

# NPC Model

CSCI 599 - Applied ML for Games

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# What is it?

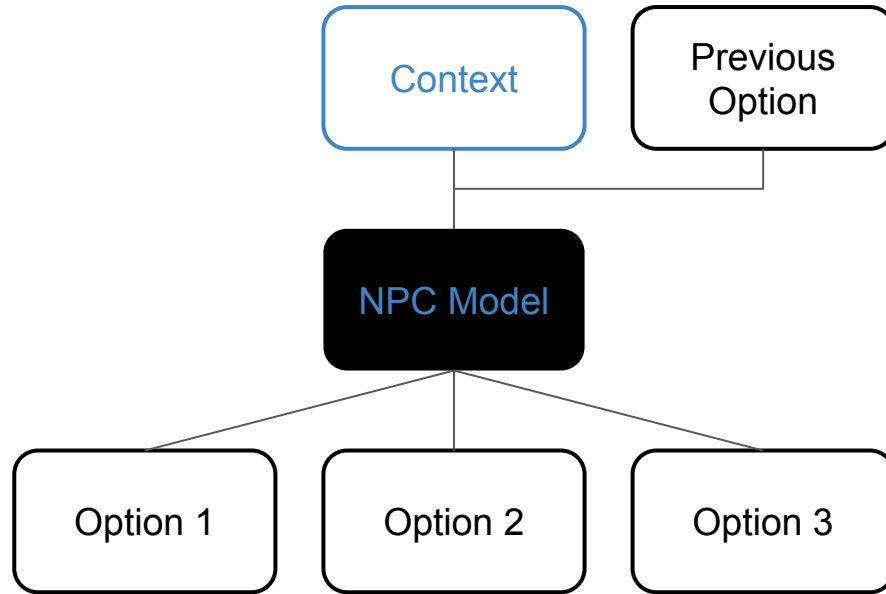
A model that generates **interactive dialogues** for **NPCs** based on keywords that describes a **context**

# How It Works

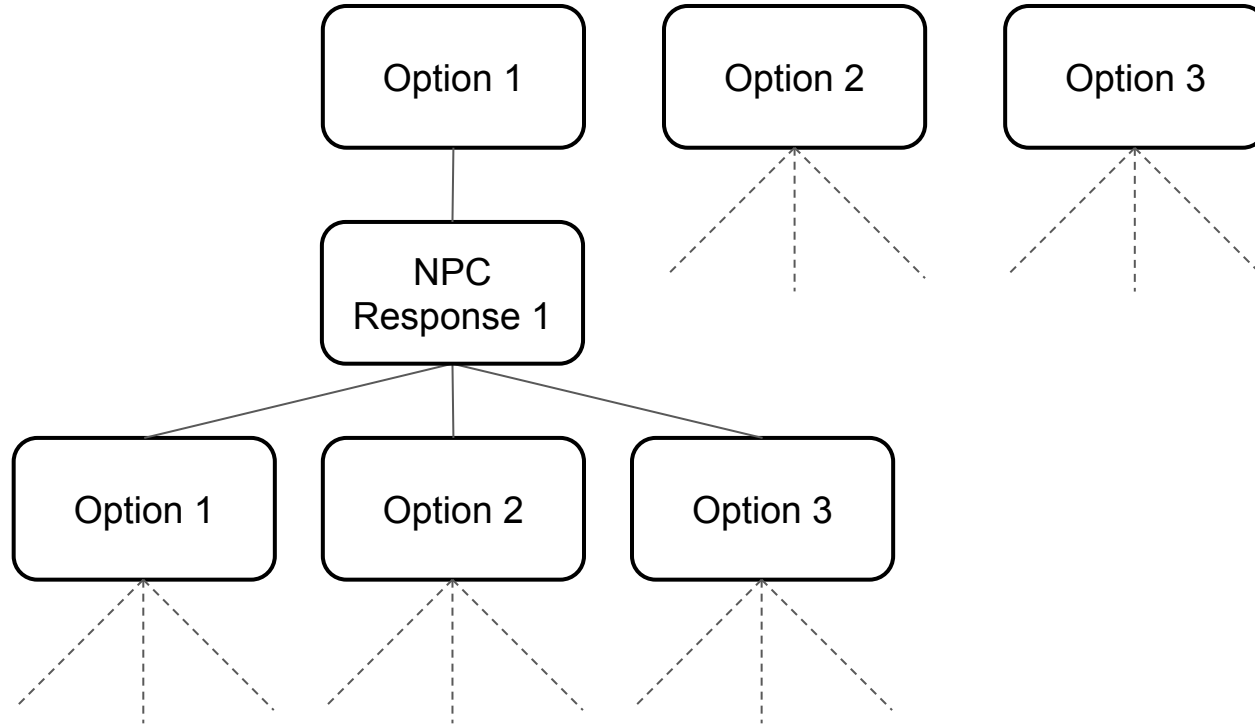
Context:

