*algorithms*

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*Article*

# Supplementary material: Measuring the Impact of Financial News and Social Media on Stock Market Modeling Using Time Series Mining Techniques

**Foteini Kollintza-Kyriakoulia [1], Manolis Maragoudakis [1] and Anastasia Krithara [2]**

[1] Department of Information and Communication Systems Engineering, University of the Aegean, Samos GR-83200, Greece; fkollintzakyriakoulia@gmail.com
[2] Institute of Informatics and Telecommunications, National Center for Scientific Center "Demokritos", Athens GR-15310, Greece; akrithara@iit.demokritos.gr
* Correspondence: mmarag@aegean.gr; Tel.: +30 22730 82261

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**Table S1.** AYLIEN API and SentiWordNet sentiment analysis. The bold letters show the points of failures of the two tools. The success rate of the two tools is the same.

| Texts | Real Tone | AYLIEN API Sentiment Score | SentiWordNet Sentiment Score |
|---|---|---|---|
| aaplfileOut1143.txt | negative | −1 | −0.029098903 |
| aaplfileOut125.txt | positive | **−1** | 0.059778419 |
| aaplfileOut17.txt | negative | −1 | −0.02376973 |
| aaplfileOut400.txt | positive | 0 | 0.049518749 |
| aaplfileOut775.txt | negative | −1 | −0.033881106 |
| aaplfileOut803.txt | positive | 1 | 0.051150107 |
| aaplfileOut815.txt | positive | 0 | 0.026146443 |
| aaplfileOut819.txt | negative | −1 | **0.005474361** |
| aaplfileOut827.txt | positive | **−1** | **−0.022682547** |
| aaplfileOut9.txt | positive | 1 | 0.050961712 |
| gefileOut23.txt | negative | −1 | **0.071823314** |
| gefileOut921.txt | negative | **1** | −0.020717845 |
| ibmfileOut1215.txt | positive | 1 | 0.046201612 |
| ibmfileOut1225.txt | negative | −1 | −0.062144748 |
| ibmfileOut1243.txt | positive | 1 | 0.049842484 |
| ibmfileOut1245.txt | negative | −1 | −0.018343307 |
| ibmfileOut1313.txt | positive | 1 | 0.075927778 |
| ibmfileOut229.txt | positive and negative | −1 | 0.011129105 |
| msftfile3Out.txt | positive | 1 | 0.050961712 |
| msftfile496Out.txt | positive | 0 | 0.066421665 |
| msftfile55Out.txt | positive | 1 | 0.032976019 |

**Table S2.** Sentiment analysis of news about AAPL. The total sentiment score for 7 August 2015 is equal to 4.

| Day | Text | AYLIEN API Sentiment Score | −1, 1, 0 |
|---|---|---|---|
| 07/08/2015 | file1.txt | negative | −1 |
| 07/08/2015 | file2.txt | negative | −1 |
| 07/08/2015 | file3.txt | positive | 1 |
| 07/08/2015 | file4.txt | positive | 1 |
| 07/08/2015 | file5.txt | negative | −1 |
| 07/08/2015 | file6.txt | neutral | 0 |
| 07/08/2015 | file7.txt | positive | 1 |
| 07/08/2015 | file8.txt | negative | −1 |

**Table S2.** Cont.

| Day | Text | AYLIEN API Sentiment Score | −1, 1, 0 |
|---|---|---|---|
| 07/08/2015 | file9.txt | negative | −1 |
| 07/08/2015 | file10.txt | positive | 1 |
| 07/08/2015 | file11.txt | neutral | 0 |
| 07/08/2015 | file12.txt | negative | −1 |
| 07/08/2015 | file13.txt | negative | −1 |
| 07/08/2015 | file14.txt | positive | 1 |
| 07/08/2015 | file15.txt | negative | −1 |
| 07/08/2015 | file16.txt | neutral | 0 |
| 07/08/2015 | file17.txt | positive | 1 |
| 07/08/2015 | file18.txt | positive | 1 |
| 07/08/2015 | file19.txt | neutral | 0 |
| 07/08/2015 | file20.txt | positive | 1 |
| 07/08/2015 | file21.txt | neutral | 0 |
| 07/08/2015 | file22.txt | positive | 1 |
| 07/08/2015 | file23.txt | positive | 1 |
| 07/08/2015 | file24.txt | positive | 1 |
| 07/08/2015 | file25.txt | positive | 1 |
| 07/08/2015 | file26.txt | negative | −1 |
| 07/08/2015 | file27.txt | positive | 1 |
| 07/08/2015 | file28.txt | positive | 1 |
| 07/08/2015 | file29.txt | positive | 1 |
| 07/08/2015 | file30.txt | negative | −1 |
| 07/08/2015 | file31.txt | negative | −1 |
| 07/08/2015 | file31.txt | neutral | 0 |
| | | | Day sentiment score: 4 |

**Table S3.** Sentiment score of news per day from 20/04/2015 to 30/10/2015.

| Date | AAPL SentSc | GE SentSc | IBM SentSc | MSFT SentSc | ORCL SentSc |
|---|---|---|---|---|---|
| 20/04/15 | 6 | 11 | 9 | 20 | 2 |
| 21/04/15 | 4 | 3 | 6 | 10 | 0 |
| 22/04/15 | 7 | 9 | 2 | 8 | 0 |
| 23/04/15 | 8 | 2 | 5 | 14 | 1 |
| 24/04/15 | 11 | 3 | 3 | 22 | 0 |
| 27/04/15 | 21 | 0 | −3 | 3 | 3 |
| 28/04/15 | 23 | 4 | 8 | 5 | 5 |
| 29/04/15 | 20 | 9 | 5 | 14 | 0 |
| 30/04/15 | 12 | 2 | 1 | 6 | 4 |
| 01/05/15 | 15 | 0 | 3 | 5 | 2 |
| 04/05/15 | 14 | 6 | 8 | 8 | 0 |
| 05/05/15 | 11 | 3 | 4 | 9 | 4 |
| 06/05/15 | 11 | 2 | 12 | 6 | 5 |
| 07/05/15 | 9 | 2 | 4 | 5 | 4 |
| 08/05/15 | 9 | 3 | 1 | 6 | 2 |
| 11/05/15 | 4 | 2 | 3 | 6 | 2 |
| 12/05/15 | 5 | −1 | 3 | 6 | 1 |
| 13/05/15 | 7 | 0 | 4 | 5 | 0 |
| 14/05/15 | 10 | 1 | 5 | 11 | 3 |
| 15/05/15 | 6 | 5 | 4 | 10 | 2 |
| 18/05/15 | 16 | 8 | 5 | 2 | 0 |
| 19/05/15 | 17 | 4 | 0 | 0 | −1 |
| 20/05/15 | 3 | 8 | 0 | 8 | −1 |
| 21/05/15 | 10 | 3 | −1 | 6 | 0 |

