

## Bloomberg

## The Impact and Importance of Keyphrases in Building NLP Products

#### Engineering

#### **Role of NLP in Finance**

Example

**Apple Working to Bring More Financial Services In-House** 

Apple Inc. is developing its own payment processing technology and infrastructure for future financial products, part of an ambitious effort that would reduce its reliance on outside partners over time, according to

A multiyear plan would bring a wide range of financial tasks in-house, said the people, who asked not to be identified because the plans aren't

public. That includes payment processing, risk assessment for lending,

fraud analysis, credit checks and additional customer-service functions

The effort is focused on future products, rather than Apple's current lineup

of services. Still, the news sent shares of CoreCard Corp. and Green Dot

Corp. -- two of Apple's existing partners -- down more than 10% apiece on

Wednesday. Goldman Sachs Group Inc., another key partner, slipped as

The push would turn the company into a bigger force in financial services, building on a lineup that already includes an Apple-branded credit card.

peer-to-peer payments, the Wallet app and a mechanism for merchants to

accept credit cards from an iPhone. Apple is also working on its own subscription service for hardware and a "buy now, pay later" feature for

- NLP extracts structure from data by identifying:
- Entities
- Key Concepts

people with knowledge of the matter.

such as the handling of disputes.

much as 1.2%.

- Topics
- Sentiment

- Facilitates search, discovery, analytics:
  - Time Series
  - Newsworthiness
  - Semantic Search

## Mayank Kulkarni

#### Identifying Keyphrases in Story Clusters

NSTM: Real-Time Query-Driven News Overview Composition at Bloomberg (Bambrick et al., ACL 2020.)

Related Entities: Apple CoreCard



**Related Keyphrases:** Financial Products 1

#### **Keyphrase Analytics: Track Sentiment over time**

APL US \$ ↓ 177.77 -1.19 ↔ 177.66/177.790 9x255 III 11 At 16:00 d Vol 89,472,160 0 178.55Z H 179.610 L 176.70D Val 15.9328

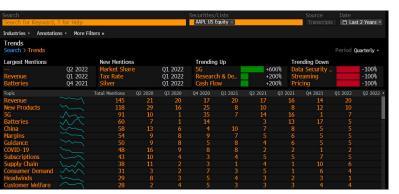
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# 08:00 16:00 28 Mar 2022

#### **Time Series Analysis: Search Trends over time**



REP

KeyBAR

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FINANCIAL TECHNOLOGY ELECTRONICS SOFTWARE FINANCIAL SOFTWARE

**Our recent work on Keyphrases** Learning Rich Representations of Keyphrases **Keyphrase Extraction as Sequence** Labeling using Contextualized Embeddings. from Text. Keyphrases: [Dystrophic epidermolysis bullosa, rare disease, mucous  $k_B$ ki  $k_{O}$  $k_B$  $(y_1)$  $-(y_2) -(y_3)$  $(y_n)$ CRF Layer (Sahrawat et al., ECIR 2020.) (Kulkarni et al., arXiv 2021. [Under Review]). Pre-train RoBERTa-based and BART-based Explore in-domain and generic contextual  $\overrightarrow{h_n}$  $\dot{h_3}$ BiLSTM architectures with novel Keyphrase-based embeddings with BiLSTM + CRF & BiLSTM pre-training objectives Embedd

State-of-the art performance on Keyphrase Extraction

Apple Pay transactions, Bloomberg has reported.

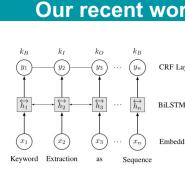


Figure 1: BiLSTM-CRF architecture

State-of-the-art performance on Keyphrase Extraction and Generation

bloomberg/KBIR Updated Feb 16 +  $\downarrow$  238

- Compatible with RoBERTa architectures
- Classification Applications

**Topics** 

**Keyphrases** 

### **Entities**

#### **Applications**

#### **Observe News Trends**

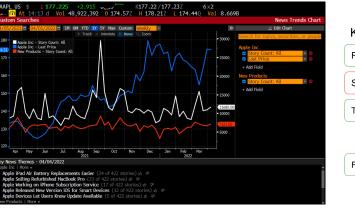
#### Contextualizing Trending Entities in News Stories (Ponza et al., WSDM 2021.)

