
Impact Alpha

White Paper

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Proprietary & Confidential

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Introduction

Impact Alpha estimates the social impact of publicly traded healthcare firms, within six specific categories, using artificial intelligence to analyze vast quantities of research and news data.

Specific Categories

- [Saving Lives]
- [Curing & Treating Life Threatening Disease]
- [Improving the Lives of the Elderly]
- [Lowering Costs]
- [Enabling Improved Coordination]
- [Embracing Value-Based Care]



IMPACT SCORE

A quantitative measurement on how well a healthcare company is doing in specific categories.

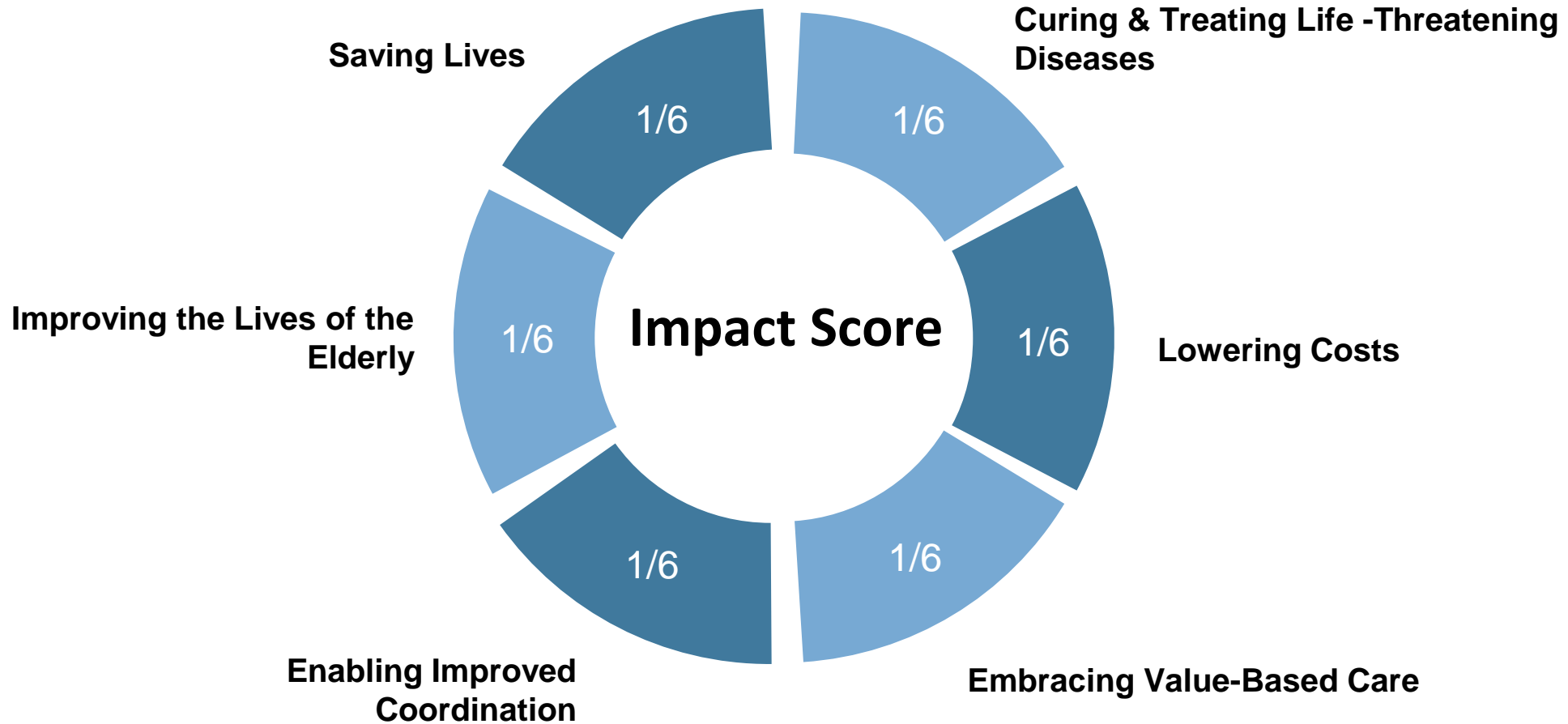
Score Meaning

- It's a number between -1 and 1;
- The absolute value measures the level of the impact;
- The sign measures that the company is benefiting or doing harm to the society.



What is Impact Score?

Using these data, portfolio managers, researchers, and investors can develop and weight their own “Impact Objectives” amongst these six categories.