keyword 1   keyword 2   keyword 3   ...

# How It Works



# How It Works



# How It Works

## \$ Context:

\$ keyword1 keyword2 keyword3 ...

## \$ Player Dialogues:

\$ Option 1: dialogue 1

\$ Option 2: dialogue 2

\$ Option 3: dialogue 3

## \$ Player (select a dialogue):

\$ Option 1

## \$ NPC Dialogue:

\$ Response to Option 1

## \$ Player Dialogues:

\$ Option 1-1: dialogue 1

\$ Option 1-2: dialogue 2

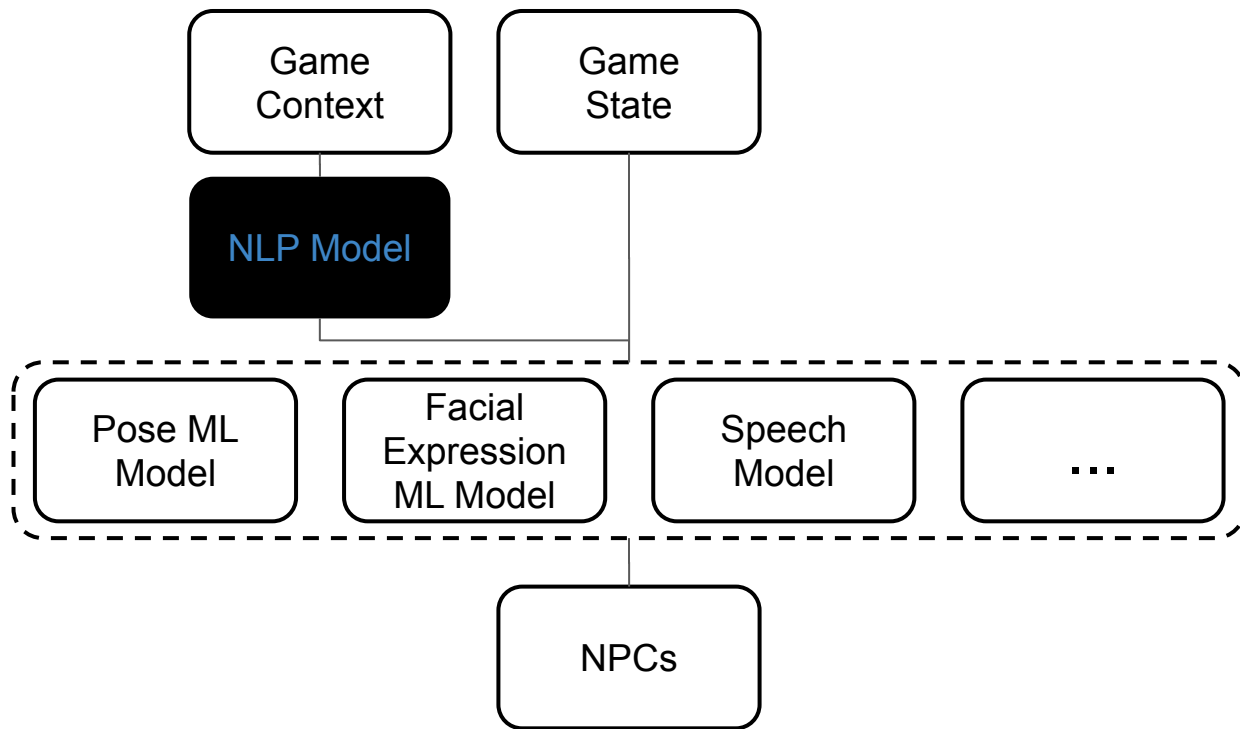
\$ Option 1-3: dialogue 3

.

