



Algorithm 2 Event detection and location estimation algorithm.

1. Given a set of queries Q for a target event.
2. Put a query Q using search API every s seconds and obtain tweets T .
3. For each tweet $t \in T$, obtain features A , B , and C . Apply the classification to obtain value $v_t = \{0, 1\}$.
4. Calculate event occurrence probability p_{occur} using $v_t, t \in T$; if it is above the threshold p_{occur}^{thre} , then proceed to step 5.
5. For each tweet $t \in T$, we obtain the latitude and the longitude l_t by i) utilizing the associated GPS location, ii) making a query to Google Map the registered location for user u_t . Set $l_t = \text{null}$ if both do not work.
6. Calculate the estimated location of the event from $l_t, t \in T$ using Kalman filtering or particle filtering.
7. (optionally) Send alert e-mails to registered users.

Table 1: Performance of classification.

(i) earthquake query:

Features	Recall	Precision	F-value
A	87.50%	63.64%	73.69%
B	87.50%	38.89%	53.85%
C	50.00%	66.67%	57.14%
All	87.50 %	63.64%	73.69%

(ii) shaking query:

Features	Recall	Precision	F-value
A	66.67%	68.57%	67.61%
B	86.11%	57.41%	68.89%
C	52.78%	86.36%	68.20%