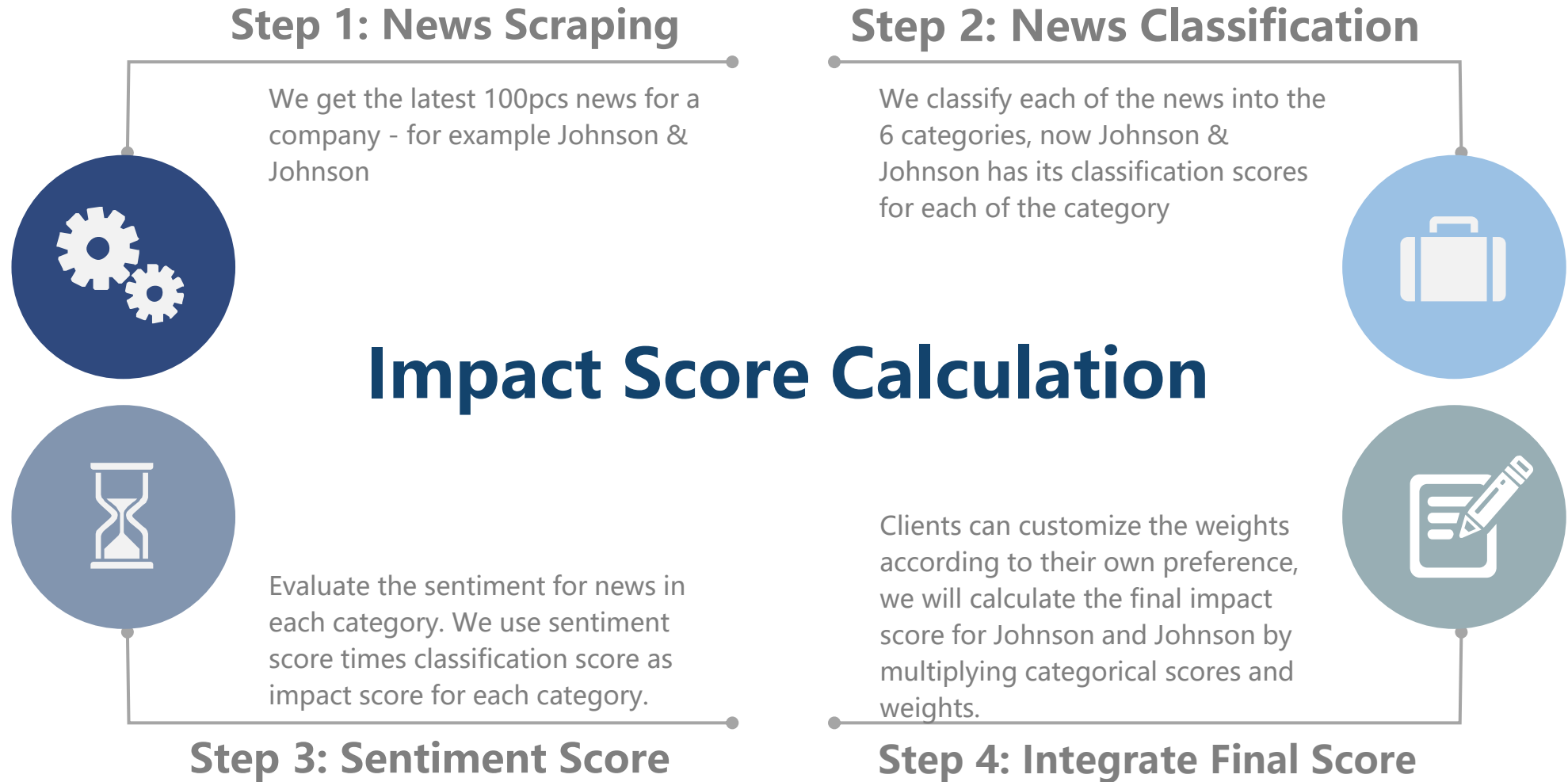


* 1/6 is the weight for each category, clients can customize it according to their own preference



What is Impact Score?

