The 1st Symposium Of Digital Transformation in Continuing Education

Text Mining and Sentiment Analysis: Methods to Enhance Quality of Online Learning

Baha Thabet

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Motivation

- Educational datamining is an emerging research area.
- Aims at discovering learner behavior, insights, learning styles to improve the learning experience.
- Online learning is producing huge amounts of data (big data) in forums, blogs and social media.
- Edu. big data is a novel approach in “Learning Analytics”.

Background (1/3)

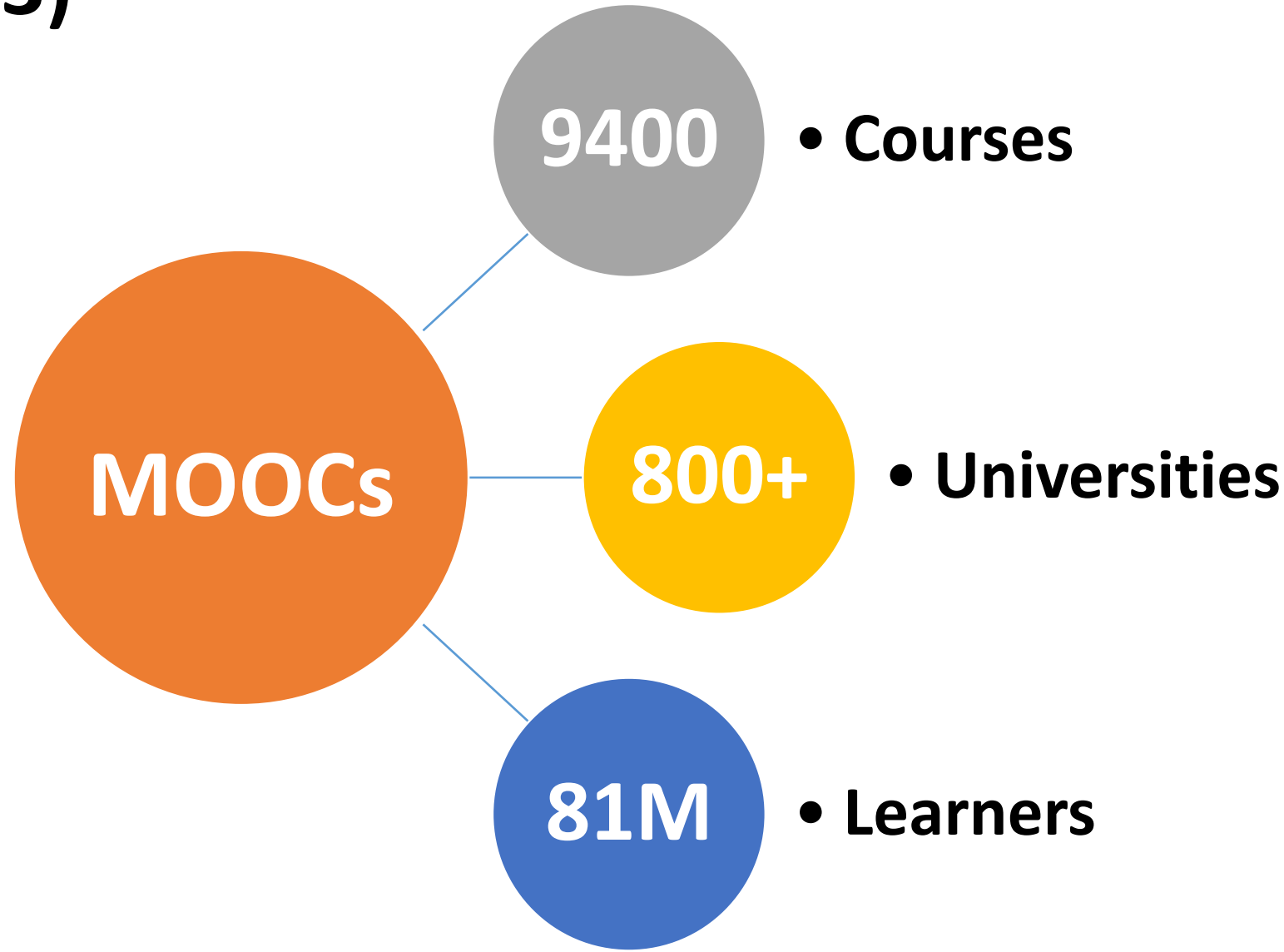
- In the last decade, online learning and education has evolved dramatically.
- Several higher education institutions are offering both credited online courses and professional development courses.

