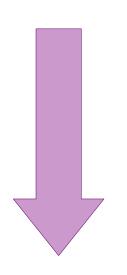


Investigating the relationship between earthquakes and online news

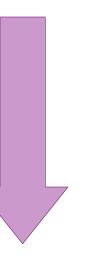
- 1. Data Collection
- Continuous harvesting of data minimum time gap between one cycle and another = every 30 minutes
- Earthquake readings from USGS are updated in database
- Differences in implementations to retrieve news articles (endpoints or direct from news agency site). Duplicate news articles are discarded



- 2. Content Processing
- Discarding unwanted text e.g. author name, date and location at the beginning of the news content; concluding remarks; embedded Javascript
- Trim content (if need be)
- Identifying the language and translating of content (if need be)

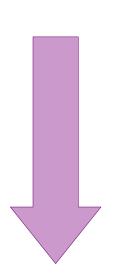


- 3. Content Filtering
- Identifying which news articles mention the word 'quake'
- Sentence segmentation (split content into sentences) if news article mentions the word 'quake'



4. Content Clustering

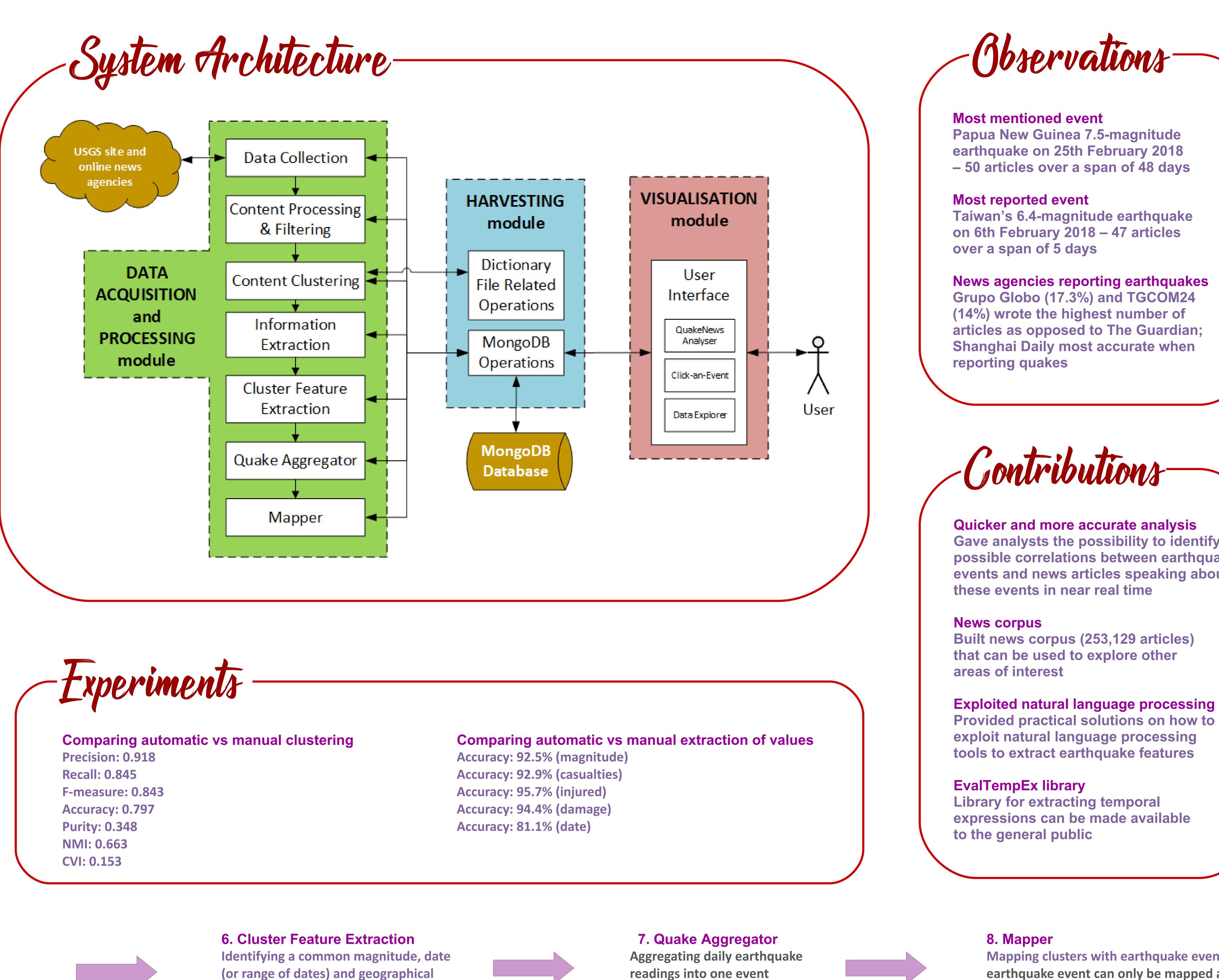
- Remove stopwords (common words) e.g. 'a', 'the' etc.
- Stemmatisation (reduce the inflectional forms from each word to root)
- Bag-of-words of each news article (count frequency of words in each article)
- Identify sentences with earthquake -related terms in each news article
- Term-by-term matrix of each news article Document similarity between news article
- and clusters by comparing bag-of-words