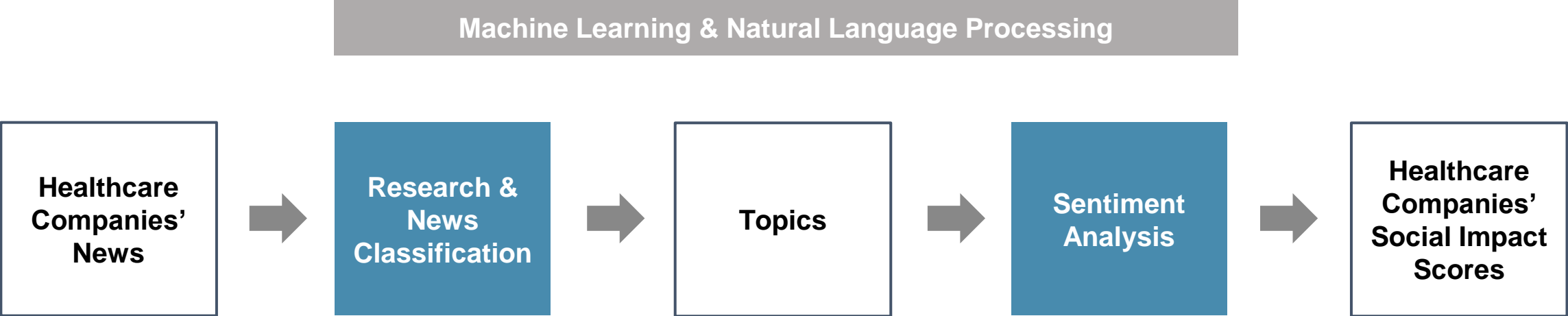
There are four steps in developing a custom impact score:





Methodology: Impact Alpha Portfolio

Impact Alpha is automated using continuous learning big data techniques.



- Saving Lives
- Curing & Treating Life Threatening Disease
- Improving the Lives of the Elderly
- Lowering Costs
- Enabling Improved Coordination
- Embracing Value-Based Care
- General



Methodology: Research & News Classification

Concept

Classify the news into single or multiple categories.

This is a preparation step to create impact scores, which includes web scraping, text cleaning, keywords dictionary building, word filtering, word count.

Model

Word count based on keywords dictionary

Categories

- 1 - Saving Lives
- 2 - Curing & Treating Life-Threatening Diseases
- 3 - Improving the Lives of the Elderly
- 4 - Lowering Costs
- 5 - Enabling Improved Coordination
- 6 - Embracing Value-Based Healthcare
- 7 - General

Data Source

Google news

```
topic_dict = [['save life', 'relieve', 'revive', 'rescue', 'lifesaving', 'salvage',  
              'cure', 'treat', 'disease', 'heal', 'mend', 'amend', 'recur', 'charm',  
              'elderly', 'old people', 'senior'],  
              ['cost', 'money', 'fee', 'pay', 'payment'],  
              ['app', 'apps', 'application', 'system', 'communicate', 'communicati',  
              'effect', 'performance', 'result', 'service', 'consequence', 'upsho',  
              ]]
```

Part of The Keywords Dictionary

Methodology: Research & News Sentiment Analysis



Concept

Analyse the sentiment of news.

We employed “textblob” package in Python to analyze the sentiment of news. Then we calculated the sentiment score of news by multiplying the sentiment scores for each category with the weights from user input and then the mean of sentiment scores for each company to get the final sentiment score.

Model

Sentiment.polarity function from **textblob** package

Categories

- 1 - Saving Lives
- 2 - Curing & Treating Life-Threatening Diseases
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- 4 - Lowering Costs
- 5 - Enabling Improved Coordination
- 6 - Embracing Value-Based Healthcare
- 7 - General

Data Source

Google news

```
@cached_property
def sentiment_assessments(self):
    """Return a tuple of form (polarity, subjectivity, assessments ) where
    polarity is a float within the range [-1.0, 1.0], subjectivity is a
    float within the range [0.0, 1.0] where 0.0 is very objective and 1.0
    is very subjective, and assessments is a list of polarity and
    subjectivity scores for the assessed tokens.

    :rtype: namedtuple of the form ``Sentiment(polarity, subjectivity,
    assessments)``
    """
    return self.analyzer.analyze(self.raw, keep_assessments=True)

@cached_property
def polarity(self):
    """Return the polarity score as a float within the range [-1.0, 1.0]

    :rtype: float
    """
    return PatternAnalyzer().analyze(self.raw)[0]
```

Sentiment Analysis Documentation

Methodology: Impact Alpha Optimization



Impact Alpha Portfolio

$$\begin{aligned} & \text{MAX} \sum_{i=1}^n w_i r_i + \sum_{i=1}^n w_i I_i \\ \text{S.T.} \quad & \sum_{i=1}^n w_i^2 \sigma_i^2 + 2 \sum_{i=1}^{n-1} \sum_{j=i+1}^n w_i w_j \sigma_{ij} \leq v \\ & w_i \geq 0 \\ & \sum_{i=1}^n w_i = 1 \end{aligned}$$

w_i, w_j denotes the proportion of wealth invested in asset i, j ;
 I_i denotes the social impact score of company i ;
 r_i denotes the return of asset i ;
 σ_{ij} denotes the covariance of the return of i with that of j ;
 v denotes the maximum variance allowed.