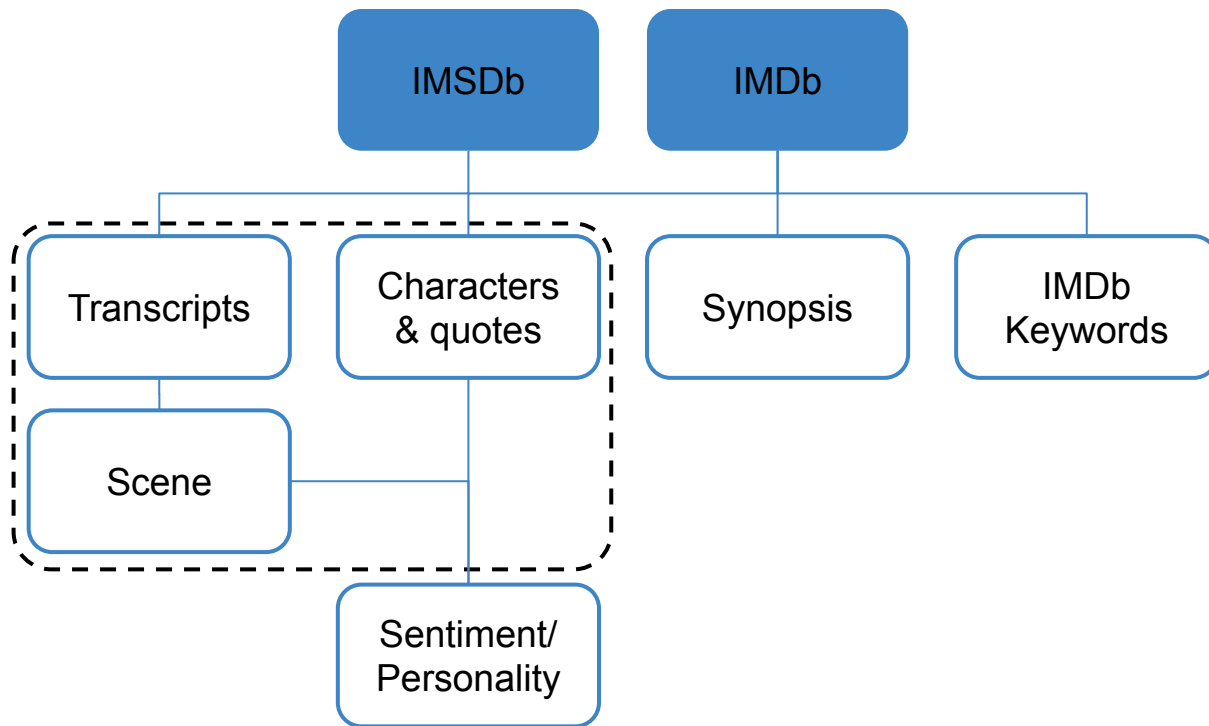
.

.

