

# **Search at Farfetch**

## **A glimpse of Semantic Search**

**José Marcelino**

**In a traditional search engine,  
what happens when I type into the  
search bar the query 'dress'?**

# 'dress'?





Luxury Italian fashion house Valentino is famed for its classic designs infused with its own signature modern edge and Rockstud details. These red leather Rockstud pumps from Valentino feature a pointed toe, Rockstud embellishments and a high stiletto heel.



Fiery red polka dot short **dress** from Ganni featuring a round neck, long sleeves, a straight fit, a polka dot print, a rear zip fastening and a ruched asymmetric hem.

# 'dress'?



FARFETCH



White asymmetric maxi **dress** from Self-Portrait featuring a fitted waist, a one shoulder design and pleated skirt.



Fiery red polka dot short **dress** from Ganni featuring a round neck, long sleeves, a straight fit, a polka dot print, a rear zip fastening and a ruched asymmetric hem.

# 'red dresses'?





White asymmetric maxi dress from Self-Portrait featuring a fitted waist, a one shoulder design and pleated skirt.



Fiery red polka dot short dress from Ganni featuring a round neck, long sleeves, a straight fit, a polka dot print, a rear zip fastening and a ruched asymmetric hem.



# Text-Normalization

‘Red dresses’  
[‘red’, ‘dresses’]  
[‘red’, ‘dress’]



White asymmetric maxi **dress** from Self-Portrait featuring a fitted waist, a one shoulder design and pleated skirt.



Fiery **red** polka dot short **dress** from Ganni featuring a round neck, long sleeves, a straight fit, a polka dot print, a rear zip fastening and a ruched asymmetric hem.

**Items with the term should have a higher score.**

**The field where the match  
appears is also important for  
scoring**

New Season

## **GOLDEN GOOSE DELUXE BRAND**

Golden Zip metallic boots

Renowned for creating comfortable apparel with a vintage-inspired flair, the collections from Golden Goose Deluxe Brand combine the perfect balance between ultra-luxe and modernity. These silver-tone leather Golden Zip metallic boots feature a pointed toe, a side zip fastening, a low block heel and stitching details.

Designer Style ID: G34WS108C2

Colour: C2 metallic

Made in Italy

Composition

Lining: leather 100%

Sole: leather 100%

Lining: cotton 100%

Outer: leather 100%

**The relevance of words  
themselves depends on their  
commonness.**

**In a simplistic view, we just need  
to define the function that  
weights all the mentioned factors.**

**Then, we just apply a minimum cut-off value to these scores and we have a reasonable search engine working.**



**“golden shoes”**



Women

**Men**

Kids

**SALE** NEW IN DESIGNERS CLOTH



golden shoes



10,000+ pieces

### Category

Accessories

Activewear

Clothing

Lifestyle

Shoes

Vintage

Watches

### Designer



Sort by ▾



New Season

**BERWICK SHOES**

classic derby shoes

\$313



Founded in 2000 by Francesca and Alessandro Gallo, Italian label Golden Goose Deluxe Brand focuses on creating laid back ready-to-wear with a fashion slant. Crafted from emerald green suede, these City shoes from Golden Goose Deluxe Brand feature an almond toe, a lace-up front fastening, a branded insole and a flat sole.

**Golden shoes from Fendi.**  
**Black Golden Goose shoes.**

**“red dress”**

**Red dress from Gucci.**  
**This is a white Red Valentino dress.**

**I want to give meaning to each sentence.**

**Each word or group of words may have a meaning which depends of the context.**



**I have specific groups for each of those ‘meanings’ in Farfetch context.**

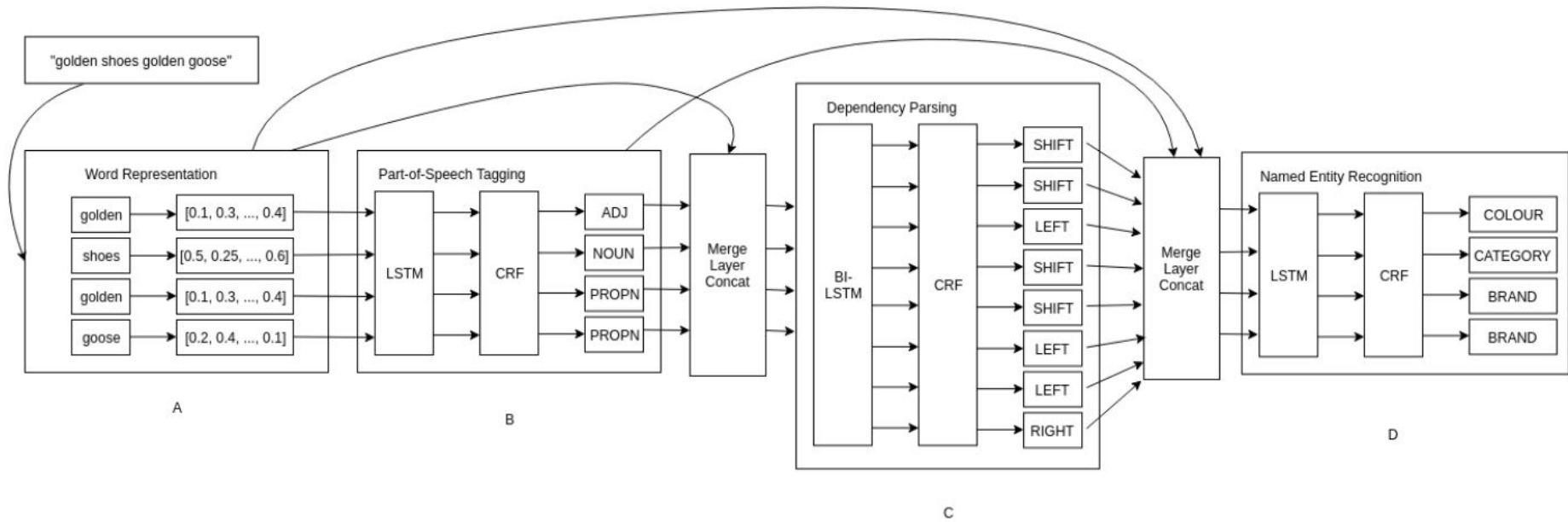
**I will call them Entities  
(*Brand*, *Category*, *Colour* ...)**