**Table S3.** Cont.

| Date | AAPL SentSc | GE SentSc | IBM SentSc | MSFT SentSc | ORCL SentSc |
|---|---|---|---|---|---|
| 22/05/15 | 6 | 3 | 1 | 5 | −2 |
| 26/05/15 | 6 | 2 | 5 | 13 | 3 |
| 27/05/15 | 5 | −2 | 6 | 7 | 0 |
| 28/05/15 | 18 | 4 | 6 | 8 | 0 |
| 29/05/15 | 19 | 3 | 0 | 8 | 2 |
| 01/06/15 | 12 | 5 | 7 | 7 | 3 |
| 02/06/15 | 4 | 3 | 1 | 11 | 3 |
| 03/06/15 | 15 | −1 | 3 | 3 | 0 |
| 04/06/15 | 17 | 2 | 4 | 7 | 3 |
| 05/06/15 | 8 | 4 | 1 | −1 | 0 |
| 08/06/15 | 20 | −1 | 8 | 6 | 3 |
| 09/06/15 | 2 | −2 | 3 | 13 | 2 |
| 10/06/15 | 6 | 4 | 1 | 9 | 0 |
| 11/06/15 | 8 | 0 | 10 | 7 | 2 |
| 12/06/15 | 6 | 0 | 3 | 5 | 1 |
| 15/06/15 | 14 | 5 | 3 | 6 | 4 |
| 16/06/15 | 19 | −3 | 2 | 10 | 2 |
| 17/06/15 | 12 | 4 | −1 | 13 | 6 |
| 18/06/15 | 22 | 4 | 3 | 7 | 17 |
| 19/06/15 | 2 | 7 | 7 | 8 | 3 |
| 22/06/15 | 5 | 3 | −4 | 4 | 2 |
| 23/06/15 | 14 | 4 | 2 | 4 | 2 |
| 24/06/15 | 18 | 4 | 8 | 8 | 2 |
| 25/06/15 | 7 | 3 | 3 | 4 | 3 |
| 26/06/15 | 15 | 0 | 1 | 9 | 1 |
| 29/06/15 | 3 | 0 | 0 | 11 | 1 |
| 30/06/15 | 17 | 8 | 2 | 14 | 2 |
| 01/07/15 | 4 | −6 | 2 | 9 | 0 |
| 02/07/15 | 4 | −5 | 4 | 4 | −1 |
| 06/07/15 | 11 | 1 | 4 | 8 | 2 |
| 07/07/15 | 9 | 1 | 0 | 7 | 0 |
| 08/07/15 | 8 | 6 | 6 | 4 | 7 |
| 09/07/15 | 8 | 1 | 2 | 14 | 1 |
| 10/07/15 | 9 | 4 | 3 | 6 | 1 |
| 13/07/15 | 3 | 6 | 7 | 18 | 4 |
| 14/07/15 | 6 | 3 | 0 | 8 | 0 |
| 15/07/15 | 14 | 3 | 4 | 9 | 3 |
| 16/07/15 | 5 | 6 | 5 | 9 | 5 |
| 17/07/15 | 16 | 16 | 3 | 2 | 3 |
| 20/07/15 | 8 | 9 | 5 | −3 | 1 |
| 21/07/15 | 9 | 0 | 7 | 8 | 0 |
| 22/07/15 | −5 | 5 | 5 | −11 | 0 |
| 23/07/15 | 13 | 3 | 0 | 6 | 0 |
| 24/07/15 | 16 | 5 | 6 | 6 | 3 |
| 27/07/15 | 3 | 3 | 0 | −2 | −1 |
| 28/07/15 | 9 | 8 | 5 | 12 | 1 |
| 29/07/15 | 9 | 0 | −1 | 10 | 0 |
| 30/07/15 | 1 | 2 | 2 | 8 | 1 |
| 31/07/15 | 3 | 4 | 2 | 15 | 0 |
| 03/08/15 | 8 | 2 | 0 | 6 | 0 |
| 04/08/15 | 12 | 1 | 3 | 6 | 2 |
| 05/08/15 | 8 | 3 | 4 | 7 | 3 |
| 06/08/15 | 7 | 3 | 10 | 3 | 0 |
| 07/08/15 | 4 | 5 | 12 | 8 | 1 |
| 10/08/15 | 4 | 4 | 4 | 3 | 1 |

**Table S3.** Cont.

| Date | AAPL SentSc | GE SentSc | IBM SentSc | MSFT SentSc | ORCL SentSc |
|---|---|---|---|---|---|
| 11/08/15 | 0 | 3 | 3 | 1 | 1 |
| 12/08/15 | −2 | 2 | 5 | 2 | 1 |
| 13/08/15 | 2 | 2 | 0 | 2 | 0 |
| 14/08/15 | 2 | −1 | 3 | 3 | 1 |
| 17/08/15 | 3 | 5 | 3 | −1 | 1 |
| 18/08/15 | 6 | 2 | 0 | 0 | 1 |
| 19/08/15 | 0 | 3 | 3 | 4 | −1 |
| 20/08/15 | 9 | 4 | −1 | 3 | 1 |
| 21/08/15 | −3 | 2 | −1 | 0 | 0 |
| 24/08/15 | −1 | 3 | 2 | 5 | 1 |
| 25/08/15 | 0 | 7 | 6 | 0 | 3 |
| 26/08/15 | 4 | 2 | 7 | 1 | 1 |
| 27/08/15 | 14 | 5 | 0 | 4 | 1 |
| 28/08/15 | −1 | 1 | −2 | 1 | 1 |
| 31/08/15 | 8 | 4 | 5 | 0 | 2 |
| 01/09/15 | 9 | −7 | 2 | 1 | 1 |
| 02/09/15 | 7 | 2 | −1 | 0 | 1 |
| 03/09/15 | 5 | 0 | 3 | 2 | 0 |
| 04/09/15 | 2 | 2 | 2 | 0 | 0 |
| 08/09/15 | 5 | 8 | 2 | 2 | 2 |
| 09/09/15 | 16 | 4 | 2 | 1 | 1 |
| 10/09/15 | 10 | 3 | 1 | 2 | 2 |
| 11/09/15 | 3 | 9 | 2 | 1 | 0 |
| 14/09/15 | 10 | 5 | 1 | −1 | 2 |
| 15/09/15 | 4 | 1 | 2 | 5 | −3 |
| 16/09/15 | 9 | 2 | 3 | 5 | 4 |
| 17/09/15 | 6 | 6 | 1 | 7 | 5 |
| 18/09/15 | 9 | 5 | 3 | 2 | 1 |
| 21/09/15 | 13 | 3 | 4 | 9 | −3 |
| 22/09/15 | 0 | 5 | 1 | 2 | 0 |
| 23/09/15 | 5 | −2 | 2 | 3 | 3 |
| 24/09/15 | 7 | 4 | 0 | 6 | 1 |
| 25/09/15 | 6 | 0 | 5 | 0 | 0 |
| 28/09/15 | 9 | 3 | 4 | 2 | 3 |
| 29/09/15 | 5 | 3 | −1 | −3 | 2 |
| 30/09/15 | 7 | 3 | −2 | 7 | 1 |
| 01/10/15 | 6 | 7 | 1 | 4 | −1 |
| 02/10/15 | 2 | 2 | 2 | 4 | 0 |
| 05/10/15 | 7 | 10 | 5 | 3 | 3 |
| 06/10/15 | 6 | 1 | −1 | 10 | 2 |
| 07/10/15 | 4 | 2 | 4 | 0 | 4 |
| 08/10/15 | 14 | 7 | 5 | 10 | 3 |
| 09/10/15 | 7 | 6 | 7 | 11 | −1 |
| 12/10/15 | 3 | 7 | 4 | 3 | −1 |
| 13/10/15 | 7 | 6 | 6 | 8 | 2 |
| 14/10/15 | 2 | 3 | 4 | 1 | 1 |
| 15/10/15 | 6 | 6 | 2 | 6 | 1 |
| 16/10/15 | 3 | 21 | 1 | 2 | 0 |
| 19/10/15 | 7 | 12 | 9 | 1 | 1 |
| 20/10/15 | 1 | 4 | −4 | 0 | 2 |
| 21/10/15 | 3 | 9 | −5 | 5 | 3 |
| 22/10/15 | 8 | 9 | −1 | 3 | 0 |
| 23/10/15 | 3 | 3 | 7 | 26 | 0 |
| 26/10/15 | 11 | 6 | 6 | 9 | 4 |
| 27/10/15 | 21 | 3 | 11 | 9 | 1 |
| 28/10/15 | 35 | 1 | 6 | 13 | 1 |
| 29/10/15 | 10 | 0 | −4 | 13 | 1 |
| 30/10/15 | 9 | −2 | 3 | 13 | 1 |

