Deep Learning Framework for Natural Language Processing

Semiconductor Systems Engineering

SKKU

Young Dae KWON

2 Model

Named Entity Recognition (NER)

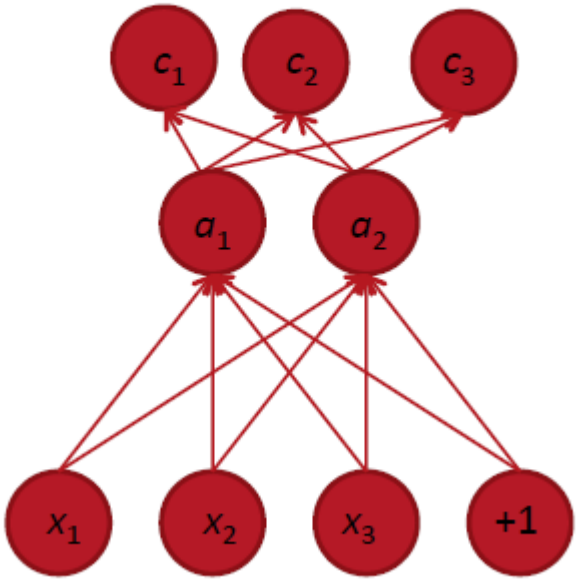
1. **Classify 5 Categories**
   1. **Person**
   2. **Organization**
   3. **Location**
   4. **Miscellaneous**
   5. **None of Those Above**

$$
\begin{aligned}
z &= W \begin{bmatrix} x_s \\ x_1 \\ x_2 \end{bmatrix} + b^{(1)} \\
a &= f(z) \\
h &= g(U^T a + b^{(2)}).
\end{aligned}
$$