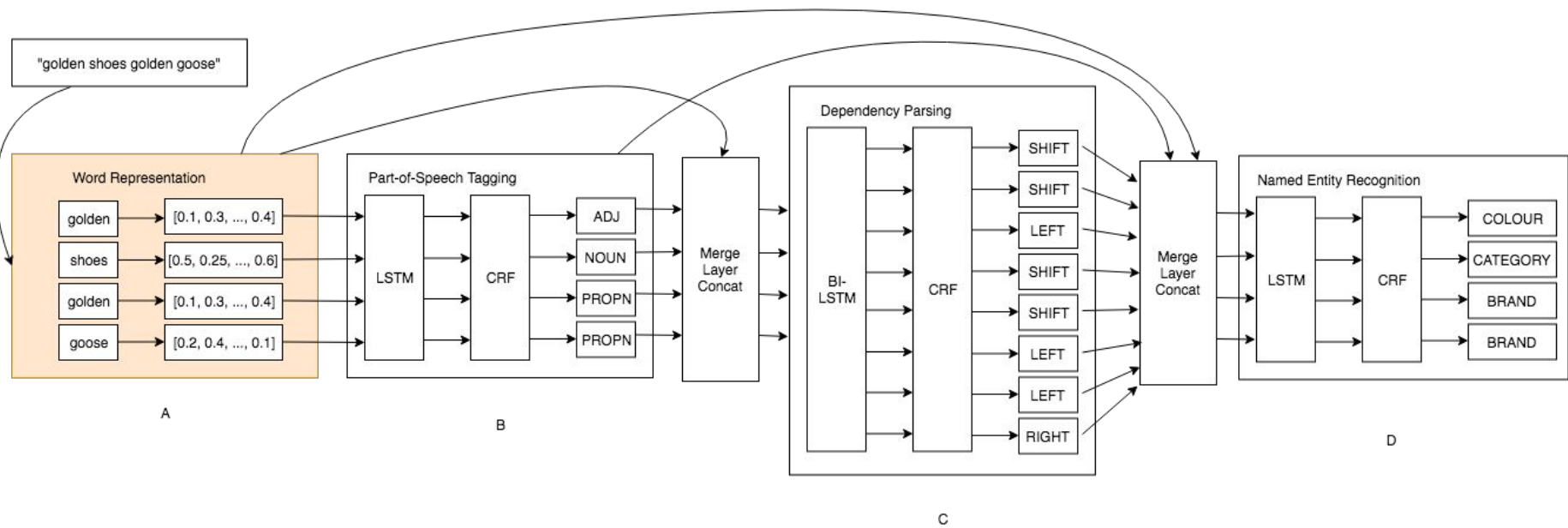
**I want to be able to predict  
Entities  
(‘Brand’, ‘Category’, ‘Colour ...)  
in unseen data based on complex  
patterns around grammar.**