# Full Model

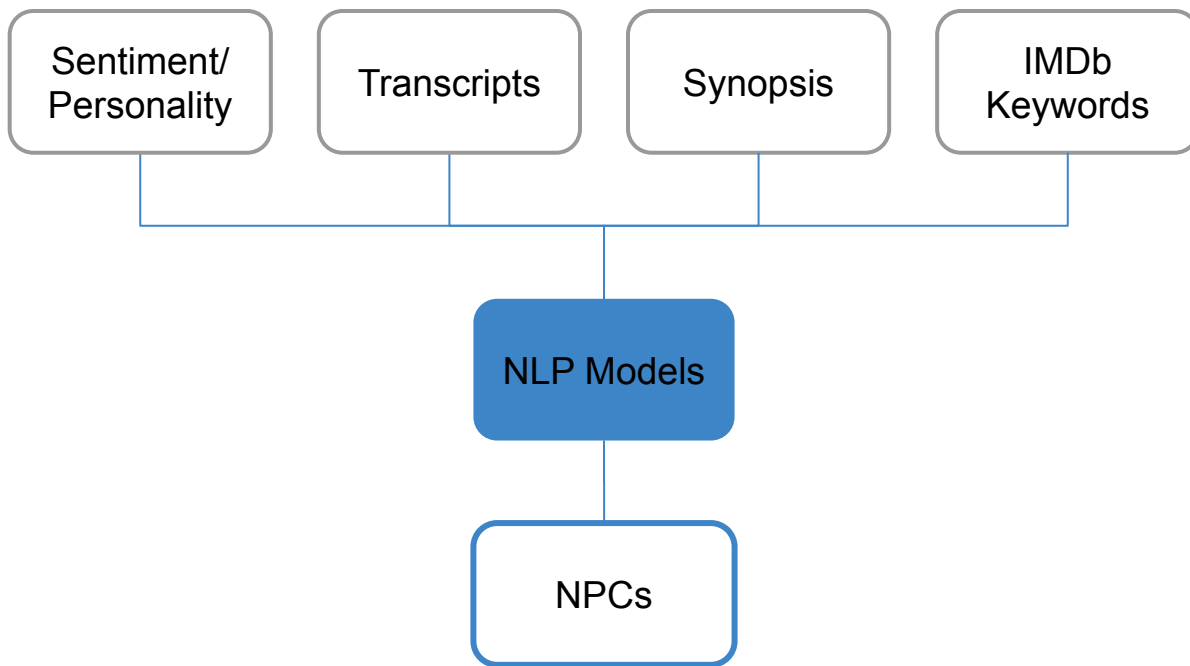


# Data Flow

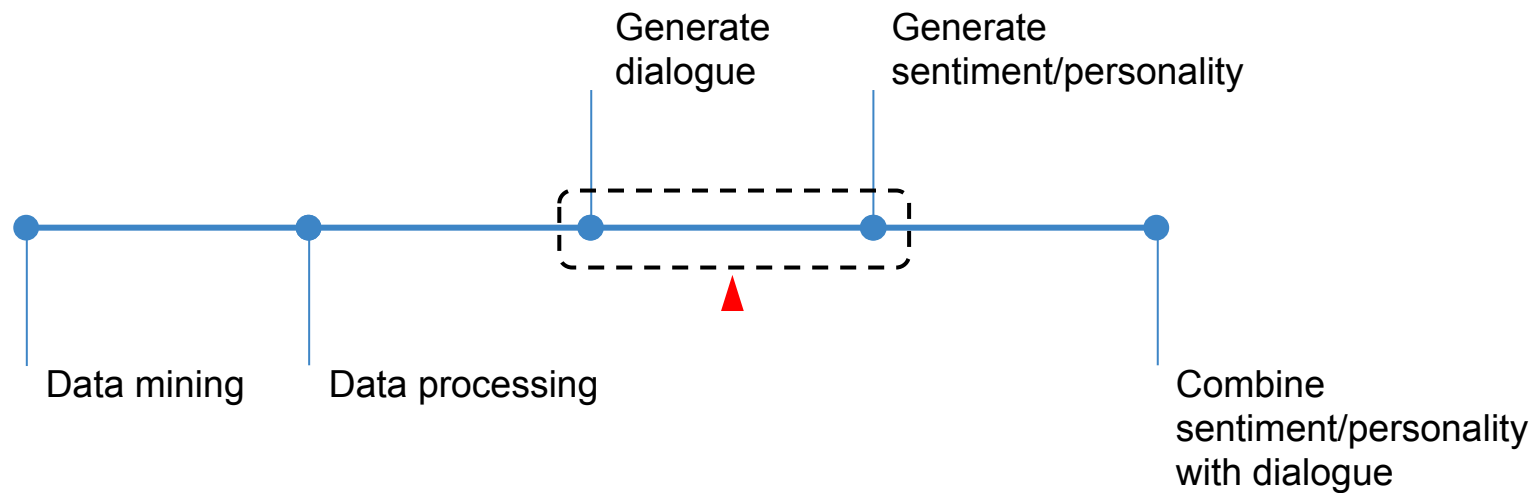




# Data Flow



# Progress



# Data Mining

## TEN THINGS I HATE ABOUT YOU

written by Karen McCullah Lutz & Kirsten Smith

based on 'Taming of the Shrew' by William Shakespeare

Revision November 12, 1997

### PADUA HIGH SCHOOL - DAY

Welcome to Padua High School,, your typical urban-suburban high school in Portland, Oregon. Smarties, Skids, Preppies, Granolas. Loners, Lovers, the In and the Out Crowd rub sleep out of their eyes and head for the main building.