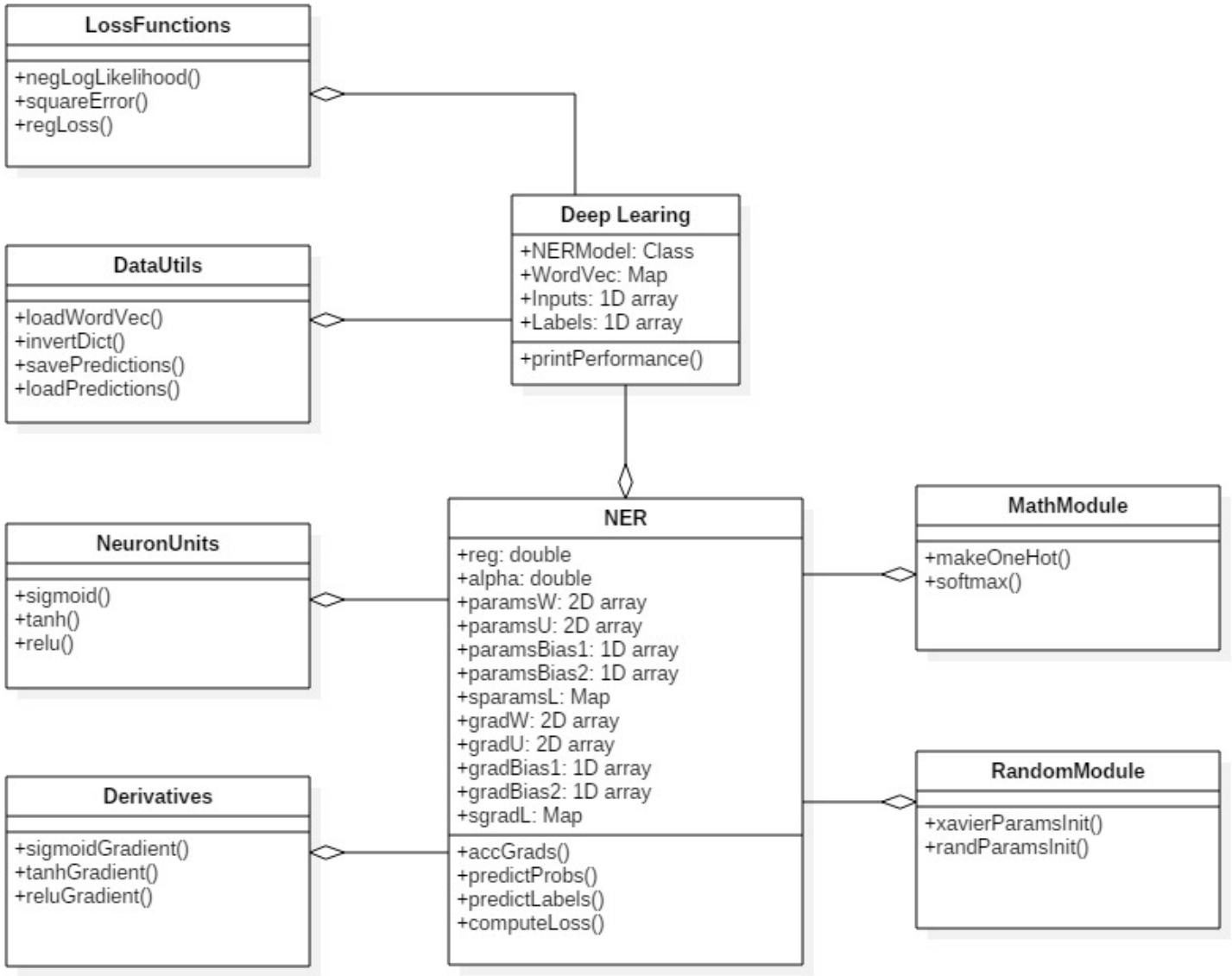
2 Model

Named Entity Recognition (NER)

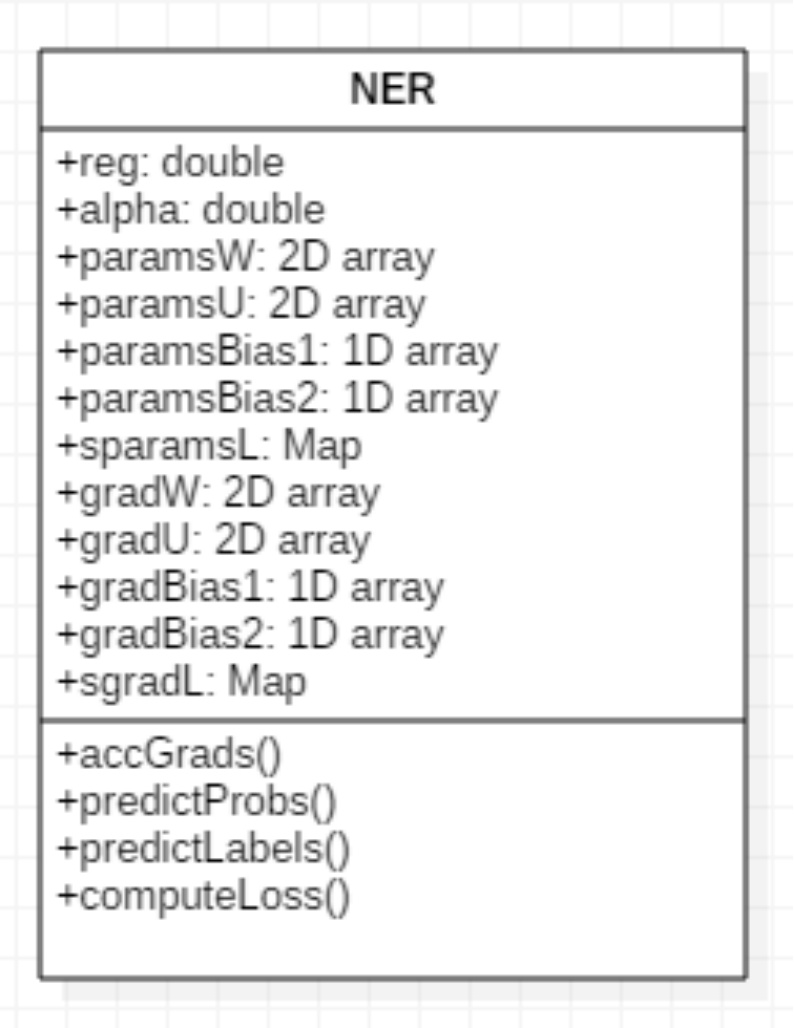
$$\hat{y} = softmax\left(W^{(S)} f(Wx + b)\right)$$