**There is a vast record of research  
around Natural Language  
Processing.**

# **A Hierarchical Deep Learning Natural Language Parser for Fashion**

**“golden shoes golden goose”**





# Word Representation

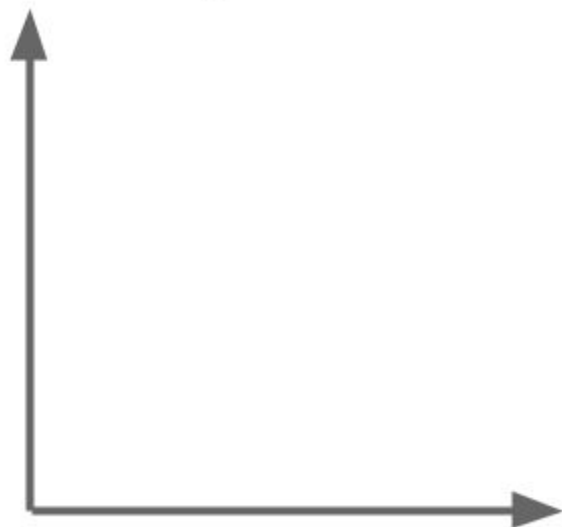
**“golden shoes golden goose”**

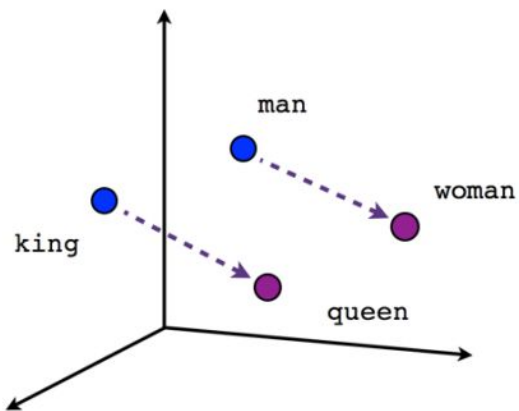
**“golden” “shoes” “golden” “goose”**

**[0.1 ... 0.2] [0.3 ... 0.2] [0.1 ... 0.2] [0.2 ... 0.4]**

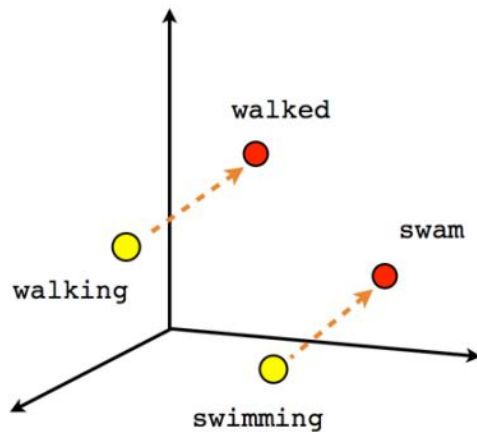


What is  $\text{king} + \text{man} - \text{woman}$ ?