Background (2/3)

- Massive Open Online Courses (MOOCs), are one of the fastest growing learning model worldwide.

Background (3/3)

MOOCs Worldwide in 2017*



*According to Class Central - https://www.class-central.com

Problem

- Learner’s population is increasing extremely.
- High rate of attrition.
- Quality concerns → Content, learner’s styles & expectations, engagement, discussion forums, motivations…
- Learning Experience?

Where To Start?

- Social media, forums, blogs… are a significant part of any online learning environment.
- It’s Producing thousands or millions of text records daily.
- And reflecting learner experiences such as opinions, impressions and reviews.

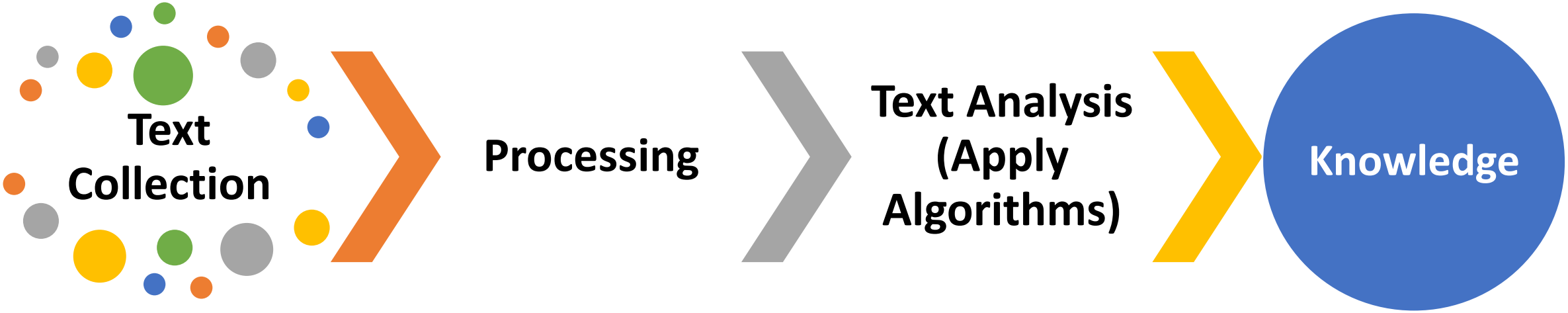
But…!

- Human capabilities cannot handle and analyze these huge unstructured texts!
- Computer can do! But

cannot understand and differentiate between the spelling variation or the contextual meaning