**Table S4.** Total number of tweets for each stock per day from 20/04/2015 to 30/10/2015.

| | # of Tweets | | | | |
|---|---|---|---|---|---|
| **Date** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
| 20/04/15 | 1920 | 387 | 1369 | 522 | 33 |
| 21/04/15 | 2241 | 390 | 1336 | 579 | 76 |
| 22/04/15 | 2013 | 318 | 304 | 462 | 74 |
| 23/04/15 | 2900 | 300 | 613 | 1403 | 130 |
| 24/04/15 | 3269 | 194 | 398 | 2344 | 83 |
| 27/04/15 | 8550 | 215 | 211 | 585 | 73 |
| 28/04/15 | 3935 | 207 | 451 | 717 | 96 |
| 29/04/15 | 4310 | 248 | 314 | 928 | 313 |
| 30/04/15 | 6486 | 183 | 445 | 925 | 388 |
| 01/05/15 | 488 | 19 | 42 | 143 | 21 |
| 04/05/15 | 2403 | 274 | 460 | 584 | 111 |
| 05/05/15 | 2541 | 250 | 479 | 854 | 124 |
| 06/05/15 | 3413 | 196 | 467 | 715 | 103 |
| 07/05/15 | 2981 | 208 | 420 | 391 | 74 |
| 08/05/15 | 2127 | 264 | 285 | 552 | 104 |
| 11/05/15 | 2150 | 248 | 282 | 382 | 72 |
| 12/05/15 | 2721 | 264 | 323 | 449 | 66 |
| 13/05/15 | 2270 | 367 | 274 | 418 | 71 |
| 14/05/15 | 2514 | 262 | 417 | 203 | 81 |
| 15/05/15 | 217 | 74 | 44 | 24 | 27 |
| 18/05/15 | 4758 | 431 | 424 | 370 | 138 |
| 19/05/15 | 3925 | 196 | 233 | 541 | 60 |
| 20/05/15 | 2678 | 665 | 670 | 485 | 100 |
| 21/05/15 | 2881 | 503 | 348 | 356 | 77 |
| 22/05/15 | 256 | 36 | 28 | 28 | 18 |
| 26/05/15 | 3636 | 586 | 551 | 812 | 143 |
| 27/05/15 | 3115 | 359 | 338 | 656 | 114 |
| 28/05/15 | 2896 | 595 | 445 | 398 | 121 |
| 29/05/15 | 344 | 71 | 53 | 44 | 14 |
| 01/06/15 | 2547 | 574 | 557 | 676 | 109 |
| 02/06/15 | 2820 | 509 | 496 | 691 | 144 |
| 03/06/15 | 2651 | 484 | 402 | 590 | 94 |
| 04/06/15 | 3160 | 557 | 494 | 479 | 122 |
| 05/06/15 | 269 | 95 | 79 | 51 | 32 |
| 08/06/15 | 5162 | 590 | 541 | 466 | 78 |
| 09/06/15 | 4971 | 859 | 589 | 529 | 174 |
| 10/06/15 | 3783 | 701 | 653 | 501 | 86 |
| 11/06/15 | 3083 | 597 | 592 | 554 | 182 |
| 12/06/15 | 314 | 57 | 71 | 90 | 16 |
| 15/06/15 | 2522 | 558 | 623 | 527 | 23 |
| 16/06/15 | 2420 | 606 | 602 | 617 | 161 |
| 17/06/15 | 2379 | 618 | 527 | 887 | 866 |
| 18/06/15 | 2842 | 693 | 555 | 517 | 1489 |
| 19/06/15 | 285 | 58 | 35 | 62 | 88 |
| 22/06/15 | 3182 | 512 | 374 | 359 | 198 |
| 23/06/15 | 2997 | 412 | 414 | 428 | 330 |
| 24/06/15 | 4077 | 579 | 760 | 471 | 198 |
| 25/06/15 | 5058 | 626 | 502 | 425 | 193 |
| 26/06/15 | 286 | 48 | 39 | 101 | 31 |
| 29/06/15 | 2795 | 677 | 416 | 606 | 226 |
| 30/06/15 | 405 | 702 | 699 | 744 | 222 |
| 01/07/15 | 2835 | 696 | 528 | 433 | 58 |
| 02/07/15 | 2681 | 270 | 205 | 380 | 110 |
| 06/07/15 | 181 | 145 | 190 | 2032 | 866 |
| 07/07/15 | 2530 | 431 | 444 | 424 | 145 |

**Table S4.** Cont.

| | # of Tweets | | | | |
|---|---|---|---|---|---|
| **Date** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
| 08/07/15 | 2955 | 211 | 211 | 1511 | 103 |
| 09/07/15 | 4970 | 102 | 314 | 1487 | 97 |
| 10/07/15 | 3968 | 389 | 477 | 988 | 80 |
| 13/07/15 | 225 | 240 | 214 | 472 | 130 |
| 14/07/15 | 2283 | 201 | 209 | 518 | 83 |
| 15/07/15 | 3198 | 430 | 325 | 495 | 145 |
| 16/07/15 | 2970 | 473 | 526 | 380 | 109 |
| 17/07/15 | 3529 | 766 | 256 | 456 | 111 |
| 20/07/15 | 3379 | 445 | 1497 | 544 | 114 |
| 21/07/15 | 9616 | 483 | 2171 | 2140 | 153 |
| 22/07/15 | 4155 | 442 | 862 | 2264 | 135 |
| 23/07/15 | 820 | 598 | 985 | 792 | 140 |
| 24/07/15 | 3640 | 482 | 610 | 891 | 86 |
| 27/07/15 | 331 | 121 | 198 | 320 | 29 |
| 28/07/15 | 622 | 481 | 436 | 470 | 96 |
| 29/07/15 | 2262 | 569 | 545 | 397 | 126 |
| 30/07/15 | 2011 | 422 | 336 | 529 | 154 |
| 31/07/15 | 2671 | 496 | 509 | 467 | 119 |
| 04/08/15 | 383 | 175 | 311 | 576 | 114 |
| 05/08/15 | 4253 | 155 | 274 | 518 | 123 |
| 06/08/15 | 3705 | 414 | 692 | 433 | 164 |
| 07/08/15 | 397 | 471 | 663 | 353 | 77 |
| 10/08/15 | 98 | 87 | 250 | 279 | 40 |
| 11/08/15 | 2937 | 239 | 219 | 367 | 93 |
| 12/08/15 | 323 | 252 | 154 | 25 | 81 |
| 13/08/15 | 1139 | 363 | 16 | 329 | 50 |
| 14/08/15 | 3104 | 530 | 515 | 340 | 67 |
| 17/08/15 | 2118 | 119 | 153 | 251 | 29 |
| 18/08/15 | 2120 | 135 | 166 | 290 | 68 |
| 19/08/15 | 2163 | 147 | 185 | 340 | 90 |
| 20/08/15 | 2264 | 154 | 130 | 311 | 86 |
| 21/08/15 | 3709 | 134 | 133 | 340 | 67 |
| 24/08/15 | 251 | 320 | 199 | 548 | 34 |
| 25/08/15 | 4301 | 571 | 405 | 367 | 71 |
| 26/08/15 | 5185 | 787 | 705 | 337 | 130 |
| 27/08/15 | 4316 | 499 | 494 | 345 | 74 |
| 28/08/15 | 3469 | 605 | 647 | 241 | 87 |
| 31/08/15 | 2447 | 251 | 305 | 239 | 1 |
| 01/09/15 | 2193 | 245 | 211 | 309 | 42 |
| 02/09/15 | 2661 | 192 | 170 | 356 | 58 |
| 03/09/15 | 208 | 127 | 185 | 354 | 50 |
| 04/09/15 | 0 | 8 | 9 | 53 | 3 |
| 08/09/15 | 47 | 482 | 530 | 325 | 35 |
| 09/09/15 | 50 | 419 | 425 | 543 | 35 |
| 10/09/15 | 544 | 423 | 252 | 45 | 44 |
| 11/09/15 | 248 | 784 | 389 | 479 | 130 |
| 14/09/15 | 48 | 139 | 96 | 350 | 63 |
| 15/09/15 | 52 | 9 | 300 | 28 | 110 |
| 16/09/15 | 151 | 55 | 244 | 156 | 458 |
| 17/09/15 | 51 | 570 | 559 | 15 | 686 |
| 18/09/15 | 251 | 62 | 17 | 38 | 144 |
| 21/09/15 | 16 | 84 | 84 | 10 | 33 |
| 22/09/15 | 50 | 194 | 147 | 252 | 73 |
| 23/09/15 | 48 | 380 | 288 | 288 | 56 |