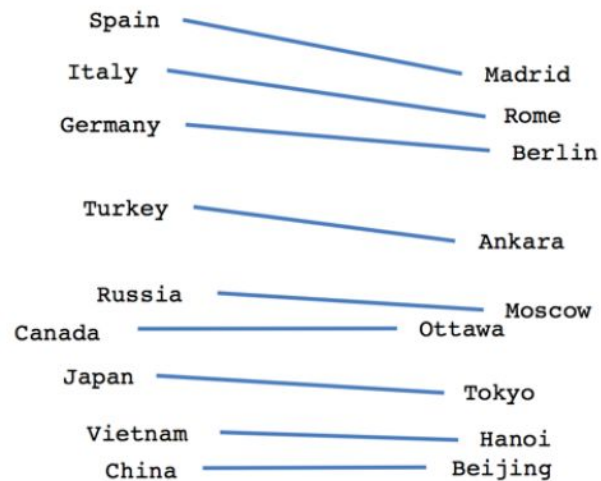




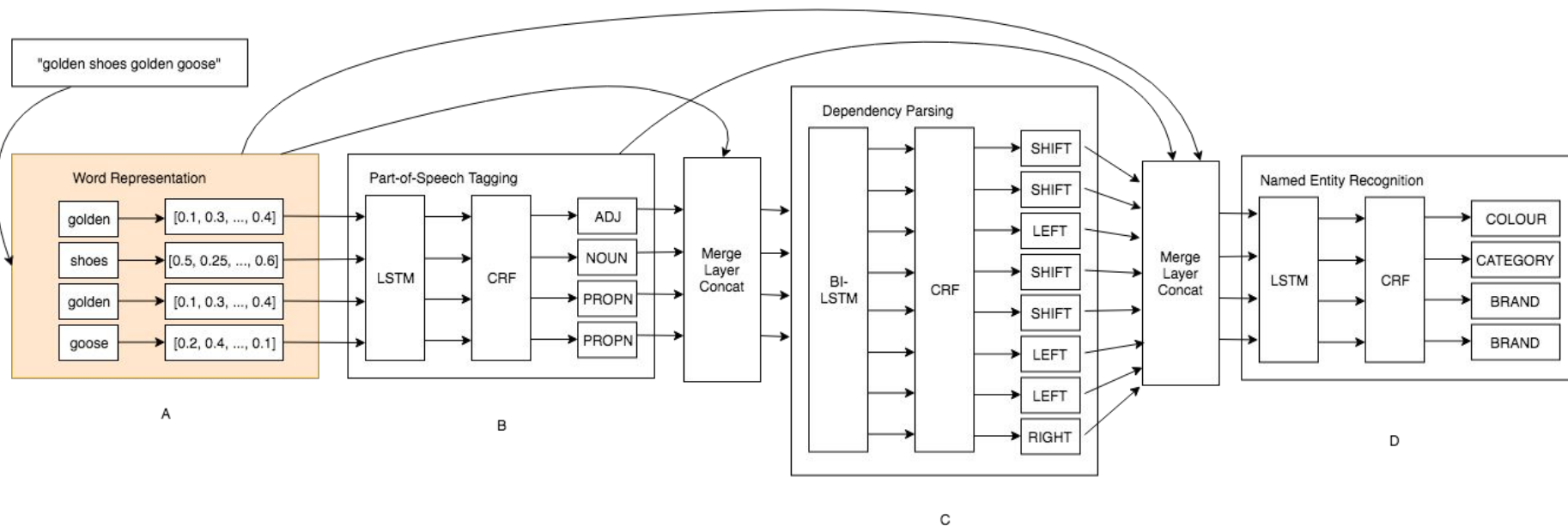
Male-Female



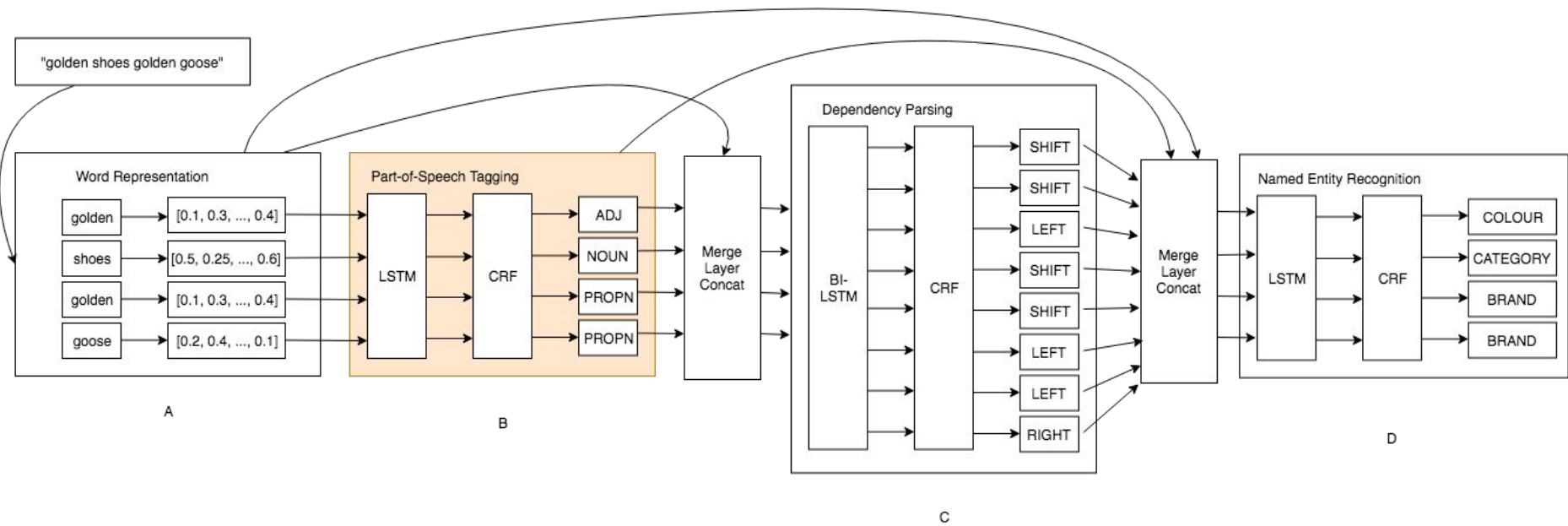
Verb tense



Country-Capital

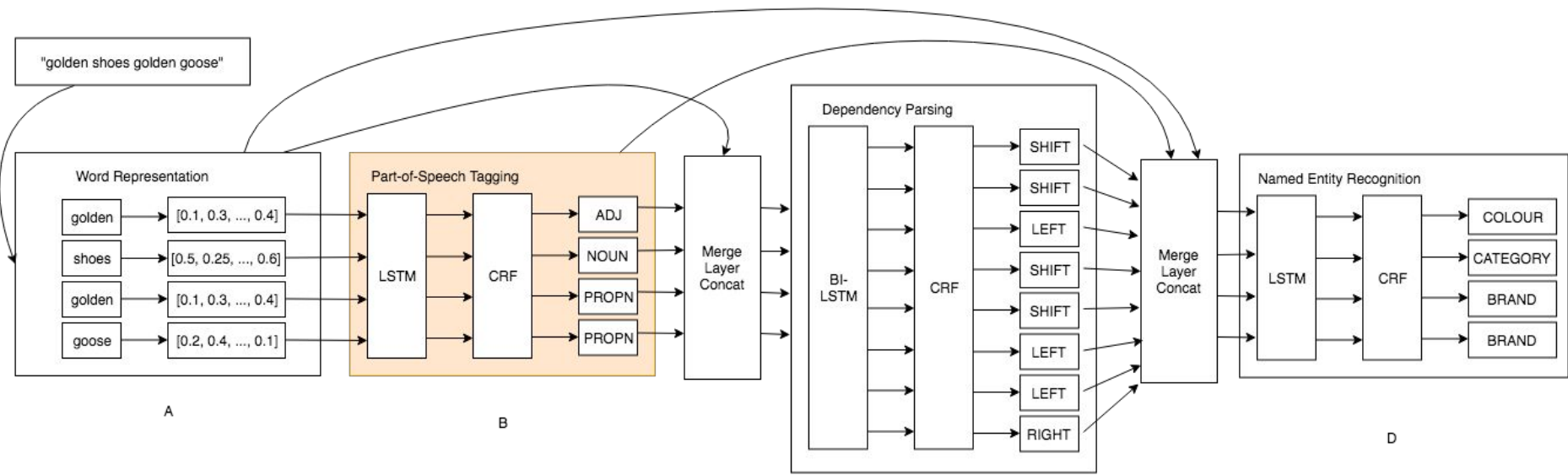


# Glove - fastText - word2vec

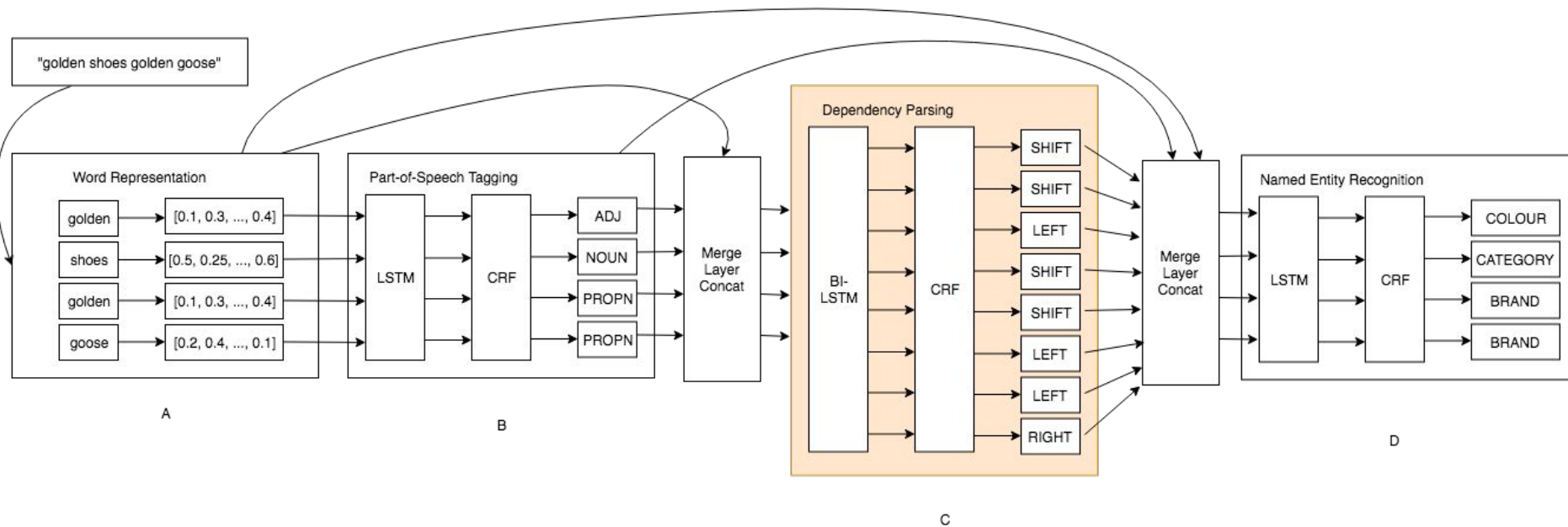


# Part-of-Speech Tagging

“golden” “shoes” “golden” “goose”  