2 UML (Overview)

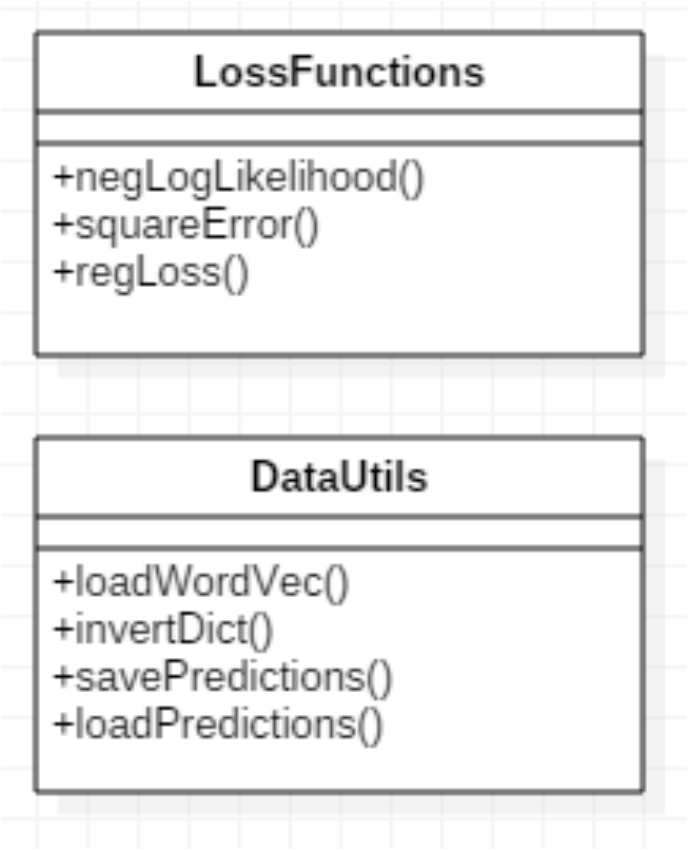


2 UML (Each Element)



1. NER Class : Named Entity Recognition 작업에 사용되는 알고리즘의 실제 코드를 담고 있다.

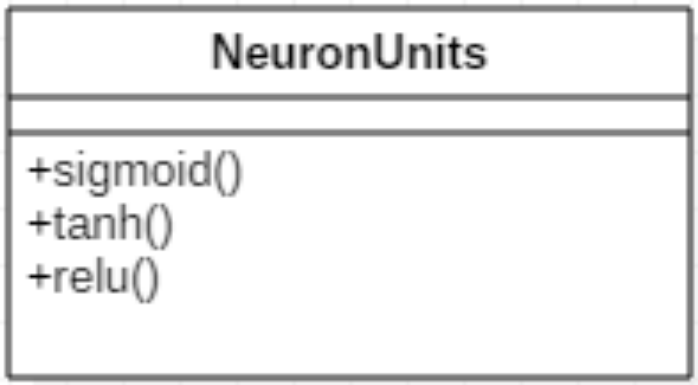
2 UML (Each Element)