### PADUA HIGH PARKING LOT - DAY

KAT STRATFORD, eighteen, pretty -- but trying hard not to be -- in a baggy granny dress and glasses, balances a cup of coffee and a backpack as she climbs out of her battered, baby blue '75 Dodge Dart.

A stray SKATEBOARD clips her, causing her to stumble and spill her coffee, as well as the contents of her backpack.

The young RIDER dashes over to help, trembling when he sees who his board has hit.

### RIDER

Hey -- sorry.

```
<a href="/name/nm0005132/">
    Patrick
  </a>
  :
</span>
Some asshole paid me to take out this really great girl
</p>
<p>
<span class="character">
<a href="/name/nm0005466/">
    Kat Stratford
  </a>
  :
</span>
Is that right?
</p>
<p>
<span class="character">
<a href="/name/nm0005132/">
    Patrick
  </a>
  :
</span>
Yeah, but I screwed up. I, um, I fell for her.
</p>
</div>
</li>
<li class="ipl-zebra-list__item quote soda">
<div class="sodatext">
<p>
<span class="character">
<a href="/name/nm0330687/">
    Cameron
  </a>
  :
</span>
She never wanted me. She wanted Joey the whole time.
</p>
<p>
<span class="character">
<a href="/name/nm0005132/">
    Patrick
  </a>
  :
</span>
Cameron, do you like the girl?
</p>
<p>
<span class="character">
<a href="/name/nm0330687/">
    Cameron
  </a>
  :
  .
</span>
```

# Data Processing

## Dialogues (Scene)

```
{
  "0037343":{
    "dialogues":[...,
      {
        "seq":"4",
        "scene":"\"GARDEN CITY\"",
        "character":"",
        "dialogue":"CAMERA PANS to show the dusty platform of a typical small Arizona town of the late nineties. CAMERA TRUCKS ALONG platform PAST a line of sleeping figures, consisting of a couple of drunks, an Indian, two Mexicans and a mongrel dog. CAMERA STOPS on the window of the ticket office. Inside the office can be glimpsed the Station Agent dozing in a chair with his feet up against the grill of the ticket window. The clicking of the signal indicator is heard. The agent opens his eyes, flips up the indicator and begins to get to his feet sleepily."
      }, ...
    ],
    "scene_count":"489",
    "char_count":"934"
  }
}
```

# Data Processing

## Dialogues (Character)

```
{
  "0037343":{
    "dialogues":[...,
      {
        "seq":"34",
        "scene": "",
        "character":"ROCKLIN",
        "dialogue":"Mind if I ride up here? Dave does mind, but his better judgment tells him to step carefully in his attitude toward this stranger,
          who does things first, then asks permission. His only answer to Rocklin is a characteristic grimace which is eloquent enough.
          And now Dave turns on the Agent, who becomes the target of his pent-up wrath."
      }, ...
    ]},
  "scene_count":"489",
  "char_count":"934"
}
```

# Data Processing

## Characters

```
{
  "0048240": {
    "0": {
      "character": "Takeshi Iijima, alpine club member",
      "quotes": ""
    },
    "1": {
      "character": "Chika, villager",
      "quotes": ""
    }, ...
  }
}
```

# Data Processing

## Synopsis and Keywords

```
{  
  "0040613": {  
    "plot": ["A man and his wife decide...", "In Manhattan, the American middle class Jim Blandings...I", ... ],  
    "synopsis": "Advertising executive Jim Blandings...",  
    "keywords": ["dilapidated-house", "house", "family-relationships", "connecticut", ... ]  
  }  
}
```