ADJECTIVE NOUN P.NOUN P.NOUN

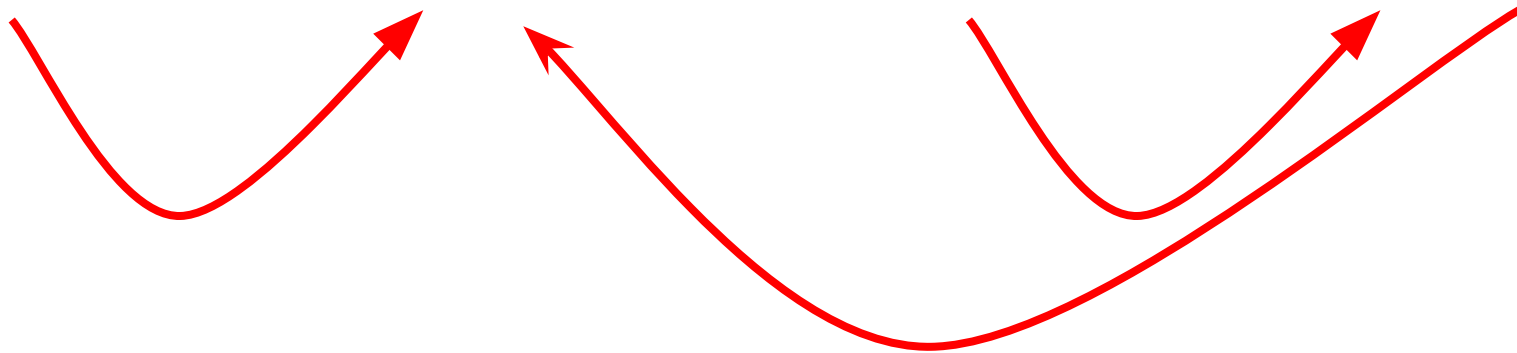


# End-to-end Sequence Labeling via Bi-directional LSTM-CNNs-CRF (*Xuezhe Ma and Eduard H. Hovy. 2016*)



# Dependency Parsing

**“golden” “shoes” “golden” “goose”**





Stack

Buffer

**ROOT**

**“golden” “shoes” “golden” “goose”**

Stack



Buffer

ROOT “golden”