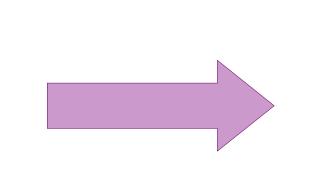
5. Feature Extraction

 Date Resolution (identifying and converting dates to a particular format)

- Tokenisation (splits a sentence into words) • Part of speech tagging (identify nouns, verbs, adjectives etc.)
- Location Resolution verified by GeoNames
- Extract magnitude, number of casualties,
- injured and quantifiable structural damage







location/s

** The news agencies are: ABC (Australia - local and international): Al Jazeera (Qatar): Associated Press (USA): BBC (UK): China Daily (China - local and international): Die Zeit (Germany): El Mundo (Spain): El Pais (Spain local and international); Grupo Globo (Brazil - local and international); India Today (India - local and international); La Nacion (Argentina - local and international); Metro End (UK); News24 (South Africa local and international); Reuters (UK); Shanghai Daily (China - local and international); Soy Chile (Chile - local and international); Sudan Tribune (Sudan); TASS (Russia); TGCOM24 (Italy - local and international); The Guardian (UK); USA Today (USA); Xinhua Net (China).

Multilingual news articles retrieved from 23 news agencies** worldwide



Earthquake readings retrieved from USGS in real-time

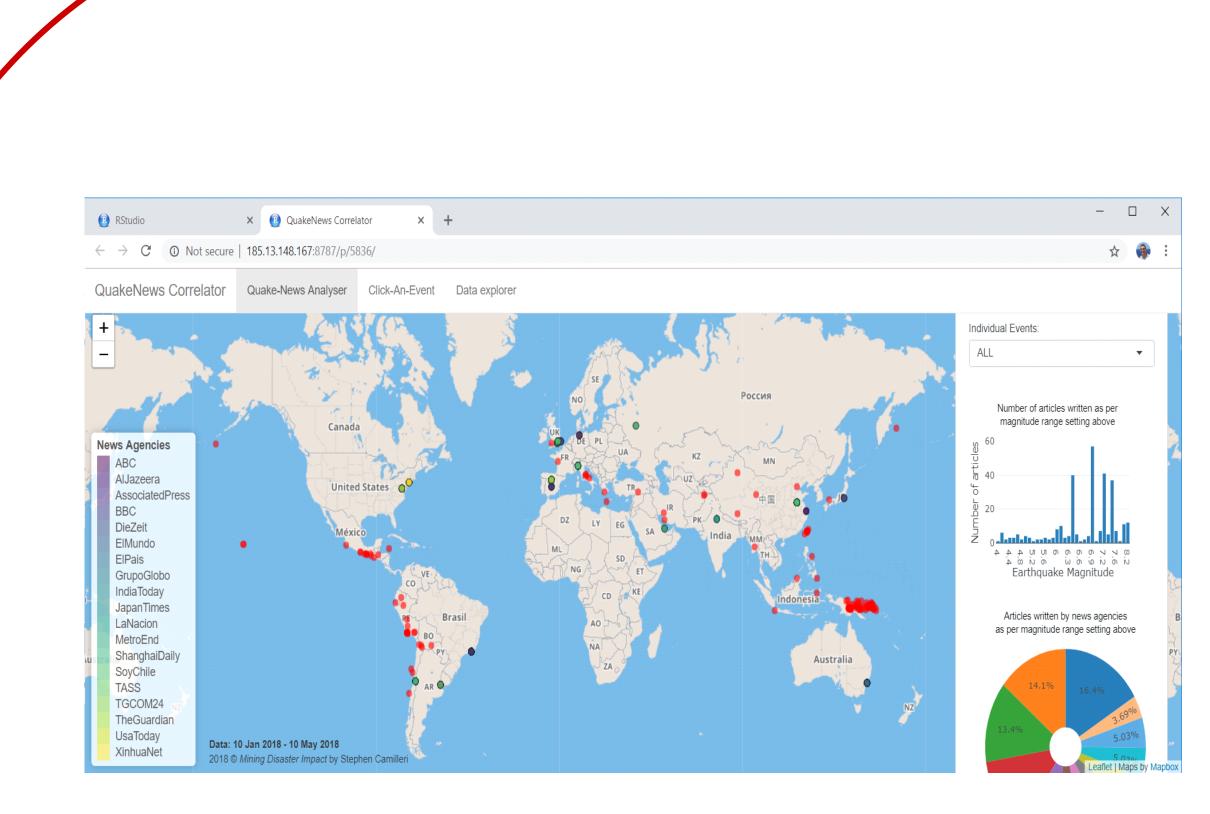
System Inputs

Gave analysts the possibility to identify possible correlations between earthquake events and news articles speaking about

Mapping clusters with earthquake events. An earthquake event can only be mapped against the most appropriate cluster (using location scores). A cluster can be mapped against one / multiple events.



To automatically map in near real-time news articles with earthquake events and to visualise the results via dashboards