# Model: Google NLP

```
Sentence 0 has a sentiment score of 0.0
Sentence 1 has a sentiment score of 0.10000000149011612
Sentence 2 has a sentiment score of 0.0
Sentence 3 has a sentiment score of 0.10000000149011612
Sentence 4 has a sentiment score of -0.5
Sentence 5 has a sentiment score of 0.5
Sentence 6 has a sentiment score of 0.0
Sentence 7 has a sentiment score of 0.10000000149011612
Sentence 8 has a sentiment score of 0.0
Sentence 9 has a sentiment score of 0.0
Sentence 10 has a sentiment score of 0.699999988079071
Sentence 11 has a sentiment score of 0.20000000298023224
Sentence 12 has a sentiment score of 0.0
Sentence 13 has a sentiment score of -0.10000000149011612
Sentence 14 has a sentiment score of -0.5
Sentence 15 has a sentiment score of -0.30000001192092896
Sentence 16 has a sentiment score of 0.699999988079071
Sentence 17 has a sentiment score of -0.30000001192092896
Sentence 18 has a sentiment score of -0.30000001192092896
Sentence 19 has a sentiment score of 0.699999988079071
Sentence 20 has a sentiment score of 0.10000000149011612
Sentence 21 has a sentiment score of 0.0
Sentence 22 has a sentiment score of 0.0
Sentence 23 has a sentiment score of 0.0
Sentence 24 has a sentiment score of 0.20000000298023224
Sentence 25 has a sentiment score of 0.20000000298023224
Sentence 26 has a sentiment score of -0.10000000149011612
Sentence 27 has a sentiment score of 0.0
Sentence 28 has a sentiment score of 0.0
Sentence 29 has a sentiment score of 0.0
Sentence 30 has a sentiment score of 0.0
Sentence 31 has a sentiment score of 0.0
Sentence 32 has a sentiment score of 0.0
Sentence 33 has a sentiment score of 0.0
Sentence 34 has a sentiment score of 0.0
Sentence 35 has a sentiment score of 0.20000000298023224
Sentence 36 has a sentiment score of 0.0
Sentence 37 has a sentiment score of 0.0
Sentence 38 has a sentiment score of -0.10000000149011612
Sentence 39 has a sentiment score of -0.10000000149011612
```

Google NLP results for Bruce Wayne in Batman Begins

Results are in the range of (-1, 1) where 0 means neutral or mixed emotions



# Model: Watson Natural Language Understanding

Examine a news article or other content

Text

URL

But I knew Harvey Dent. I was...his friend. And it will be a very long time before someone inspires us the way he did. Gordon, choked with emotion, gathers the papers of his eulogy. I believed in Harvey Dent. And we FADE TO BLACK. Dr. Pavel, I'm CIA. Dr. Pavel nods, nervous. CIA Man hands the Driver a briefcase. He wasn't alone. CIA Man, confused, spots the Hooded Men. He turns to Dr. Pavel. You don't get to bring friends. Don't worry, no charge for them. Why would I want them? They were trying to grab your prize. (Smiles.) They work for the mercenary. The masked man. Get 'em on board - I'll call it in. What are you doing in the middle of my operation? 3. Hooded Man 1 says nothing. CIA Man pulls out a handgun. The flight plan I just filed with the Agency lists me, my men, and Dr. Pavel here. But only one of you. CIA Man opens the cargo door. Special Forces hang Hooded Man 1 out into the howling wind - CIA Man

Sentiment

Emotion

Keywords

Entities

Categories

Concept

Syntax

Semantic Roles

Analyze the overall emotion and the targeted emotion of the content.

[JSON](#) ▾

## Overall Emotion

Joy ▬ 0.61    Anger ▬ 0.15    Disgust ▬ 0.14    Sadness ▬ 0.54    Fear ▬ 0.62

A collection of APIs that analyzes text through NLP. The generated results include sentiment, emotion, keywords, entities, categories, concept, syntax, and semantic Roles.

# Model: Markovify

## Batman: The Dark Knight Rises

However, there are only eleven minutes left for the henchmen there, Gordon spots a displaced manhole and takes three SWAT officers chase the thugs into the trading floor, Petrov suddenly draws a pistol to the end of the henchmen fled into, but find that the men have vanished.

The SWAT officers chase the thugs draw their weapons and make their way to the trading floor by posing as a deliveryman, and wearing a seatbelt.

Talia's intention is to take the three trucks are being driven around the city with C4 explosive charges. As he drives away from the group.

The bullet ricochets off the barrel and hits the trigger of the estate is sold, with the other he will need to fly the bomb in that position until he can register what they are searching the tunnel, not knowing that it is empty. As Batman chases Bane and orders him to stay with Fox and Miranda quickly escape by slipping out a coup in a report. Unfortunately, someone has betrayed Jones and his men to a cement mixer truck parked on the reactor.