“shoes” “golden” “goose”

**SHIFT**

Stack



Buffer

ROOT “golden” “shoes”

“golden” “goose”

**SHIFT**

Stack



ROOT “golden” “shoes”

Buffer

“golden” “goose”

LEFT

Stack



Buffer

ROOT “shoes” “golden”

“goose”

**SHIFT**

Stack



Buffer

ROOT “shoes” “golden” “goose”

**SHIFT**

Stack

Buffer



ROOT “shoes” “golden” “goose”

**LEFT**

Stack

Buffer

ROOT “shoes” “goose”




LEFT



Stack

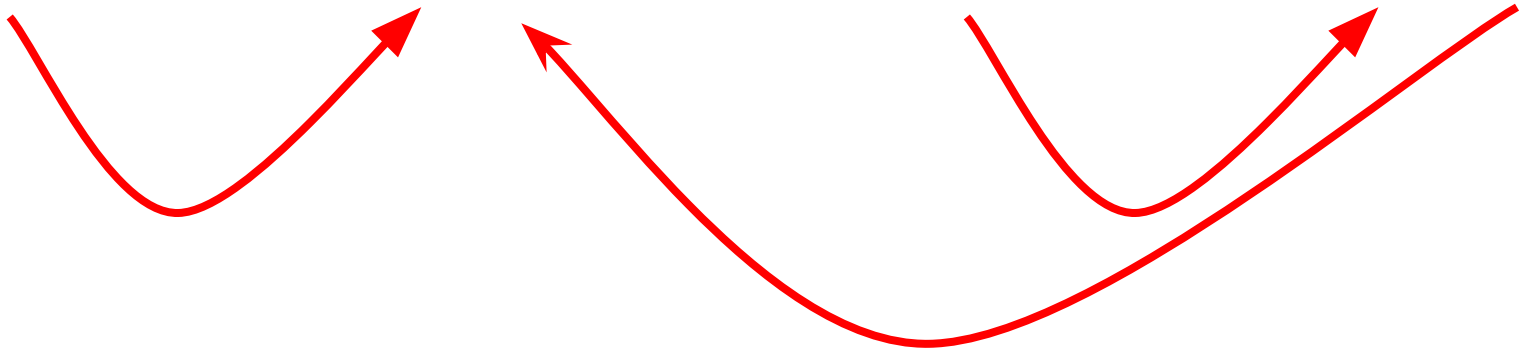
Buffer

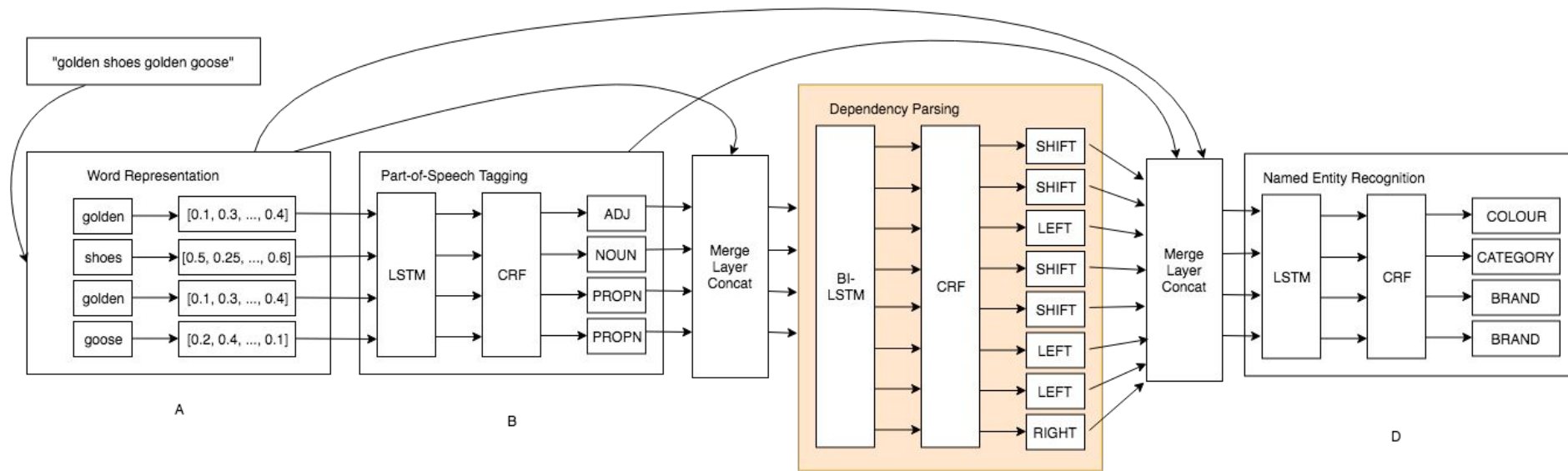


ROOT “goose”