**Table S4.** Cont.

| | # of Tweets | | | | |
|---|---|---|---|---|---|
| **Date** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
| 24/09/15 | 51 | 312 | 226 | 87 | 39 |
| 25/09/15 | 49 | 53 | 53 | 11 | 3 |
| 28/09/15 | 402 | 311 | 203 | 6 | 0 |
| 29/09/15 | 51 | 533 | 371 | 114 | 50 |
| 30/09/15 | 47 | 212 | 158 | 37 | 56 |
| 01/10/15 | 52 | 33 | 198 | 9 | 38 |
| 02/10/15 | 49 | 0 | 19 | 41 | 3 |
| 05/10/15 | 48 | 607 | 397 | 519 | 67 |
| 06/10/15 | 1080 | 538 | 294 | 823 | 56 |
| 07/10/15 | 292 | 662 | 477 | 607 | 67 |
| 08/10/15 | 2984 | 601 | 528 | 520 | 55 |
| 09/10/15 | 320 | 44 | 56 | 119 | 1 |
| 12/10/15 | 1976 | 17 | 211 | 16 | 61 |
| 13/10/15 | 2080 | 214 | 220 | 128 | 69 |
| 14/10/15 | 5350 | 42 | 11 | 364 | 181 |
| 15/10/15 | 2641 | 191 | 73 | 429 | 80 |
| 16/10/15 | 477 | 102 | 76 | 26 | 5 |
| 19/10/15 | 2282 | 428 | 331 | 33 | 52 |
| 20/10/15 | 238 | 400 | 2927 | 249 | 123 |
| 21/10/15 | 2296 | 460 | 684 | 540 | 54 |
| 22/10/15 | 1811 | 180 | 346 | 1335 | 61 |
| 23/10/15 | 221 | 21 | 58 | 714 | 10 |
| 26/10/15 | 3771 | 179 | 192 | 975 | 128 |
| 27/10/15 | 8977 | 290 | 1042 | 886 | 144 |
| 28/10/15 | 2720 | 233 | 2111 | 1040 | 120 |
| 29/10/15 | 5049 | 216 | 444 | 921 | 149 |
| 30/10/15 | 3056 | 37 | 14 | 111 | 10 |

**Table S5.** A short excerpt example of normalization into [0, 1] for APPLE company.

| Date | Normalization # of Tweets | Normalization SentimentScore | Normalization Close |
|---|---|---|---|
| 20/04/15 | 0.199667221 | 0.275 | 0.82898747 |
| 21/04/15 | 0.233049085 | 0.225 | 0.805621402 |
| 22/04/15 | 0.209338602 | 0.3 | 0.863528615 |
| 23/04/15 | 0.301580699 | 0.325 | 0.899085676 |
| 24/04/15 | 0.339954243 | 0.4 | 0.919742635 |
| 27/04/15 | 0.889143095 | 0.65 | 1 |
| 28/04/15 | 0.40921381 | 0.7 | 0.929224517 |
| 29/04/15 | 0.448211314 | 0.625 | 0.864205892 |
| 30/04/15 | 0.674500832 | 0.425 | 0.746020996 |
| 01/05/15 | 0.050748752 | 0.5 | 0.874703691 |
| 04/05/15 | 0.249896007 | 0.475 | 0.866237724 |
| 05/05/15 | 0.264247088 | 0.4 | 0.768032509 |
| 06/05/15 | 0.354929285 | 0.4 | 0.741280054 |
| 07/05/15 | 0.31000416 | 0.35 | 0.749746021 |
| 08/05/15 | 0.221193844 | 0.35 | 0.829664748 |
| 11/05/15 | 0.223585691 | 0.225 | 0.78564172 |
| 12/05/15 | 0.28296589 | 0.25 | 0.770233661 |
| 13/05/15 | 0.236064892 | 0.3 | 0.775143921 |
| 14/05/15 | 0.261439268 | 0.375 | 0.874703691 |
| 15/05/15 | 0.022566556 | 0.275 | 0.868608195 |
| 18/05/15 | 0.494800333 | 0.525 | 0.916694887 |
| 19/05/15 | 0.408173877 | 0.55 | 0.912631222 |

**Table S6.** GrammarViz 2.0 API AAPL patterns.

| | AAPL | | |
|---|---|---|---|
| **Rules** | **Close Time Series** | **SentimentScore Time Series** | **numTweets Time Series** |
| R#1 | (0, 18), (21, 48) | (10, 26), (28, 44), (30, 47), (50, 80) | (0, 17), (27, 46), (38, 57) |
| R#2 | (4, 21), (79, 98) | (12, 28), (112, 128) | (3, 20), (87, 108) |
| R#3 | (9, 29), (118, 136) | (14, 30), (84, 103) | (10, 36), (33, 52), (43, 63), (73, 90), (102, 119) |
| R#4 | (19, 35), (57, 73) | (16, 32), (118, 136) | (22, 41), (52, 69), (119, 135) |
| R#5 | (35, 61), (74, 93), (100, 121) | (18, 36), (89, 112) | (55, 74), (67, 86) |
| R#6 | (48, 69), (90, 113) | (23, 39), (115, 131) | (64, 80), (94, 111), (100, 116) |
| R#7 | (67, 87), (107, 126) | (25, 42), (39, 55), (41, 58), (98, 117) | (108, 124), (110, 129) |
| R#8 | | (41, 59), (98, 118) | |
| R#9 | | (45, 61), (70, 86) | |
| R#10 | | (76, 94), (82, 98) | |