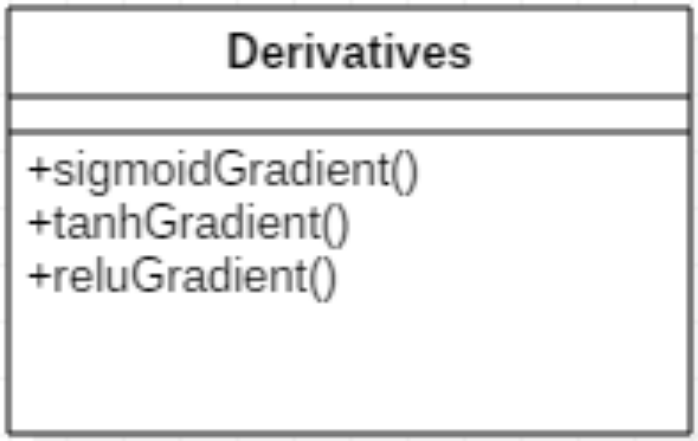


1. LossFunctions Class : Neural Networks의 Loss를 구하는 여러 종류의 함수를 담고 있다.

2. DataUtils Class : Neural Networks의 입력값으로 사용되는 Word Vector을 다루기 위한 함수가 정의되어 있다.

2 UML (Each Element)

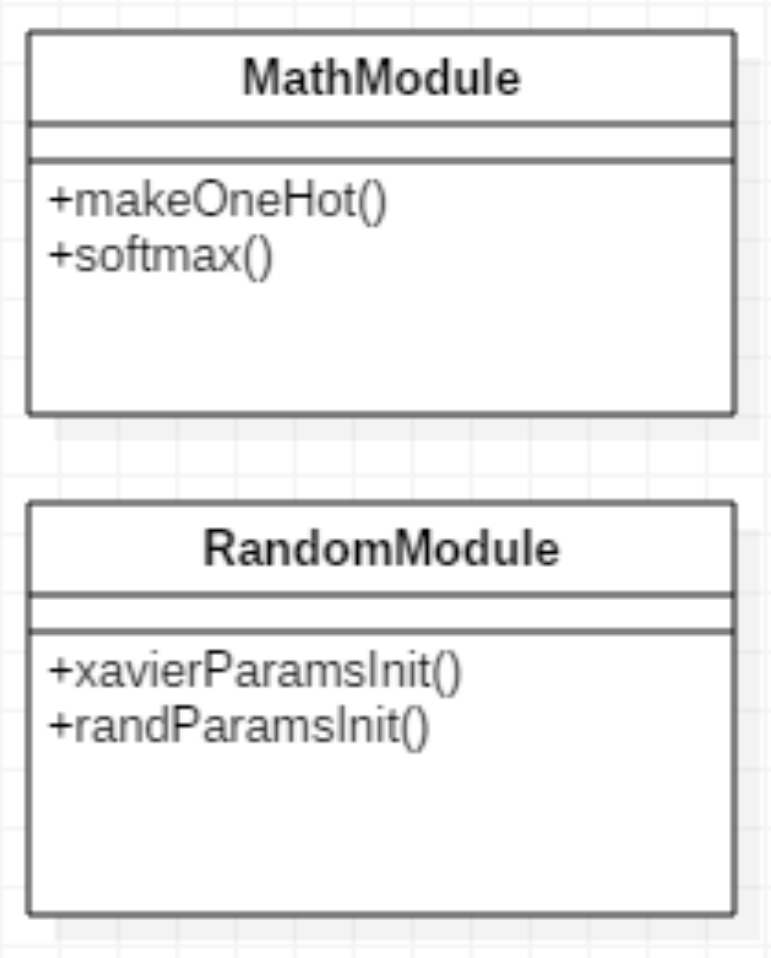




1. NeuronUnits Class : Forward Propagation시 각 Neuron Unit에서 Non-Linearity를 계산하는 함수를 담고 있다.

2. Derivatives Class : Back Propagation시 각 Neuron Unit의 Gradient를 계산하는 함수를 담고 있다.

2 UML (Each Element)



1. MathModule Class : Neural Networks의 출력값 계산에 필요한 함수와 여러 수학 함수를 담고 있다.

2. RandomModule Class : 매개변수를 임의로 초기화 시키는 여러 종류의 함수를 담고 있다.

3 Experiments Setting

3. 1 Data Description

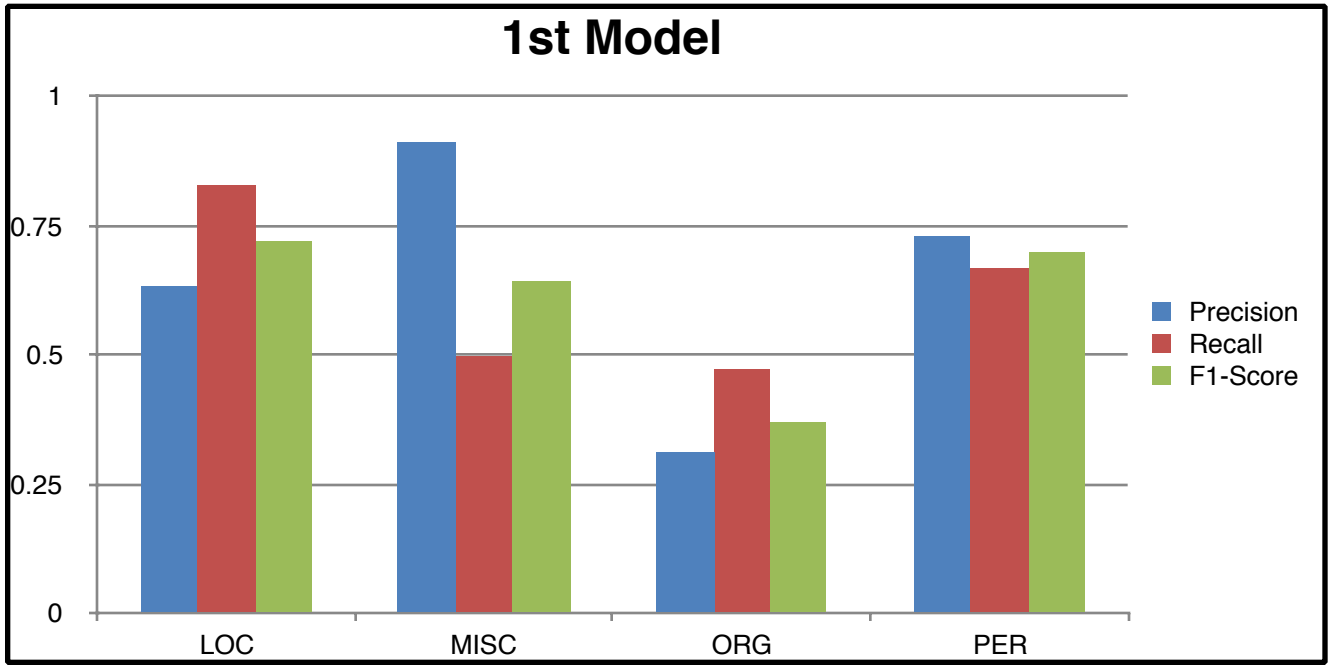
	Train	Dev	Word Vector
단어 수	203,621	51,362	100,232