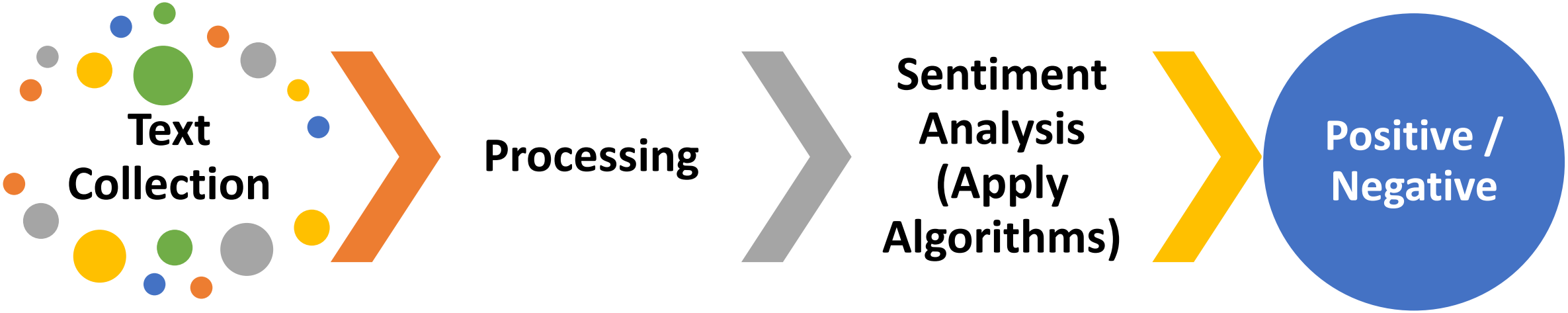
Text Mining and Sentiment Analysis

Text Mining, the process of extracting and revealing new knowledge & semantic relations from unstructured textual data.

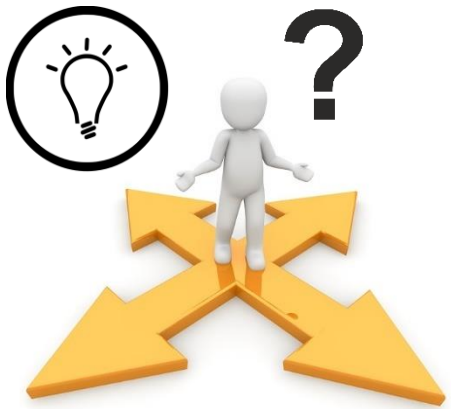


Text Mining and Sentiment Analysis

Sentiment Analysis (opinion mining) the process to analyze opinions and reviews that posted by users regarding an idea, situation or product.



Text Mining and Sentiment Analysis Applications



Business Intelligence

Market Analysis

Online Learning

Industry

Opinion Lexicon-based Approach (1/4)

- Effective method for opinion analysis.
- Introduced in 2011 by 5 scientists (Taboada, Brooke, Tofiloski, Voll & Stede).
- Aims at calculating the sentiment from the semantic orientation of word or phrases that occur in a text.

Opinion Lexicon-based Approach (2/4)

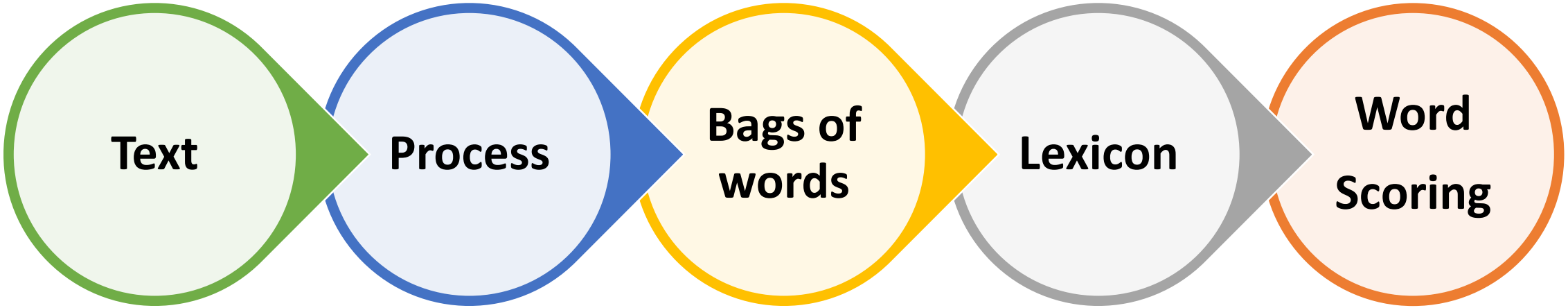
- A dictionary of positive and negative words.
- Each word has a given semantic orientation (SO) value.
- A text message is represented as a bag of words.
- SO values from the dictionary are assigned to the words with a summation function.

Opinion Lexicon-based Approach (3/4)

Examples from the adverb dictionary.