**RIGHT**

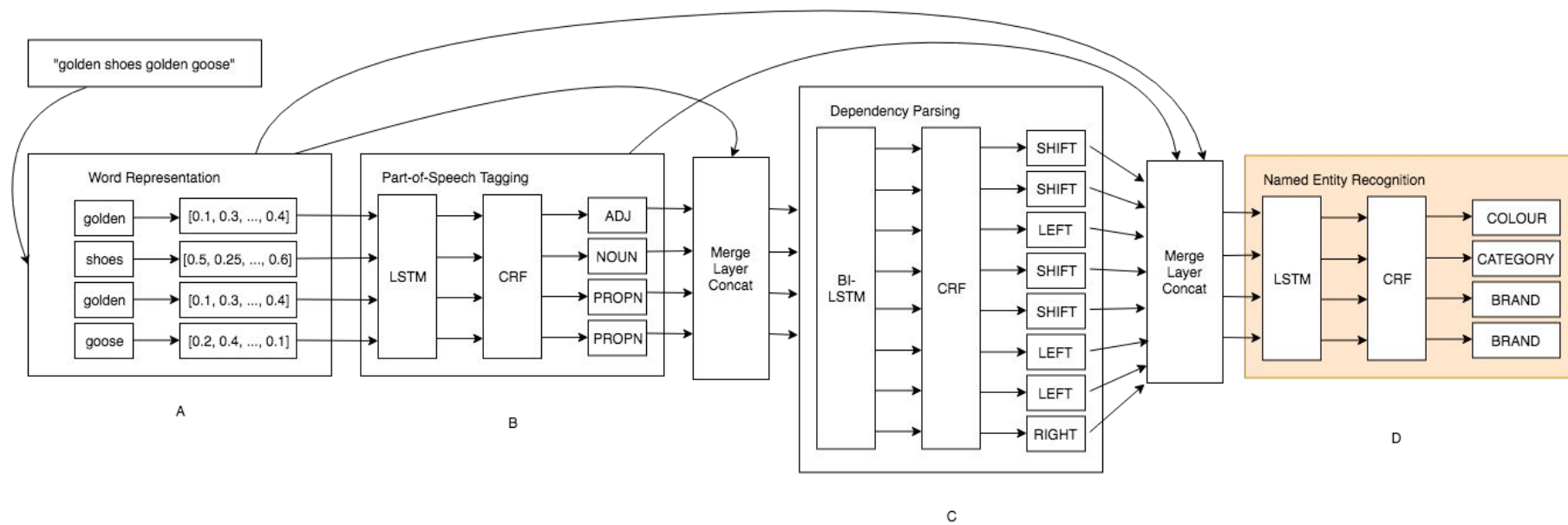
**“golden” “shoes” “golden” “goose”**





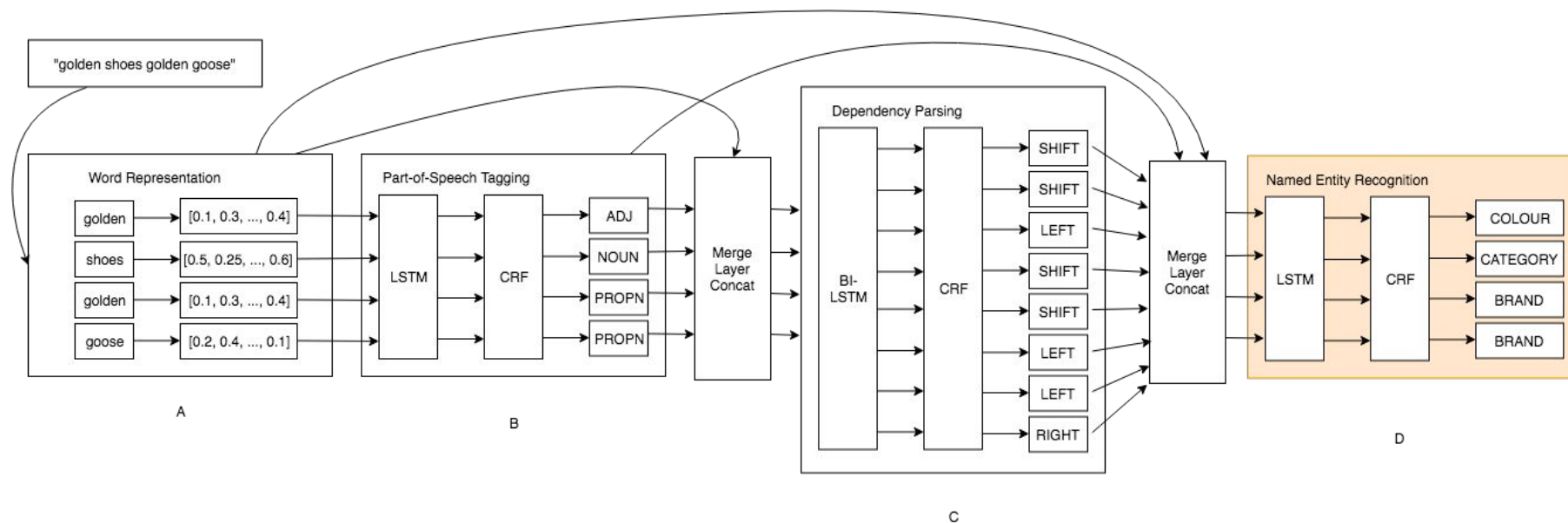
**Transition-Based Dependency Parsing with Stack Long Short-Term Memory (*Dyer et al., 2015*)**