Click-An-Event Dashboard

The Click-An-Event dashboard provides markings of earthquakes that have taken place and whose magnitude is greater or equal to 4. Following clicking on marker, the user is presented with colour-coded markers representing the order in which news agency headquarters published articles or according to the names of the news agencies.

provides analysis of which news agencies reacted to a specific earthquake across time

RStudio	× 😰 QuakeNews Correlator	× +
\leftrightarrow \circ \circ	Not secure 185.13.148.167:8787/p/5836/	
QuakeNews Cor	rrelator Quake-News Analyser Click-	An-Event Data explorer
Search words in cont	tent	Source:
		ALL
Show 10 • entries	S	
Date 10 Jan 2018	 Headline 7.2 magnitude earthquake in the Caribbe 	ean Sea: tsunami alert begins
Date 10 Jan 2018	Headline7.2 magnitude earthquake in the Caribbe	-
Date	♣ Headline	-
Date 10 Jan 2018	Headline7.2 magnitude earthquake in the Caribbe	red in Honduras
Date 10 Jan 2018 10 Jan 2018	Headline 7.2 magnitude earthquake in the Caribbe Strong earthquake of 7.6 Richter registe	red in Honduras ake, tsunami warning in place
Date 10 Jan 2018 10 Jan 2018 10 Jan 2018	 Headline 7.2 magnitude earthquake in the Caribbe Strong earthquake of 7.6 Richter registe Caribbean hit by magnitude-7.8 earthquake 	red in Honduras ake, tsunami warning in place ake, tsunami warning in place



Retrieves the earthquake evens and news agency sites, which published articles about those events and displays them in in the specific dashboards + makes them available for searching

Stephen Camilleri (1), Joel Azzopardi (1), and Matthew R. Agius (2) stephen.camilleri.03@um.edu.mt | joel.azzopardi@um.edu.mt | matthew.agius@um.edu.mt