3. 2 Parameter Setting

Word Vector Dimension	Output Dimension	Regularization Factor	Epoch
50	5	0.001	3

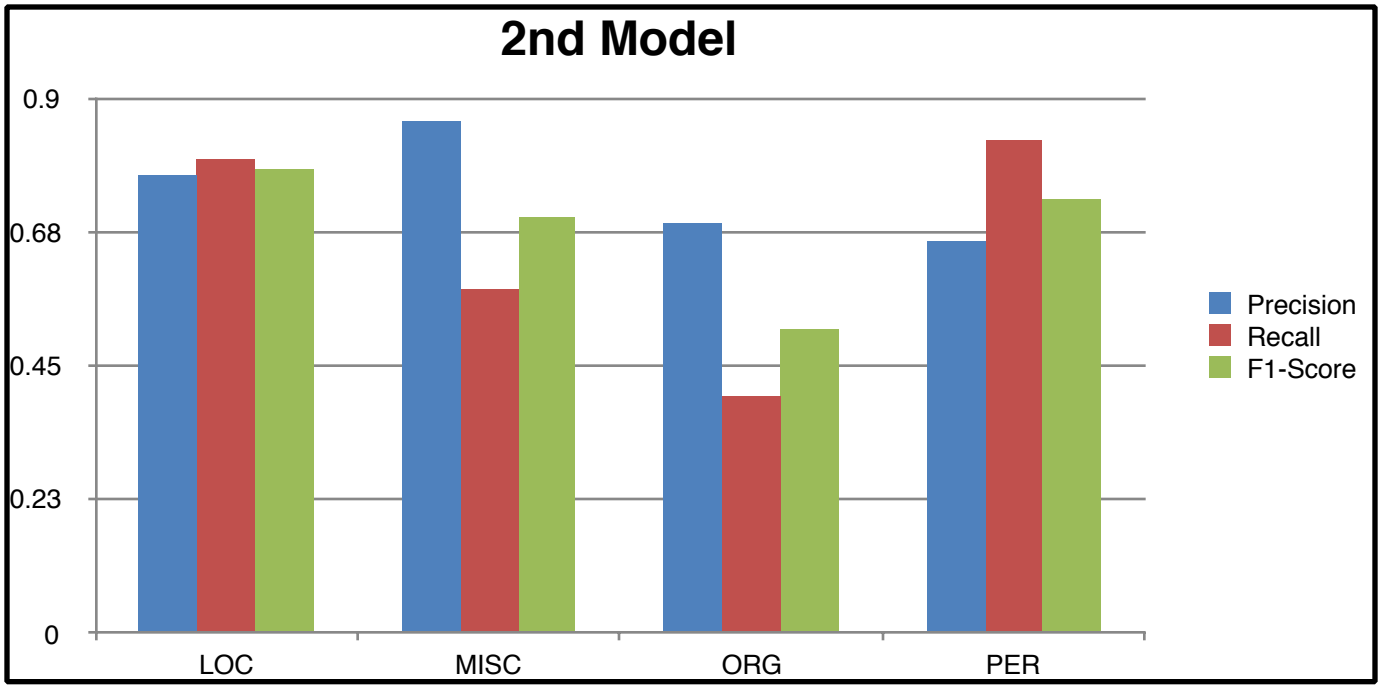
4 Experiments

==== 1st Model ====
Hidden Layer Dim : 100
Batch Size : 1
Learning Rate : 0.1