Word	SO Value
excruciatingly	−5
inexcusably	−3
foolishly	−2
satisfactorily	1
purposefully	2
hilariously	4

Opinion Lexicon-based Approach (4/4)

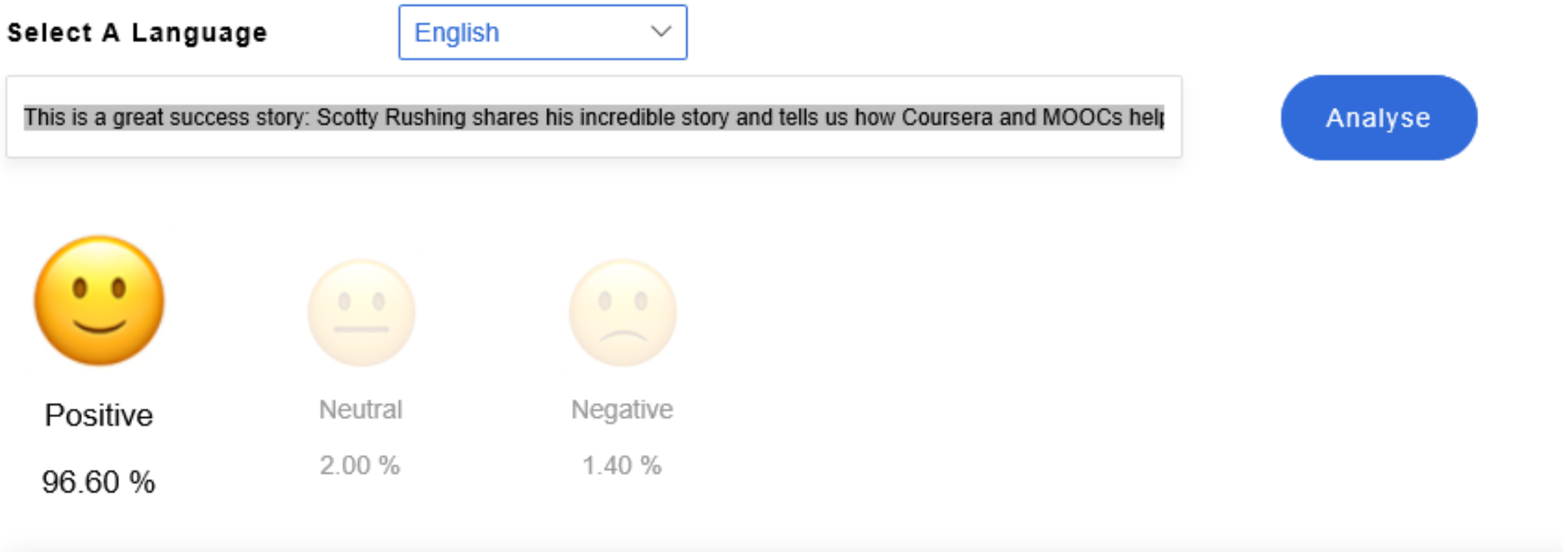


- Opinion or reviews
- Cleaning
- Words to be compared
- Comparing dictionary
- Set SO values from Lexicon to words

Testing Opinion Lexicon-based

- 10 opinions and reviews collected randomly.
- Tested on two online text and sentiment analysis, one of them is using the lexicon-based approach.

Opinion Lexicon Demo (1/5)



Opinion Lexicon Demo (2/5)

Online demo

Please enter your text for analysis or leave default one.

This is a great success story: Scotty Rushing shares his incredible story and tells us how Coursera and MOOCs helped him out of homelessness and onto the road to success.

Run Analysis

Twitter-like content

Language English

scroll down for full analysis

this is a great success story: Scotty Rushing shares his incredible story and tells us how Coursera and MOOCs helped him out of homelessness and onto the road to success.

incredible **great** success

this is a great

This document is: positive (+0.851)

Subjectivity: STRONG SUBJECTIVE

Opinion Lexicon Demo (3/5)

Detected Entities

Coursera	PER	+0.514

Detected Themes

this is a great	**+6.012**

Detected Keywords

great	**+0.908**
success	+0.461
incredible	+0.326

Opinion Lexicon Demo (4/5)

Online demo

Please enter your text for analysis or leave default one.