**Table S7.** GrammarViz 2.0 API GE patterns.

| | GE | | |
|---|---|---|---|
| **Rules** | **Close Time Series** | **SentimentScore Time Series** | **numTweets Time Series** |
| R#1 | (6, 34), (91, 114) | (3, 21), (20, 38) | (0, 19), (47, 66) |
| R#2 | (20, 39), (40, 62) | (8, 27), (29, 45) | (7, 24), (18, 39) |
| R#3 | (35, 54), (74, 92) | (13, 32), (34, 50) | (13, 30), (16, 32) |
| R#4 | (48, 66), (104, 122) | (24, 43), (99, 116) | (42, 60), (64, 80) |
| R#5 | (8, 32), (52, 68), (92, 113) | (32, 48), (47, 67), (113, 131) | (58, 78), (71, 88) |
| R#6 | (58, 77), (78, 95) | (36, 52), (53, 69), (118, 134) | (69, 85), (88, 105), (116, 133) |
| R#7 | (64, 82), (84, 100) | (38, 55), (82, 99) | (80, 96), (106, 125) |
| R#8 | | (41, 57), (60, 77) | (85, 101), (94, 111) |
| R#9 | | (44, 61), (85, 104), (102, 119) | (88, 106), (116, 134) |
| R#10 | | (55, 72), (66, 86) | |
| R#11 | | (72, 88), (74, 91) | |
| R#12 | | (105, 122), (111, 127) | |

**Table S8.** GrammarViz 2.0 API IBM patterns.

| | IBM | | |
|---|---|---|---|
| **Rules** | **Close Time Series** | **SentimentScore Time Series** | **numTweets Time Series** |
| R#1 | (0, 17), (112, 129) | (1, 20), (21, 44) | (0, 19), (88, 107) |
| R#2 | (11, 30), (51, 70) | (6, 23), (32, 49), (85, 104) | (10, 39), (101, 122) |
| R#3 | (16, 43), (40, 57), (57, 76), (66, 86), (78, 98) | (12, 29), (119, 136) | (25, 57), (43, 60) |
| R#4 | (38, 57), (56, 76), (64, 86), (75, 98) | (16, 33), (78, 98) | (10, 38), (47, 64), (101, 120) |
| R#5 | (46, 65), (105, 126) | (19, 35), (113, 129) | (51, 67), (53, 69) |
| R#6 | (56, 78), (64, 89), (75, 99) | (35, 63), (49, 65) | (0, 16), (62, 81), (88, 105) |
| R#7 | (96, 117), (115, 136) | (52, 71), (57, 73) | (73, 91), (97, 115) |
| R#8 | | (59, 75), (72, 90) | (77, 94), (115, 132) |
| R#9 | | (62, 81), (104, 126) | (84, 102), (93, 110) |
| R#10 | | (90, 108), (95, 116) | (108, 125), (118, 134) |
| R#11 | | (21, 42), (91, 108), (98, 116) | |

**Table S9.** GrammarViz 2.0 API MSFT patterns.

| | MSFT | | |
|---|---|---|---|
| **Rules** | **Close Time Series** | **SentimentScore Time Series** | **numTweets Time Series** |
| R#1 | (0, 18), (54, 74), (66, 85), (98, 117) | (4, 24), (84, 104) | (0, 23), (61, 77), (99, 116) |
| R#2 | (8, 24), (71, 87) | (10, 26), (34, 51) | (10, 27), (71, 90) |
| R#3 | (15, 35), (22, 44) | (14, 33), (46, 63), (104, 120) | (15, 31), (108, 124) |
| R#4 | (30, 48), (84, 101) | (19, 35), (41, 58) | (17, 47), (55, 72) |
| R#5 | (38, 60), (75, 98) | (24, 43), (39, 55) | (40, 57), (76, 93) |
| R#6 | (46, 64), (103, 122) | (29, 48), (44, 60) | (43, 60), (119, 136) |
| R#7 | (50, 74), (64, 85) | (54, 72), (68, 90) | (49, 66), (90, 106), (102, 118) |
| R#8 | (91, 110), (117, 133) | (61, 80), (94, 113) | (52, 69), (116, 133) |
| R#9 | (64, 80), (108, 128) | (66, 82), (114, 131) | (59, 75), (93, 109) |
| R#10 | (22, 42), (40, 58), (78, 96) | (4, 21), (7, 24), (76, 97), (84, 101), (87, 104) | (84, 100), (86, 102) |
| 11 | | (90, 107), (107, 125) | |

**Table S10.** GrammarViz 2.0 API ORCL patterns.

| | ORCL | | |
|---|---|---|---|
| **Rules** | **Close Time Series** | **SentimentScore Time Series** | **numTweets Time Series** |
| R#1 | (6, 25), (45, 64) | (0, 19), (106, 125) | (6, 24), (38, 58), (49, 69) |
| R#2 | (11, 30), (92, 112) | (6, 28), (37, 57) | (11, 30), (16, 46), (115, 136) |
| R#3 | (17, 40), (79, 101) | (19, 37), (48, 65) | (37, 58), (47, 69) |
| R#4 | (8, 25), (26, 43), (47, 64) | (24, 41), (81, 97), (121, 136) | (60, 81), (76, 96) |
| R#5 | (31, 59), (51, 73) | (45, 62), (76, 92), (78, 95) | (74, 90), (87, 103), (105, 121) |
| R#6 | (89, 106), (104, 125) | (59, 77), (89, 120) | (83, 101), (97, 117) |
| R#7 | (98, 118), (117, 134) | (68, 88), (83, 102) | |
| R#8 | (17, 34), (35, 59), (56, 73), (79, 98) | | |

**Table S11.** AAPL DTW distances. M.V., Mean Value.

| | **Patterns Close** | **DTW (Close-Sent)** | **(+3)** | | **(−3)** | |
|---|---|---|---|---|---|---|
| AAPL | | | | | | |
| R#1 | (0, 18) | 0.132927814 | (3, 21) | 0.130453007 | (0, 15) | 0.118455931 |
| | (21, 48) | 0.224499881 | (24, 52) | 0.129996033 | (18, 45) | 0.234678589 |
| | M.V. | 0.178713848 | | 0.13022452 | | 0.17656726 |
| R#2 | (4, 21) | 0.122488151 | (7, 24) | 0.17775651 | (1, 18) | 0.126236494 |
| | (79, 98) | 0.013949321 | (82, 101) | 0.014667447 | (76, 95) | 0.010755306 |
| | M.V. | 0.068218736 | | 0.096211979 | | 0.0684959 |
| R#3 | (9, 29) | 0.138622 | (12, 32) | 0.148184249 | (6, 26) | 0.176994298 |
| | (118, 136) | 0.012753229 | (121, 139) | 0 | (115, 133) | 0.006232954 |
| | M.V. | 0.075687614 | | 0 | | 0.091613626 |
| R#4 | (19, 35) | 0.290880447 | (22, 38) | 0.261919781 | (16, 32) | 0.17196995 |
| | (57, 73) | 0.082611713 | (60, 76) | 0.055699564 | (54, 70) | 0.096754118 |
| | M.V. | 0.18674608 | | 0.158809672 | | 0.134362034 |
| R#5 | (35, 61) | 0.08811786 | (38, 64) | 0.075305168 | (32, 58) | 0.061768084 |
| | (74, 93) | 0.006734272 | (77, 96) | 0.019192221 | (71, 90) | 0.019056363 |
| | (100, 121) | 0.003301351 | (103, 124) | 0.004559662 | (97, 118) | 0.00333735 |
| | M.V. | 0.032717828 | | 0.033019017 | | 0.028053932 |
| R#6 | (48, 69) | 0.087700635 | (51, 72) | 0.104168535 | (45, 66) | 0.089930725 |
| | (90, 113) | 0.006052134 | (93, 116) | 0.00352377 | (87, 110) | 0.00745198 |
| | M.V. | 0.046876385 | | 0.053846152 | | 0.048691353 |
| R#7 | (67, 87) | 0.011688972 | (70, 90) | 0.015396011 | (64, 84) | 0.045889765 |
| | (107, 126) | 0.003705718 | (110, 129) | 0.005635293 | (104, 123) | 0.003326848 |
| | M.V. | 0.007697345 | | 0.010515652 | | 0.024608307 |
| | (0, 136) | 0.020023392 | (3, 136) | 0.016962889 | (0, 133) | 0.019556095 |

