CS 224n Assignment #3: Dependency Parsing

1. Machine Learning & Neural Networks (8 points)
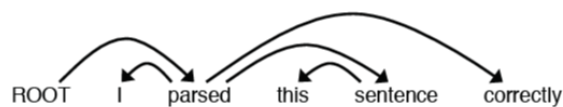
a) 1)

2) Smaller gradients will lead to larger updates.

b) 1) $\gamma(1-p) = 1$ ➔ $\gamma = \frac{1}{1-p}$

2) Dropout makes neurons output 'wrong' values on purpose. And network will have different outputs every (sequences of) activation with dropout.

2. Neural Transition-Based Dependency Parsing (42 points)

a)

Stack	Buffer	New dependency	Transition
[ROOT]	[I, parsed, this, sentence, correctly]		Initial Configuration
[ROOT, I]	[parsed, this, sentence, correctly]		SHIFT
[ROOT, I, parsed]	[this, sentence, correctly]		SHIFT
[ROOT, parsed]	[this, sentence, correctly]	parsed→I	LEFT−ARC

Stack	Buffer	New dependency	Transition
[Root, parsed, this]	[sentence, correctly]		SHIFT
[Root, parsed, this, sentence]	[correctly]		SHIFT
[Root, parsed, sentence]	[correctly]	sentence->this	LEFT-ARC
[Root, parsed]	[correctly]	parsed->sentence	RIGHT-ARC
[Root parsed,	[]		SHIFT

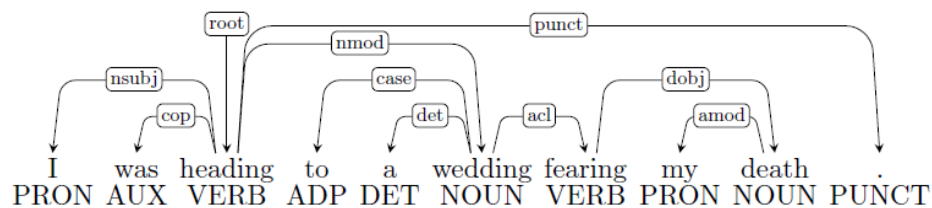| correctly]			
[Root, parsed]	[]	parsed->correctly	RIGHT-ARC
[Root]	[]	Root->parsed	RIGHT-ARC

b) 2n+1

Each word will be pushed into stack and popped from stack, and we have one initial step.

e)

- dev UAS: 88.25

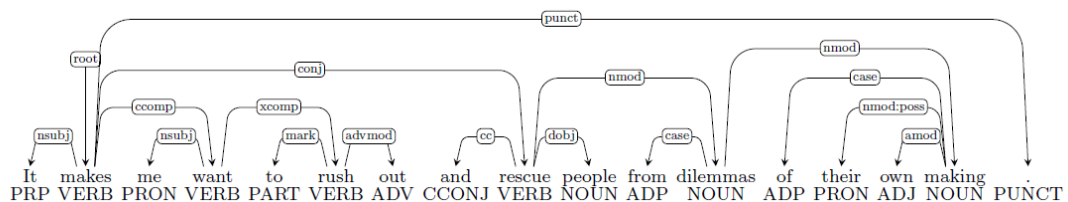- test UAS: 88.94

f)1)

Error type: Verb Phrase Attachment Error

Incorrect dependency: wedding->fearing

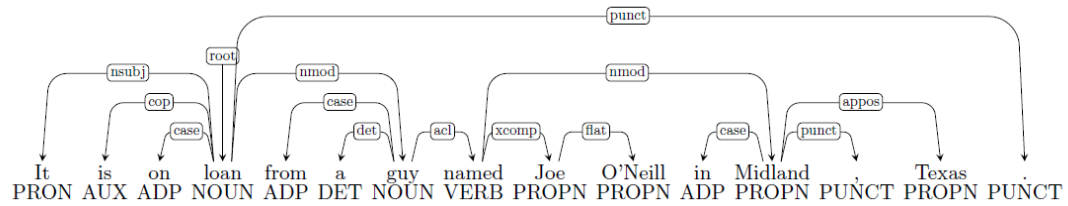Correct dependency: heading->fearing

2)

Error type: Coordination Attachment Error

Incorrect dependency: makes->rescue

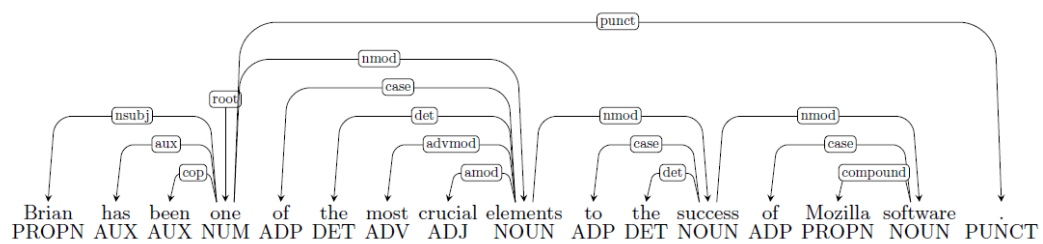Correct dependency: rush->rescue

3)

Error type: **Prepositional Phrase Attachment Error**

Incorrect dependency: named->Midland

Correct dependency: guy->Midland

4)

Error type: **Modifier Attachment Error**

Incorrect dependency: elements->most

Correct dependency: crucial->most