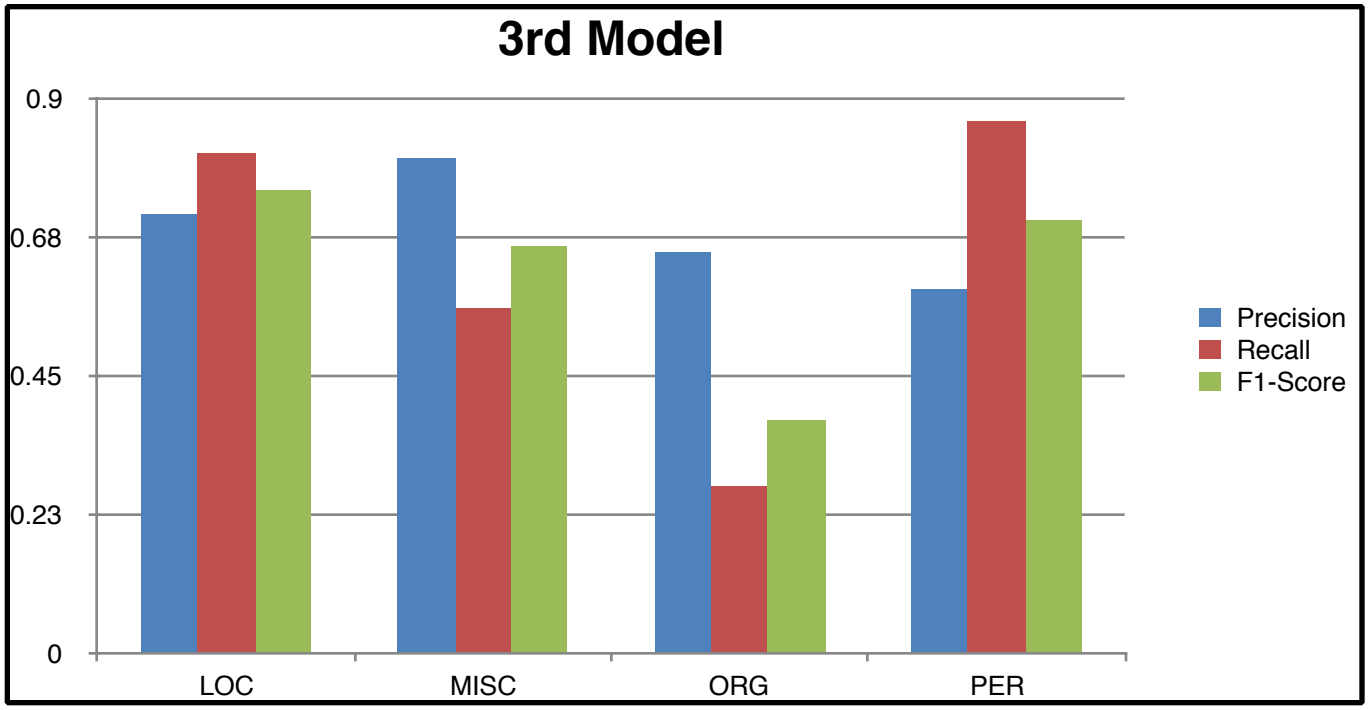
4 Experiments

==== 2nd Model ====
Hidden Layer Dim : 100
Batch Size : 1
Learning Rate : 0.03



4 Experiments

==== 3rd Model ====
Hidden Layer Dim : 100
Batch Size : 1
Learning Rate : 0.01