**Table S12.** GE DTW distances.

| | Patterns Close | DTW (Close-Sent) | (+3) | | (−3) | |
|---|---|---|---|---|---|---|
| GE | | | | | | |
| R#1 | 6,34 | 0.048316762 | (9, 37) | 0.063273874 | (3, 31) | 0.043765866 |
| | 91,114 | 0.005961417 | (94, 117) | 0.005351481 | (88, 111) | 0.0135242 |
| | M.V. | 0.027139089 | | 0.034312677 | | 0.028645033 |
| R#2 | 20,39 | 0.057791944 | (23, 42) | 0.123959666 | (17, 36) | 0.076728033 |
| | 40,62 | 0.024307804 | (43, 65) | 0.017040897 | (37, 59) | 0.035606593 |
| | M.V. | 0.041049874 | | 0.070500282 | | 0.056167313 |
| R#3 | 35,54 | 0.061067905 | (38, 57) | 0.033648581 | (32, 51) | 0.075834768 |
| | 74,92 | 0.00615485 | (77, 95) | 0.007091716 | (71, 89) | 0.01451124 |
| | M.V. | 0.033611377 | | 0.020370149 | | 0.045173004 |
| R#4 | 48,66 | 0.022490484 | (51, 69) | 0.026277473 | (45, 63) | 0.02849157 |
| | 104,122 | 0.015399226 | (107, 125) | 0.025514367 | (101, 119) | 0.019592552 |
| | M.V. | 0.018944855 | | 0.02589592 | | 0.024042061 |
| R#5 | 8,32 | 0.053561217 | (11, 35) | 0.058276778 | (5, 29) | 0.040027176 |
| | 52,68 | 0.018014158 | (55, 71) | 0.008168801 | (49, 65) | 0.021174637 |
| | 92,113 | 0.006940416 | (95, 116) | 0.005332492 | (89, 110) | 0.016022284 |
| | M.V. | 0.02617193 | | 0.023926023 | | 0.025741366 |
| R#6 | 58,77 | 0.006520571 | (61, 80) | 0.005007802 | (55, 74) | 0.006889779 |
| | 78,95 | 0.007797516 | (81, 98) | 0.009291552 | (75, 92) | 0.006447103 |
| | M.V. | 0.007159043 | | 0.007149677 | | 0.006668441 |
| R#7 | 64,82 | 0.008452165 | (67, 85) | 0.003285581 | (61, 79) | 0.004910511 |
| | 84,100 | 0.011438153 | (87, 103) | 0.014549678 | (81, 97) | 0.008021026 |
| | M.V. | 0.009945159 | | 0.00891763 | | 0.006465769 |
| | (0, 136) | 0.019209451 | (3, 136) | 0.020979292 | (0, 133) | 0.01437877 |

**Table S13.** IBM DTW distances.

| | Patterns Close | DTW (Close-Sent) | (+3) | | (−3) | |
|---|---|---|---|---|---|---|
| IBM | | | | | | |
| R#1 | (0, 17) | 0.061996272 | (3, 20) | 0.106579383 | (0, 14) | 0.057772954 |
| | (112, 129) | 0.029249601 | (115, 132) | 0.044831215 | (109, 126) | 0.020145415 |
| | M.V. | 0.045622937 | | 0.075705299 | | 0.038959185 |
| R#2 | (11, 30) | 0.100113416 | (14, 33) | 0.196234262 | (8, 27) | 0.101560123 |
| | (51, 70) | 0.040641168 | (54, 73) | 0.034131776 | (48, 67) | 0.037569513 |
| | M.V. | 0.070377292 | | 0.115183019 | | 0.069564818 |
| R#3 | (16, 43) | 0.09579497 | (19, 46) | 0.090980905 | (13, 40) | 0.116387367 |
| | (40, 57) | 0.067699973 | (43, 60) | 0.054790764 | (37, 54) | 0.116387367 |
| | (57, 76) | 0.026851872 | (60, 79) | 0.036069286 | (54, 73) | 0.034131776 |
| | (66, 86) | 0.023585529 | (69, 89) | 0.028918762 | (63, 83) | 0.025042108 |
| | (78, 98) | 0.015253489 | (81, 101) | 0.016386188 | (75, 95) | 0.022080311 |
| | M.V. | 0.045837167 | | 0.045429181 | | 0.062805786 |

**Table S13.** Cont.

| | Patterns Close | DTW (Close-Sent) | (+3) | | (−3) | |
|---|---|---|---|---|---|---|
| R#4 | (38, 57) | 0.064717503 | (41, 60) | 0.063105081 | (35, 54) | 0.061315475 |
| | (56, 76) | 0.0267374 | (59, 79) | 0.044572698 | (53, 73) | 0.034382754 |
| | (64, 86) | 0.01814183 | (67, 89) | 0.029067463 | (61, 83) | 0.031105461 |
| | (75, 98) | 0.021796311 | (78, 101) | 0.014226569 | (72, 95) | 0.021229447 |
| | M.V. | 0.032848261 | | 0.037742953 | | 0.037008284 |
| R#5 | (46, 65) | 0.019908383 | (49, 68) | 0.0328417 | (43, 62) | 0.061463001 |
| | (105, 126) | 0.016392128 | (108, 129) | 0.026416929 | (102, 123) | 0.020549259 |
| | M.V. | 0.018150255 | | 0.029629315 | | 0.04100613 |
| R#6 | (56, 78) | 0.016392128 | (59, 81) | 0.026416929 | (53, 75) | 0.030367806 |
| | (64, 89) | 0.025844635 | (67, 91) | 0.021750789 | (61, 86) | 0.026635526 |
| | (75, 99) | 0.022439104 | (78, 102) | 0.014362557 | (72, 96) | 0.022000222 |
| | M.V. | 0.021558622 | | 0.020843425 | | 0.026334518 |
| R#7 | (96, 117) | 0.020778609 | (99, 120) | 0.016388883 | (93, 114) | 0.014430732 |
| | (115, 136) | 0.051017149 | (118, 139) | 0.057881881 | (112, 133) | 0.071952463 |
| | M.V. | 0.035897879 | | 0.037135382 | | 0.043191598 |
| | (0, 136) | 0.021060988 | (3, 136) | 0.025955844 | (0, 133) | 0.023155161 |

