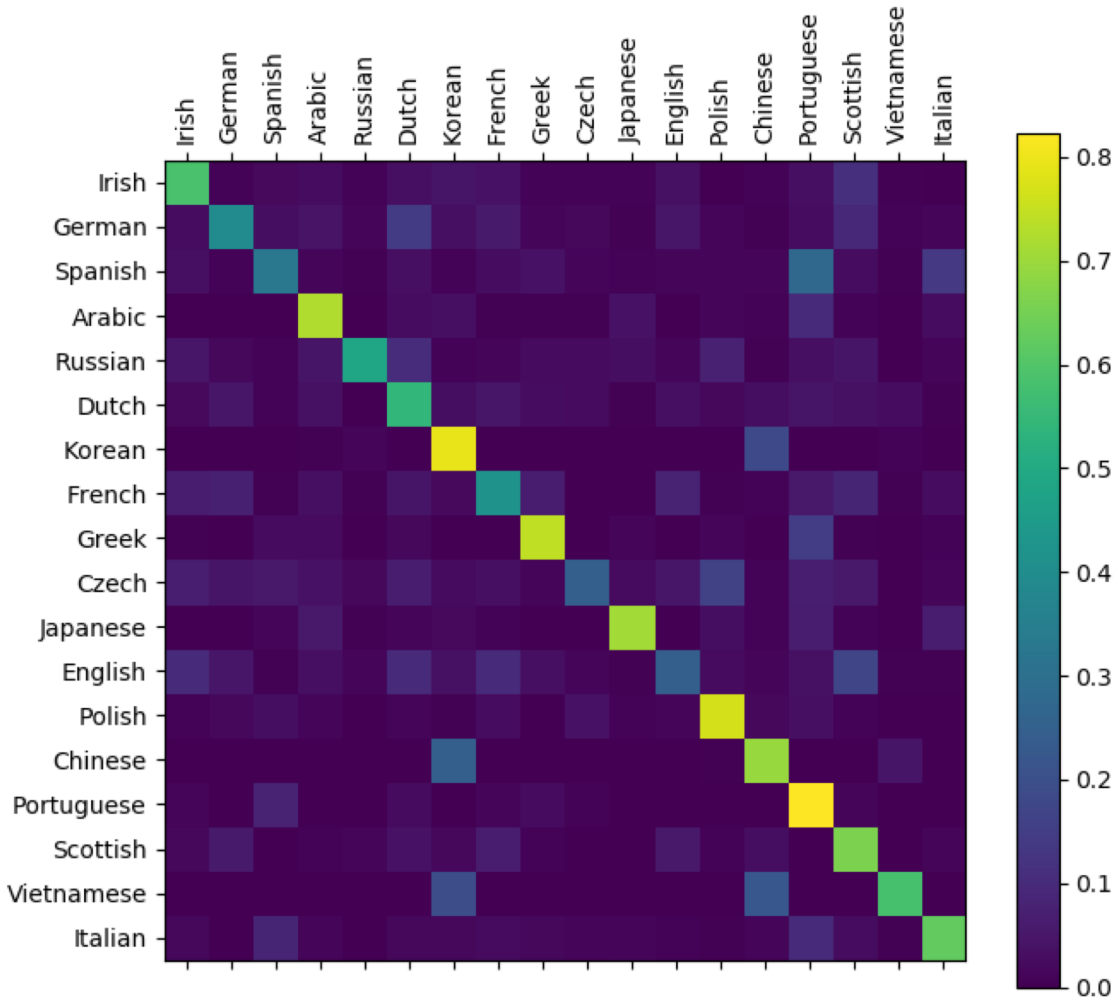
> Ben Amor
1 French
2 Scottish
3 German

> Stepputtis
1 Greek
2 Russian
3 Czech

> Kelly
1 Irish
2 English
3 Scottish

RNN Demo: Name Classification

After training for 100 epochs



> Ben Amor
1 French
2 German
3 Dutch

> Stepputtis
1 Greek
2 Russian
3 German

> Kelly
1 Irish
2 English
3 Scottish

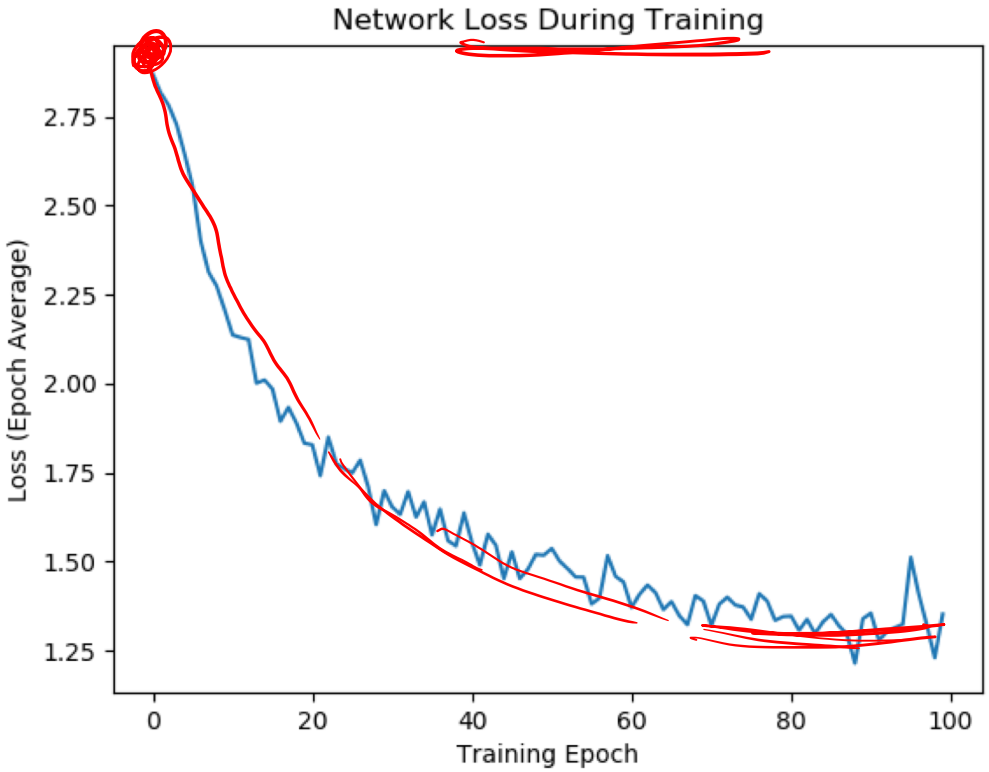
RNN Demo: Name Classification

Before Training

> Ben Amor
1 Spanish
2 English
3 Chinese

> Stepputtis
1 Spanish
2 English
3 Czech

> Kelly
1 Spanish
2 Czech
3 Russian



After Training

> Ben Amor
1 French
2 German
3 Dutch

> Stepputtis
1 Greek
2 Russian
3 German

> Kelly
1 Irish
2 English
3 Scottish

Summary

- We discussed using RNNs for language
- Context is important in natural language
- We applied it to name classification
- Can also be used for text generation, etc.