He's figured out himself that Bruce stop letting maids into this part of the estate is sold, with the stock exchange's security chief, Blake arrives, climbs out of his bed. Outside, Blake screeches to a spat with Alfred, who is afraid he has nowhere to move.

The henchmen attach cables to the door and given the same treatment. As they break cover and prepare to fire their guns at the hospital while Foley is dealing with the sound of police cars screeching to a gala costume ball.

Foley yells for the nuke to detonate.

Fox admits that although she doesn't want to know where the Clean Slate software program, which has the body thrown in a West African country that secured diamond mining operations for Daggett.

The SWAT officers begin swinging a battering ram at the bodyguard while collaring Daggett.

The majority of the estate is sold, with the barrel, and shoots one henchman, killing him instantly.

The two henchmen bring Gordon down here.

Bane also threatens the government forces to guard the city burn.

He manages to figure out what she saw of his fight with Bane.

The explosion echoes through the boiler room, and take up positions in the chest and falls.

# Model: LSTM (Keras)

```
----- Generating text after Epoch: 95
----- Diversity:0.3
----- Generating with seed:
"to fire for me only so don't try"
to fire for me only so don't try something so by that there is been back to tell the ship. he turns to see him. if i'm gonna get a few
----- Diversity:0.4
----- Generating with seed:
"to fire for me only so don't try"
to fire for me only so don't try something so has a lot way here. so just caine that away who will tell you hear where this he's new pu
----- Diversity:0.5
----- Generating with seed:
"to fire for me only so don't try"
to fire for me only so don't try something more back. day, going. i'm so is gonna know how who will then you if that. you were deal back
----- Diversity:0.6
----- Generating with seed:
"to fire for me only so don't try"
to fire for me only so don't try one of a way to doing her. then he will dozen i'll see did arm, end home. the jupiter arthur, obvious b
----- Diversity:0.7
----- Generating with seed:
"to fire for me only so don't try"
to fire for me only so don't try something so hand for clear back truth — that. i hear no, we're fills an on, service craft of out. the
```

```
111/1640 [=>.....] - ETA: 1:55 - loss: 2.1848e-04 - accuracy: 0.2697
112/1640 [=>.....] - ETA: 1:55 - loss: 2.1835e-04 - accuracy: 0.2704
113/1640 [=>.....] - ETA: 1:55 - loss: 2.1853e-04 - accuracy: 0.2696
114/1640 [=>.....] - ETA: 1:55 - loss: 2.1846e-04 - accuracy: 0.2703
115/1640 [=>.....] - ETA: 1:55 - loss: 2.1870e-04 - accuracy: 0.2693
116/1640 [=>.....] - ETA: 1:55 - loss: 2.1882e-04 - accuracy: 0.2686
117/1640 [=>.....] - ETA: 1:55 - loss: 2.1850e-04 - accuracy: 0.2695
118/1640 [=>.....] - ETA: 1:55 - loss: 2.1858e-04 - accuracy: 0.2693
119/1640 [=>.....] - ETA: 1:55 - loss: 2.1847e-04 - accuracy: 0.2697
120/1640 [=>.....] - ETA: 1:55 - loss: 2.1861e-04 - accuracy: 0.2690
121/1640 [=>.....] - ETA: 1:55 - loss: 2.1836e-04 - accuracy: 0.2696
122/1640 [=>.....] - ETA: 1:55 - loss: 2.1849e-04 - accuracy: 0.2692
123/1640 [=>.....] - ETA: 1:55 - loss: 2.1819e-04 - accuracy: 0.2703
124/1640 [=>.....] - ETA: 1:55 - loss: 2.1840e-04 - accuracy: 0.2699
125/1640 [=>.....] - ETA: 1:55 - loss: 2.1841e-04 - accuracy: 0.2700
```

One-layer Bidirectional LSTM with 128 units,  
which preserve the information from past and  
future while adding dropout regularization  
technique to prevent overfitting

# Going Forward

Continue to explore dialogue generators and sentiment analyzers

Combine sentiment with dialogues

Improve the quality of the dialogues

# Demo

Two models comparison