**Table S14.** MSFT DTW distances.

| | Patterns Close | DTW (Close-Sent) | (+3) | | (−3) | |
|---|---|---|---|---|---|---|
| MSFT | | | | | | |
| R#1 | (0, 18) | 0.043112148 | (3, 21) | 0.0204134 | (0, 15) | 0.049143746 |
| | (54, 74) | 0.015542666 | (57, 77) | 0.01394839 | (51, 71) | 0.017164034 |
| | (66, 85) | 0.008467735 | (69, 88) | 0.010408634 | (63, 82) | 0.016193293 |
| | (98, 117) | 0.004577522 | (101, 120) | 0.005211202 | (95, 114) | 0.0105623 |
| | M.V. | 0.017925018 | | 0.012495406 | | 0.023265843 |
| R#2 | (8, 24) | 0.005421031 | (11, 27) | 0.003862107 | (5, 21) | 0.007380309 |
| | (71, 87) | 0.003463839 | (74, 90) | 0.007862162 | (68, 84) | 0.012899386 |
| | M.V. | 0.004442435 | | 0.005862134 | | 0.010139847 |
| R#3 | (15, 35) | 0.006774264 | (18, 38) | 0.004893978 | (12, 32) | 0.003597077 |
| | (22, 44) | 0.004319237 | (25, 47) | 0.004973965 | (19, 41) | 0.007342368 |
| | M.V. | 0.00554675 | | 0.004933972 | | 0.005469722 |
| R#4 | (30, 48) | 0.006384279 | (33, 51) | 0.019299148 | (27, 45) | 0.004136388 |
| | (84, 101) | 0.01533234 | (87, 104) | 0.011925536 | (81, 98) | 0.012931449 |
| | M.V. | 0.01085831 | | 0.015612342 | | 0.008533919 |
| R#5 | (38, 60) | 0.014296979 | (41, 63) | 0.011544044 | (35, 57) | 0.014078864 |
| | (75, 98) | 0.008317173 | (78, 101) | 0.011455648 | (72, 81) | 0.008967967 |
| | M.V. | 0.011307076 | | 0.011499846 | | 0.011523416 |
| R#6 | (46, 64) | 0.013270383 | (49, 67) | 0.027231381 | (43, 61) | 0.012998366 |
| | (103, 122) | 0.011395867 | (106, 125) | 0.009095291 | (99, 119) | 0.00612255 |
| | M.V. | 0.012333125 | | 0.018163336 | | 0.009560458 |

**Table S14.** Cont.

| | Patterns Close | DTW (Close-Sent) | (+3) | | (−3) | |
|---|---|---|---|---|---|---|
| R#7 | (50, 74) | 0.020329805 | (53, 77) | 0.015352291 | (47, 71) | 0.013835133 |
| | (64, 85) | 0.012564501 | (67, 88) | 0.015352291 | (61, 82) | 0.012478417 |
| | M.V. | 0.016447153 | | 0.015352291 | | 0.013156775 |
| R#8 | (91, 110) | 0.013802492 | (94, 113) | 0.010748756 | (88, 107) | 0.018469122 |
| | (117, 133) | 0.024031566 | (120, 136) | 0.02170773 | (114, 130) | 0.011311427 |
| | M.V. | 0.018917029 | | 0.016228243 | | 0.014890274 |
| R#9 | (64, 80) | 0.014465065 | (67, 83) | 0.011110363 | (61, 77) | 0.013368028 |
| | (108, 128) | 0.012543398 | (111, 131) | 0.00829675 | (105, 125) | 0.009627537 |
| | M.V. | 0.013504232 | | 0.009703557 | | 0.011497783 |
| R#10 | (22, 42) | 0.004771107 | (25, 45) | 0.005182019 | (19, 39) | 0.005182967 |
| | (40, 58) | 0.018671199 | (43, 61) | 0.012998366 | (37, 55) | 0.008392423 |
| | (78, 96) | 0.011077892 | (81, 99) | 0.013120006 | (75, 93) | 0.006914332 |
| | M.V. | 0.011506733 | | 0.010433463 | | 0.006829907 |
| | (0, 136) | 0.012017329 | (3, 136) | 0.009474218 | (0, 133) | 0.012100802 |

**Table S15.** ORCL DTW distances.

| | Patterns Close | DTW (Close-Sent) | (+3) | | (−3) | |
|---|---|---|---|---|---|---|
| ORCL | | | | | | |
| R#1 | (6, 25) | 0.471294804 | (9, 28) | 0.482935421 | (3, 22) | 0.448408047 |
| | (45, 64) | 0.05660017 | (48, 67) | 0.037376999 | (42, 61) | 0.073555168 |
| | M.V. | 0.263947487 | | 0.26015621 | | 0.260981607 |
| R#2 | (11, 30) | 0.458907488 | (14, 33) | 0.494422239 | (8, 27) | 0.478130769 |
| | (92, 112) | 0.008971793 | (95, 115) | 0.005116217 | (89, 109) | 0.010234149 |
| | M.V. | 0.23393964 | | 0.249769228 | | 0.244182459 |
| R#3 | (17, 40) | 0.481525513 | (20, 43) | 0.240640673 | (14, 37) | 0.478424925 |
| | (79, 101) | 0.013528202 | (82, 104) | 0.011339415 | (76, 98) | 0.019213732 |
| | M.V. | 0.247526857 | | 0.125990044 | | 0.248819328 |
| R#4 | (8, 25) | 0.468079249 | (11, 28) | 0.472905162 | (5, 23) | 0.460089992 |
| | (26, 43) | 0.255305062 | (29, 46) | 0.211643055 | (23, 40) | 0.452912864 |
| | (47, 64) | 0.049486634 | (50, 67) | 0.031153507 | (44, 61) | 0.072598914 |
| | M.V. | 0.257623648 | | 0.238567241 | | 0.328533923 |
| R#5 | (31, 59) | 0.150034876 | (34, 62) | 0.105219971 | (28, 56) | 0.17816773 |
| | (51, 73) | 0.032485304 | (54, 76) | 0.018515332 | (48, 70) | 0.034385703 |
| | M.V. | 0.09126009 | | 0.061867652 | | 0.106276716 |
| R#6 | (89, 106) | 0.008754538 | (92, 109) | 0.007342528 | (86, 103) | 0.005647757 |
| | (104, 125) | 0.003985485 | (107, 128) | 0.004216581 | (101, 122) | 0.007539246 |
| | M.V. | 0.006370011 | | 0.005779554 | | 0.006593501 |
| R#7 | (98, 118) | 0.005107479 | (101, 121) | 0.006850016 | (95, 115) | 0.005116217 |
| | (117, 134) | 0.004019476 | (120, 136) | 0.005971956 | (114, 131) | 0.003458915 |
| | M.V. | 0.004563477 | | 0.006410986 | | 0.004287566 |

**Table S15.** Cont.

| | Patterns Close | DTW (Close-Sent) | (+3) | | (−3) | |
|---|---|---|---|---|---|---|
| R#8 | (17, 34) | 0.493278351 | (20, 37) | 0.489724639 | (14, 31) | 0.500775503 |
| | (35, 59) | 0.117772983 | (38, 62) | 0.101679742 | (32, 56) | 0.150765899 |
| | (56, 73) | 0.038263488 | (59, 76) | 0.026799588 | (53, 70) | 0.019677882 |
| | (79, 98) | 0.014458159 | (82, 101) | 0.011661849 | (76, 95) | 0.022347265 |
| | M.V. | 0.165943245 | | 0.157466454 | | 0.173391637 |
| | (0, 136) | 0.058098865 | (3, 136) | 0.053149474 | (0, 133) | 0.058516133 |

**Table S16.** Random windows length $w$ for close—sentimentScore time series. Mean Value (M.V.) of DTW distance between the two time series.