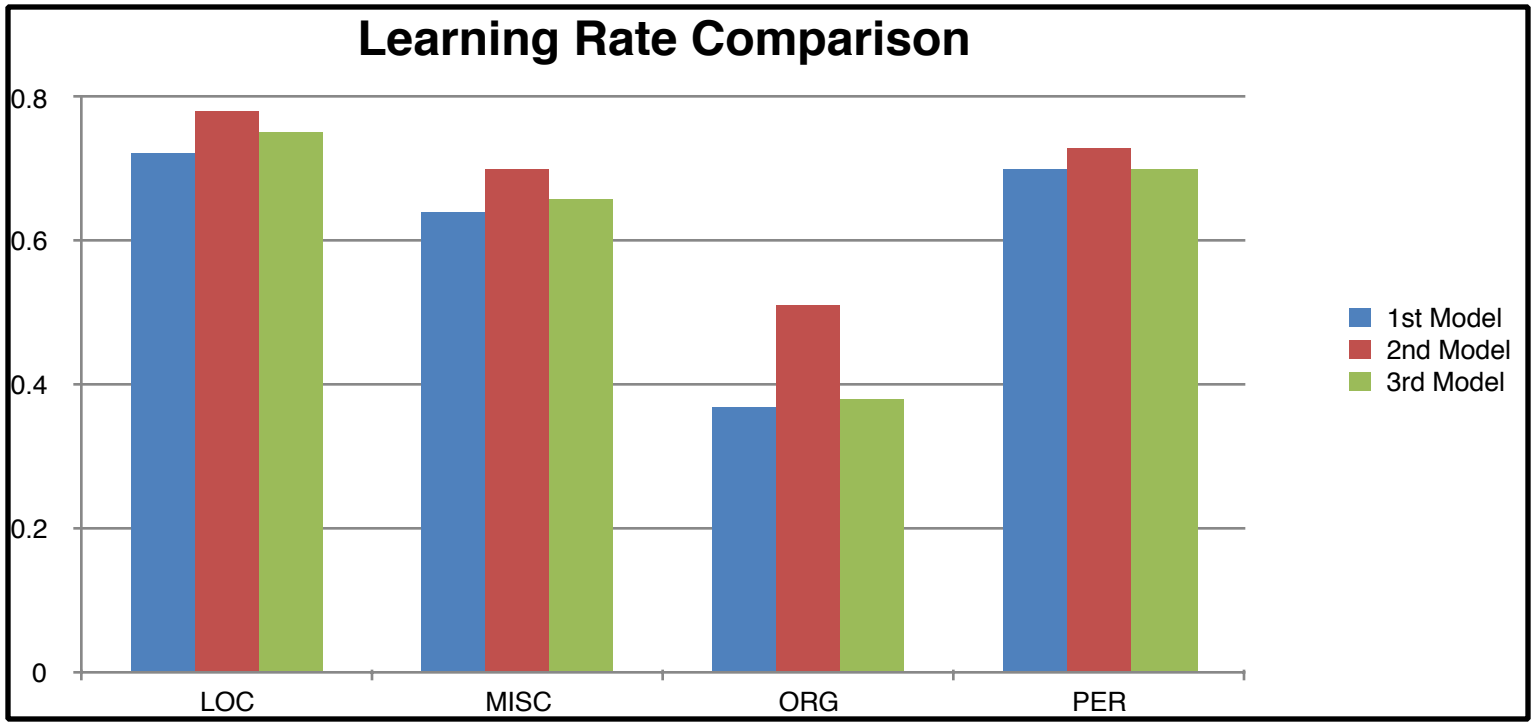


4 Experiments

==== 1st Model ====
Hidden Layer Dim : 100
Batch Size : 1
Learning Rate : 0.1

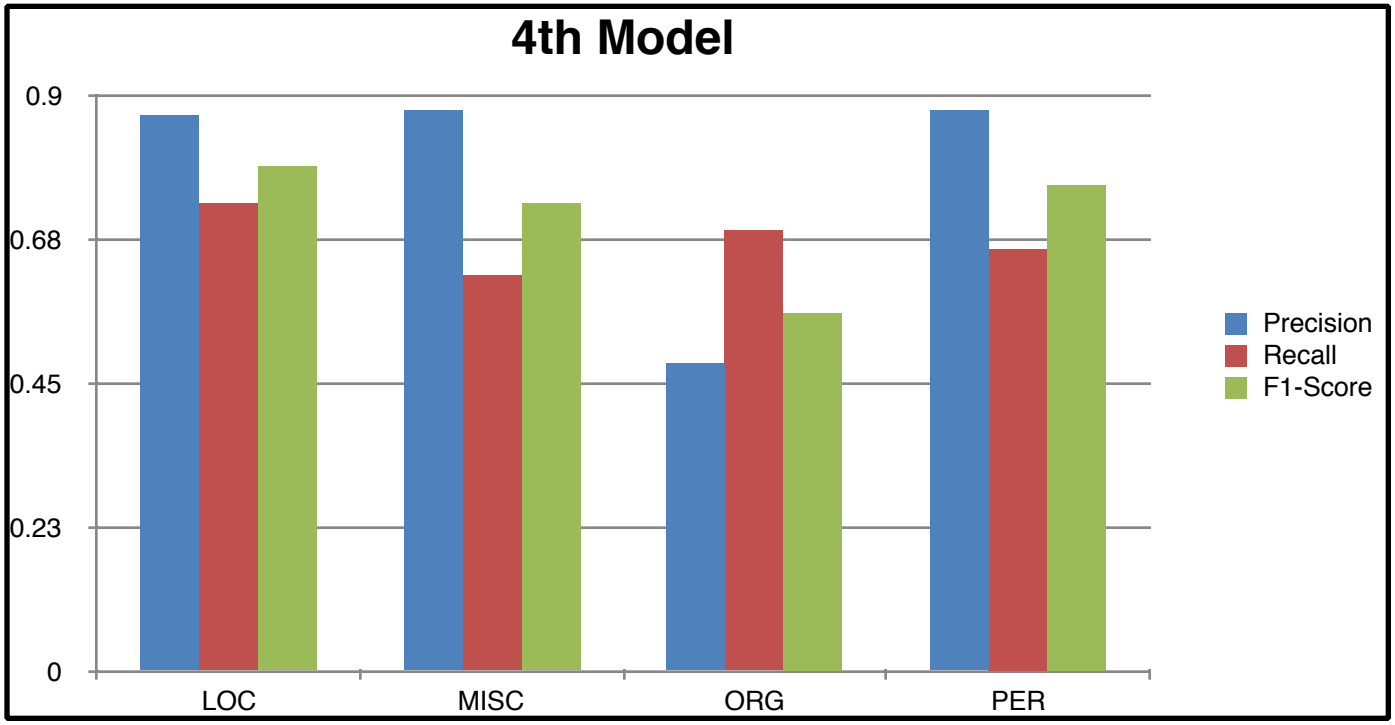
==== 2nd Model ====
Hidden Layer Dim : 100
Batch Size : 1
Learning Rate : 0.03