Companies Security	List To	opics	Region Wo	orldwide 🔹	Trend Period 8 Hours
News Reader Activity News Sentiment Social Sentiment News Volume Social Volume Social Velocity					
Largest Increase La	gest Total				
Security	Δ Pub.	GN	∆ Price	Δ AVAT News Summ	ary
1) Nutex Health Inc			+557.34%	+7.69M% Begin Listin	ng on Nasdaq Market
2) Hertz Global Holdir	gs	~	+8.81%	+131.40% Hertz to Bu	y up to 65,000 Electric Vehicles
3) People's United Fir	a	~	0.00%	-100.00% M&T Bank (	Completes People's United Deal
4 Aareal Bank AG		~	+7.46%	+370.06% Advent, Cer	nterbridge Near Aareal Bank Bid
S Ferrero Internation	al			Kinder Egg	s Recalled Due to Salmonella Fears
6) Starbucks Corp		~	-4.48%	+236.82% Starbucks F	Re-Appoints Schultz as CEO
7) Curis Inc		~	-32.10%	+2.85k% FDA Has Pla	aced Hold on TakeAim Leukemia Study
8 Kangping Technolo	ју 📕	~		-8.37% Kangping T	echnology Suzh : Annual 12/31/2021
9 Suedzucker AG		~	+0.25%	+412.46% Südzucker	AG's Executive Board
10) Twitter Inc		~	+29.50%	+2.64k% Tesla and I	Musk Stake in Twitter

Companies Security Lis	t Topics	Region Worldwi	de 🛃		Trend Period 8 Hours	*
News Reader Activity	ews Sentiment	Social Sentiment	News Volume	Social Volume	Social Velocity	
Most Negative Most Positive						
Security	Sent. ↓ GN	Δ Price Δ	AVAT News Summ	nary		<b>^</b>
1) Twitter Inc	+0.80 🖊	+29.57% +2	.64k% Tesla and	Musk Stake in Tw	itter	
2) Alibaba Group Holdin	+0.72 🖊	+6.26% -2	6.93% China Weig	hs Giving U.S. Ao	cess to Audits	
3) Intercure Ltd	+0.68 🖊	+0.75% +16	1.73% InterCure	to Announce Finar	ncial Results	
4 Geode Capital Manag	+0.67		Fund Owne	d 12,250 Shares	Electronics Stock	
9 Palo Alto Networks I	+0.62 🖊	+1.98% -2	6.25% Palo Alto I	Networks Rises Bo	ofA	
6) Ferrari NV	+0.60 🖊	+4.08% +13	2.41% UBS Adjus	s Ferrari N.V Pric	e Target	
<ol> <li>Jumia Technologies</li> </ol>	+0.57 🖊	+28.48% +1	.32k% UPS Partn	ers With Jumia		
8 Kindred Group PLC	+0.53	+2.49% +2	3.07% Unibet Liv	e in Ontario on Da	V	
9 Logitech Internationa.	+0.49	+5.06% +1	8.23% LOGI Raise	ed to 'Buy' Goldm	an	
10 Danian Matanada Ltd	0 40 1 4	14.00%	471.9 Denien Mar		0% DM an Devenue	

#### **Time Series Analysis: Compare Story Flow**

#### **Emerging & Trending Keyphrases**



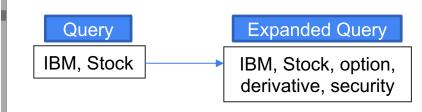
Keyphrase:		Related Entities:	Related Stories:
Financial Products	1	Apple, CoreCard, …	Apple working to bring more Financial Services,
Super Tuesday	ŧ	Pete Buttigieg, Donald Trump	Pete Buttigieg wants to scrap state and I tax deductions
Tax Reform Package	t	Pete Buttigieg, Donald Trump	Pete Buttigieg wants to scrap state and I tax deductions
Fraud Analysis	1	BidFair, Apple	U.K. Makes First Ever NFT Seizure in Crackdown on Tax Fraud, Apple working

#### prove Readability & Accessibility



#### **Query Expansion**

bring more Financial Services



#### Check out our models on HuggingFace

- bloomberg/KeyBART 🕾 Text2Text Generation 🗉 Updated Feb 16 🗉 🤟 365

 Compatible with BART architectures

- Generation and Zero-shot Applications
- Hosted inference API

🕫 Text2Text Generatio

IBM stock Compute

IBm stock;share price;indexation;indexing terms;indexes;inde

> JSON Outp