MODELO DE LENGUAJE CONDICIONAL:

Conversaciones para dar órdenes a un asistente virtual

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Introducción

El procesamiento de lenguaje natural es el área de la inteligencia artificial en la que se analizan y crean modelos para entender el lenguaje del ser humano, y se impulsa el desarrollo de algoritmos y técnicas para que las máquinas puedan reproducirlo de manera exitosa.

Las tareas de procesamiento natural requieren de un modelo de lenguaje, que permita calcular probabilidades y construir predicciones.

Modelo de lenguaje condicional

Un modelo de lenguaje condicional asigna probabilidades a expresiones, condicionadas a otras expresiones.

En general, un modelo de lenguaje condicional se puede representar como sigue:

$$P_\theta(U_t | f(U_{1:t-1}))$$

Datos

Los datos utilizados en este proyecto son el conjunto de datos Taskmaster-1, liberado de manera gratuita en 2019 por sus autores. La base de datos está formada por 13,215 diálogos orientados a realizar seis tipos de tareas:

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- Ordenar pizzas.
- Realizar citas con el mecánico.
- Solicitar un servicio de transporte (Uber, Lyft).
- Comprar boletos de cine.
- Ordenar café.
- Reservar un restaurante.

Typos

```
{
  "index": 27,
  "speaker": "ASSISTANT",
  "text": "OK. Peace out, JP (*'cause
  we're going to have colloquial
  speech in our AI soon, right?)"
}
```

```
{
  "index": 18,
  "speaker": "USER",
  "text": "(25 minutes later) Is someone here?"
},
{
  "index": 19,
  "speaker": "ASSISTANT",
  "text": "Hey here is your pizza."
},
```

```
{
  "index": 20,
  "speaker": "USER",
  "text": "n/a"
},      {
  "index": 21,
  "speaker": "ASSISTANT",
  "text": "n/a"
},        {
  "index": 22,
  "speaker": "USER",
  "text": "n/a"
},        {
  "index": 23,
  "speaker": "ASSISTANT",
  "text": "n/a"
}
```

Modelo utilizado

El modelo implementado fue un encoder-decoder con un mecanismo de atención.
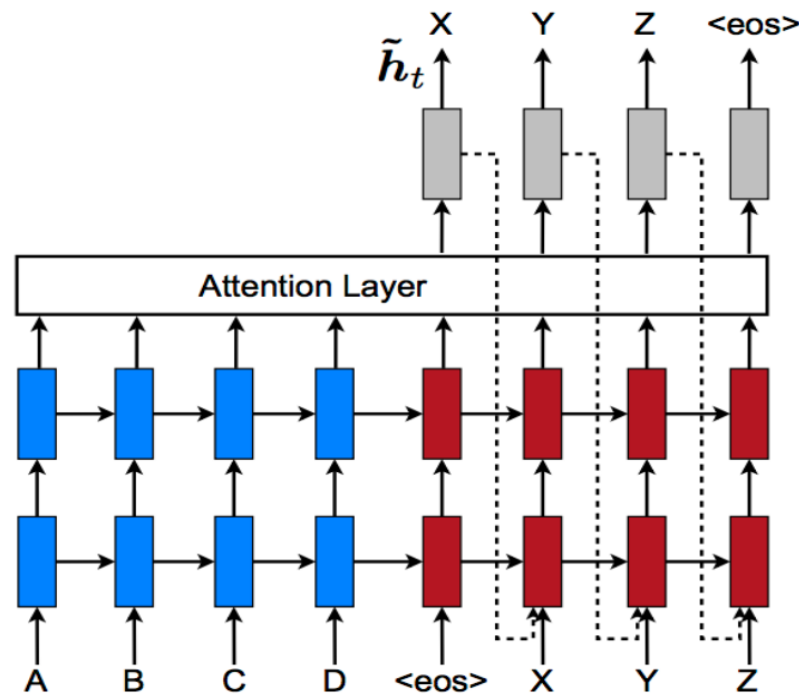
Resultados obtenidos

Asistente y usuario

- Entrenando la red considerando respuestas del asistente y del usuario

n=3

Entrada	Predicción
i would like to order a pizza from papa johns	hi , i would like to order a pizza from pizza hut
hi i want to eat some pizza	i need to order a pizza from pizza hut
do you have any promotion	i would like to order a pizza from pizza hut
what is the cost of the extra ingredient	ok , i will order the pizza hut , is that correct \?
what is the delivery time	ok , i will order the pizza for me please

```
Epoch 15 Batch 0 Loss 0.2384
Epoch 15 Batch 100 Loss 0.2377
Epoch 15 Batch 200 Loss 0.2708
Epoch 15 Batch 300 Loss 0.2640
Epoch 15 Batch 400 Loss 0.2848
Epoch 15 Batch 500 Loss 0.3148
Epoch 15 Batch 600 Loss 0.3322
Epoch 15 Loss 0.2711
Time taken for 1 epoch 1519.9763906002045 sec
```

n=5

Entrada	Predicción
i would like to order a pizza from papa johns	i would like to order a pizza from pizza hut \. <end>
hi i want to eat some pizza	i want to order a pizza from pizza hut <end>
do you have any promotion	i would like to order a pizza from pizza hut <end>
what is the cost of the extra ingredient	**i want a large pepperoni and sausage pizza with pepperoni and sausage \? yes , i would like a large pepperoni and sausage pizza with pe [se repite la oración muchas veces]**
what is the delivery time	i would like a large pepperoni and sausage pizza with pepperoni and sausage

```
Epoch 15 Batch 0 Loss 0.3643
Epoch 15 Batch 100 Loss 0.3281
Epoch 15 Batch 200 Loss 0.3573
Epoch 15 Batch 300 Loss 0.3409
Epoch 15 Batch 400 Loss 0.3968
Epoch 15 Batch 500 Loss 0.3941
Epoch 15 Batch 600 Loss 0.3359
Epoch 15 Loss 0.3705
Time taken for 1 epoch 663.51744556427 sec
```

* Esta oración tronó el modelo, la oración se repite un gran número de veces

Resultados obtenidos

Solo asistente

Entrenando la red con solo los diálogos del asistente

n=3

Entrada	Predicción
i would like to order a pizza from papa johns	hi , i would like to order a pizza from pizza hut
hi i want to eat some pizza	i will pick it up ?
do you have any promotion	hi , i would like to order a pizza from pizza hut
what is the cost of the extra ingredient	yes , that is correct \.
what is the delivery time	i want to order a pizza from papa johns

```
Epoch 15 Batch 0 Loss 0.3137
Epoch 15 Batch 100 Loss 0.2875
Epoch 15 Batch 200 Loss 0.3279
Epoch 15 Batch 300 Loss 0.3492
Epoch 15 Loss 0.3084
Time taken for 1 epoch 226.01698684692383 sec
```

n=5

Entrada	Predicción
i would like to order a pizza from papa johns	i would like to order a pizza from pizza hut \.
hi i want to eat some pizza	i want to order a pizza from pizza hut
do you have any promotion	i would like to order a pizza from pizza hut \.
what is the cost of the extra ingredient	i would like to order a pizza from pizza hut \.
what is the delivery time	i would like to order a pizza from pizza hut \.

```
Epoch 15 Batch 0 Loss 0.4576
Epoch 15 Batch 100 Loss 0.4307
Epoch 15 Batch 200 Loss 0.4688
Epoch 15 Batch 300 Loss 0.3720
Epoch 15 Loss 0.4135
Time taken for 1 epoch 498.0246253013611 sec
```