==== 3rd Model ====
Hidden Layer Dim : 100
Batch Size : 1
Learning Rate : 0.01

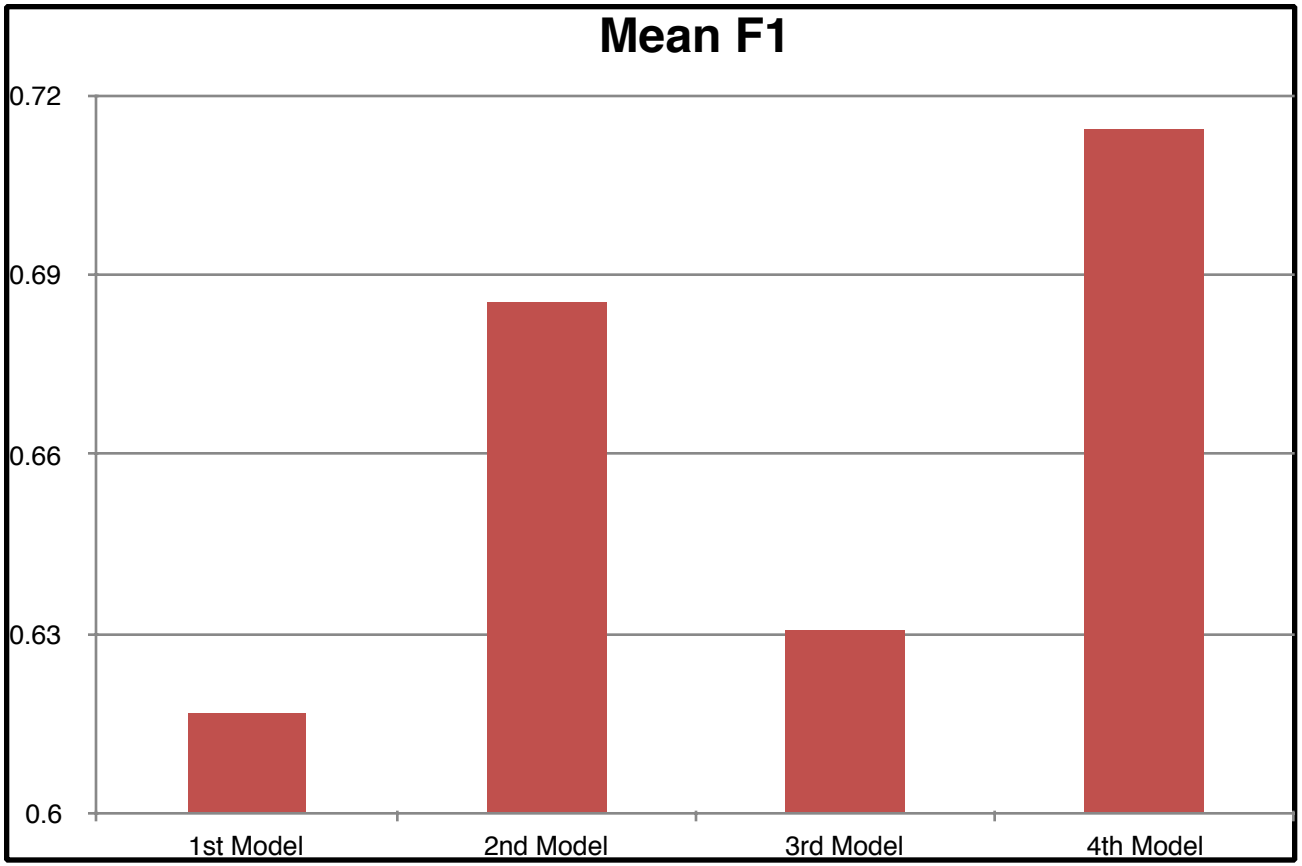


4 Experiments

```
==== 4th Model ====
Hidden Layer Dim : 100
Batch Size       : 5
Learning Rate    : 0.1
```



4 Experiments



5 Conclusion

A. Great Learning Experience

B. Much Fun