**A Fast and Accurate Dependency Parser using Neural Networks (*Chen and Manning, 2014*)**



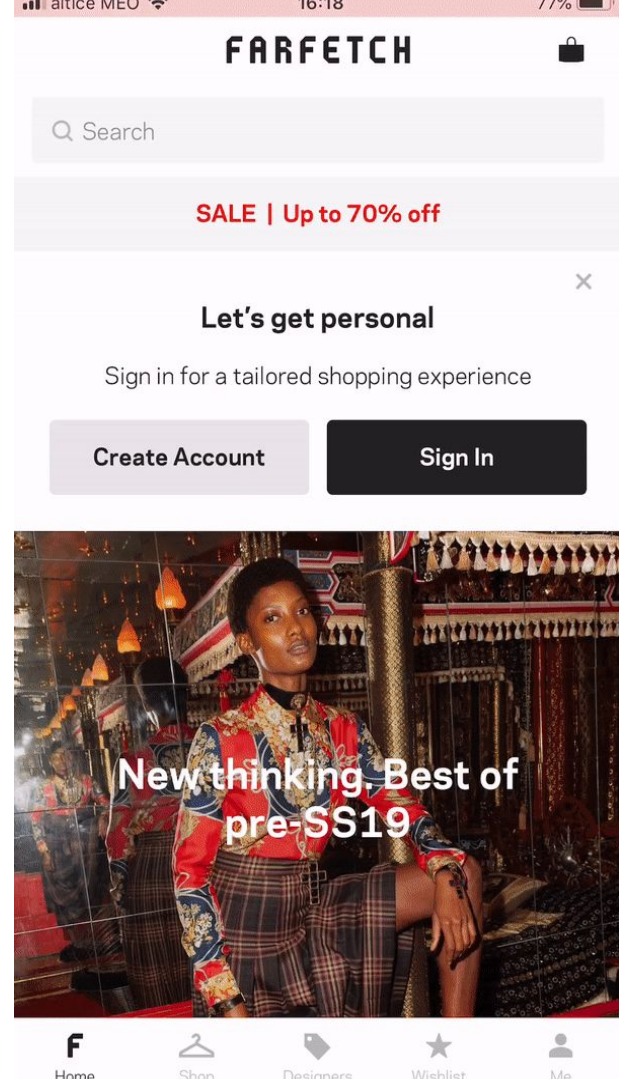
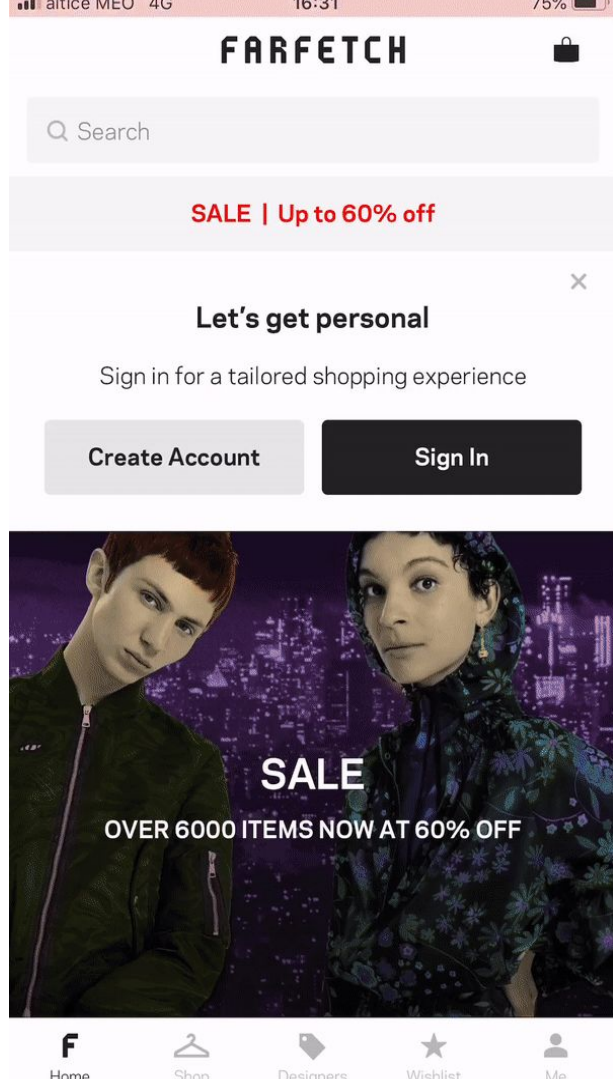
# Named Entity Recognition

**“golden” “shoes” “golden” “goose”**  
**COLOUR CATEGORY BRAND BRAND**



# End-to-end Sequence Labeling via Bi-directional LSTM-CNNs-CRF (*Xuezhe Ma and Eduard H. Hovy. 2016*)

**We render over 91k unique words  
and 21.3M annotated sentences.**





*In Proceedings of KDD (KDD Workshop on AI for Fashion)*

*José Marcelino, Luís Baia, João Faria and Ricardo Gamelas Sousa. [A Hierarchical Deep Learning Natural Language Parser for Fashion](#)*

**Thank you**