1. Can't provide for personalized courseware and attention from a tutor
2. It is difficult to keep track of students' assignments and involvement
3. Learners with disabilities and a poor Internet connection can't use MOOCs
4. Language can be a barrier while offering MOOCs

Run Analysis

Twitter-like content

Language English

scroll down for full analysis

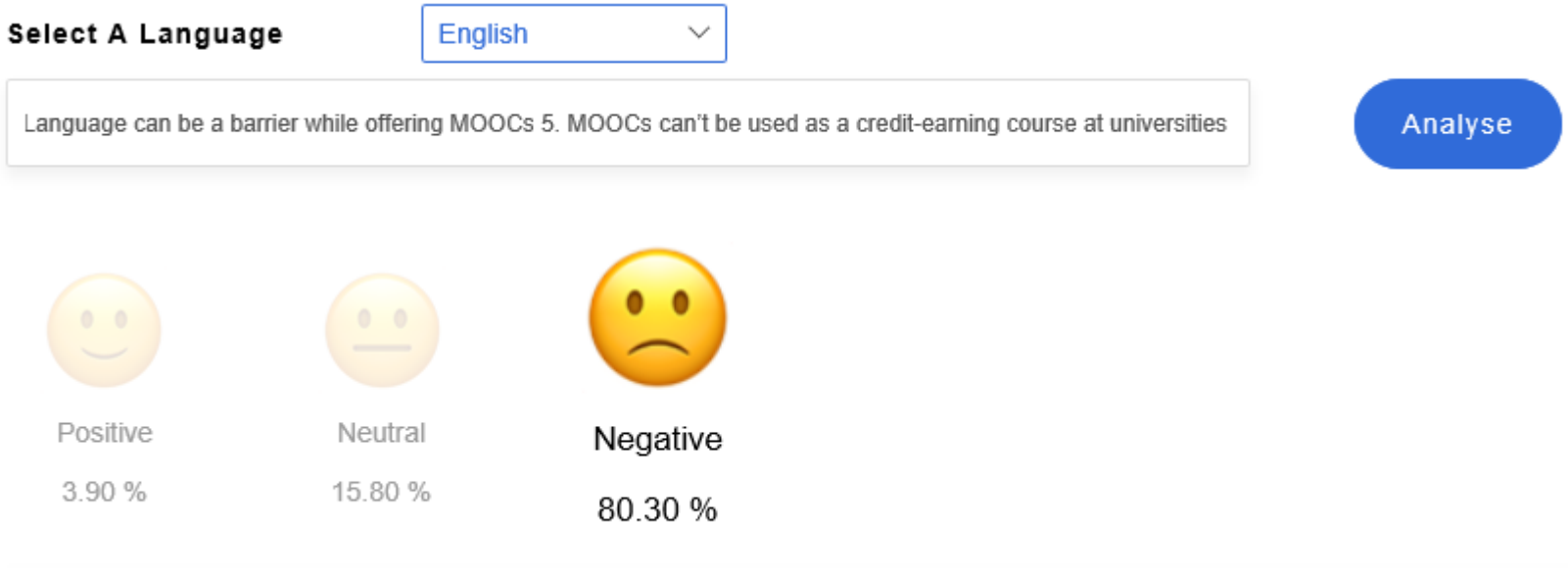
1. Can't provide for personalized courseware and attention from a tutor 2. It is difficult to keep track of students' assignments and involvement 3. Learners with disabilities and a poor Internet connection can't use MOOCs 4. language can be a barrier while offering MOOCs 5. MOOCs can't be used as a credit-earning course at universities

poor difficult provide students language course

This document is: negative (-0.821)

Subjectivity: WEAK SUBJECTIVE

Opinion Lexicon Demo (5/5)



Conclusion (1/3)

- The results shows that the Lexicon based Approach is giving more details about the important words with ranks.
- Sentiment analysis is giving accepted indicators & impressions for specific text as shown in the results.

Conclusion (2/3)

- Learners opinions and reviews can be extracted among huge amounts of text records by text mining and sentiment analysis methods.
- The extracted opinions and reviews can be used to improve the whole learning environment.

Conclusion (3/3)

- Opinion Lexicon dictionary and semantic orientation values can be customized for a specific topic, brand or idea to give more accurate results.

Thank You

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