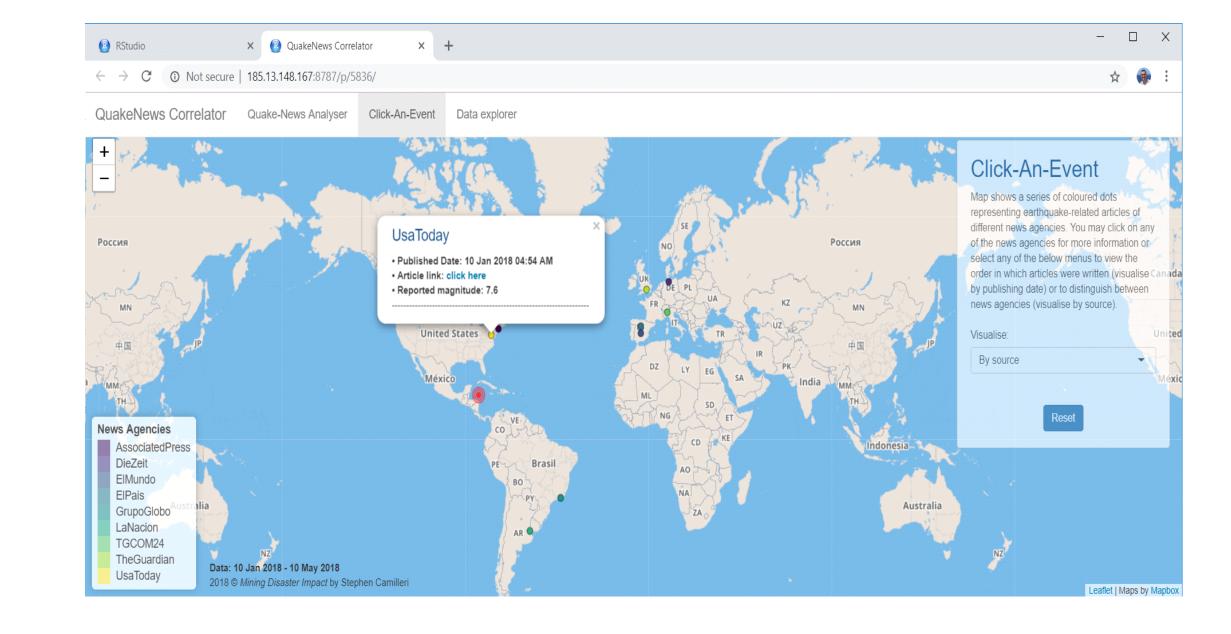


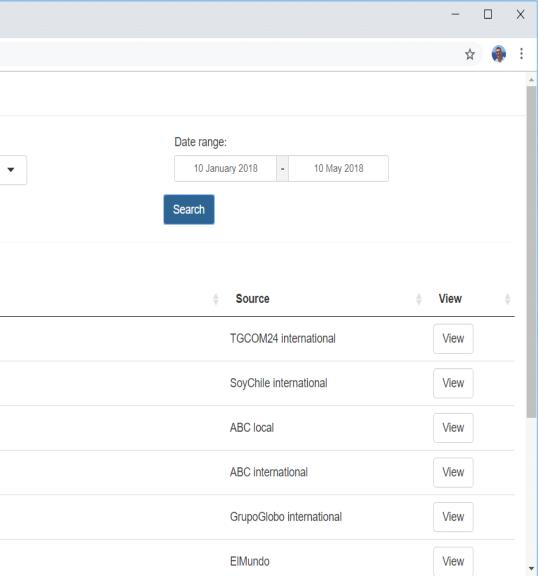
QuakeNews Analyser Dashboard

The QuakeNews Analyser dashboard focuses on identifying relationships between news articles and earthquakes, whose magnitude is greater or equal to 4 and having a specific magnitude range (e.g between 4 and 5). Markers represent the geographical locations where earthquakes took place and geographical locations of news agencies' headquarters, who reported about these events.

provides analysis of how news agencies react to earthquakes of different magnitudes







Data Explorer

In the Data Explorer tab, users are given the chance to search and view all the articles harvested from different news agencies. Filtering of results can be carried out by searching for word/s in the (translated) content and by narrowing the search date and/or news agency.

searches for articles (with filtering) and retrieves content of article and other information