| **Window Size = 10** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
|---|---|---|---|---|---|
| (0 to 9) | 0.132594944 | 0.029407011 | 0.092242161 | 0.077443956 | 0.421920571 |
| (10 to 19) | 0.220766056 | 0.074360434 | 0.118744716 | 0.001840917 | 0.406115196 |
| (20 to 29) | 0.30832706 | 0.056872127 | 0.25752526 | 0.008708723 | 0.545575005 |
| (30 to 39) | 0.255556822 | 0.130645331 | 0.09814162 | 0.00856189 | 0.41815446 |
| (40 to 49) | 0.092403903 | 0.048857659 | 0.089159528 | 0.017389937 | 0.159801089 |
| (50 to 59) | 0.092051367 | 0.02218414 | 0.046321985 | 0.039845794 | 0.07968165 |
| (60 to 69) | 0.145747555 | 0.010902172 | 0.051924713 | 0.024259335 | 0.020463904 |
| (70 to 79) | 0.031126111 | 0.00644333 | 0.038545699 | 0.006645506 | 0.049387201 |
| (80 to 89) | 0.034904158 | 0.02980676 | 0.037502497 | 0.015615256 | 0.029621275 |
| (90 to 99) | 0.011650497 | 0.019715245 | 0.032379206 | 0.015197023 | 0.00168897 |
| (100 to 109) | 0.008491675 | 0.010327482 | 0.029034686 | 0.023148428 | 0.0125765 |
| (110 to 119) | 0.002896972 | 0.027893341 | 0.020737998 | 0.009708541 | 0.008276105 |
| (120 to 129) | 0.010765293 | 0.078999909 | 0.03583258 | 0.007960564 | 0.005079089 |
| (130 to 136) | 0.036694448 | 0.391818808 | 0.144921426 | 0.040453866 | 0.014416648 |
| M.V. | 0.09885549 | 0.067016696 | 0.078072434 | 0.021198553 | 0.155196976 |
| **Window Size = 15** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
| (0 to 14) | 0.109940139 | 0.026756657 | 0.057772954 | 0.051912832 | 0.402811968 |
| (15 to 29) | 0.167979319 | 0.04952271 | 0.231559283 | 0.003933699 | 0.512928547 |
| (30 to 44) | 0.233999892 | 0.11806591 | 0.099284731 | 0.005833092 | 0.211565198 |
| (45 to 59) | 0.077718213 | 0.035824153 | 0.053105705 | 0.023147338 | 0.088357876 |
| (60 to 74) | 0.059333059 | 0.009938994 | 0.036173 | 0.015673704 | 0.024701819 |
| (75 to 89) | 0.012929441 | 0.017677232 | 0.036219332 | 0.007465024 | 0.012936454 |
| (90 to 104) | 0.007124996 | 0.009022719 | 0.019207299 | 0.009172702 | 0.004291232 |
| (105 to 119) | 0.002583163 | 0.01872367 | 0.016538332 | 0.010676578 | 0.00726314 |
| (120 to 134) | 0.014989892 | 0.161936701 | 0.116833957 | 0.029490723 | 0.004185029 |
| (135 to 149) | 0.043969151 | 0.51037172 | 0.08409094 | 0.068615823 | 0.025628153 |
| M.V. | 0.073056726 | 0.095784046 | 0.075078553 | 0.022592152 | 0.129466942 |
| **Window Size = 20** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
| (0 to 19) | 0.140765058 | 0.038802565 | 0.069209532 | 0.041315812 | 0.414017883 |
| (20 to 39) | 0.243761634 | 0.057791944 | 0.099271397 | 0.006589108 | 0.481864732 |
| (40 to 59) | 0.061237306 | 0.027366395 | 0.064257965 | 0.017935151 | 0.073489052 |
| (60 to 79) | 0.047460404 | 0.006010785 | 0.036069286 | 0.013210629 | 0.02276052 |
| (80 to 99) | 0.024232003 | 0.01016897 | 0.018693446 | 0.013040824 | 0.013184924 |
| (100 to 119) | 0.00265609 | 0.015736948 | 0.016447408 | 0.005750519 | 0.005851461 |
| (120 to 139)–>(120 to 136) | 0.015284347 | 0.119681172 | 0.063828398 | 0.037343638 | 0.005971956 |
| M.V. | 0.076485263 | 0.03936554 | 0.052539633 | 0.01931224 | 0.14530579 |

**Table S16.** Cont.

| **Window Size = 10** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
|---|---|---|---|---|---|
| **Window Size = 50** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
| (0 to 49) | 0.087563615 | 0.023222385 | 0.040792067 | 0.018401021 | 0.181187229 |
| (50 to 99) | 0.020892696 | 0.009804916 | 0.024100138 | 0.014454492 | 0.009804755 |
| (100 to 136) | 0.007553615 | 0.058670432 | 0.035772381 | 0.012782511 | 0.005917864 |
| M.V. | 0.038669975 | 0.030565911 | 0.033554862 | 0.015212674 | 0.065636616 |
| **Window Size = 70** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
| (0 to 69) | 0.05828581 | 0.00922796 | 0.023147534 | 0.015571096 | 0.105280792 |
| (70 to 136) | 0.009824072 | 0.034843632 | 0.024369371 | 0.008509838 | 0.009100912 |
| M.V. | 0.034054941 | 0.022035796 | 0.023758453 | 0.012040467 | 0.057190852 |

**Table S17.** The rules, of all companies, in which there is a correlation (small DTW distance) between the closing price (close) and news (sentimentScore) time series.

| | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
|---|---|---|---|---|---|
| Rules | R#2, R#5, R#6, R#7 | R#1, R#2, R#3, R#4, R#5, R#6, R#7 | R#1, R#2, R#3, R#4, R#5, R#6, R#7 | R#1, R#2, R#3, R#4, R#5, R#6, R#7, R#8, R#9, R#10 | R#5, R#6, R#7 |

**Table S18.** AAPL DTW distance between close and numTweets time series. Mean Value (M.V.) of the intervals that consist of a rule.

| | **Patterns Close** | **DTW (Close-numTweets)** | **(+3)** | | **(−3)** | |
|---|---|---|---|---|---|---|
| AAPL | | | | | | |
| R#1 | (0, 18) | 0.167207678 | (3, 21) | 0.174740651 | (0, 15) | 0.151107425 |
| | (21, 48) | 0.382495786 | (24, 52) | 0.258877117 | (18, 45) | 0.381802585 |
| | M.V. | 0.274851732 | | 0.216808884 | | 0.266455005 |
| R#2 | (4, 21) | 0.175319856 | (7, 24) | 0.261279676 | (1, 18) | 0.158732259 |
| | (79, 98) | 0.013793546 | (82, 101) | 0.022375984 | (76, 95) | 0.007520081 |
| | M.V. | 0.094556701 | | 0.14182783 | | 0.08312617 |
| R#3 | (9, 29) | 0.368761897 | (12, 32) | 0.359538589 | (6, 26) | 0.268433225 |
| | (118, 136) | 0.023506788 | (121, 139) | 0.026802946 | (115, 133) | 0.027778131 |
| | M.V. | 0.196134342 | | 0.193170768 | | 0.148105678 |
| R#4 | (19, 35) | 0.427951467 | (22, 38) | 0.427124199 | (16, 32) | 0.429205026 |
| | (57, 73) | 0.091673757 | (60, 76) | 0.067387733 | (54, 70) | 0.115827943 |
| | M.V. | 0.259812612 | | 0.247255966 | | 0.272516484 |
| R#5 | (35, 61) | 0.121167522 | (38, 64) | 0.143205473 | (32, 58) | 0.120260969 |
| | (74, 93) | 0 | (77, 96) | 0.021581356 | (71, 90) | 0.025432138 |
| | (100, 121) | 0.04967333 | (103, 124) | 0.062730224 | (97, 118) | 0.046283901 |
| | M.V. | 0.060759345 | | 0.075839018 | | 0.063992336 |
| R#6 | (48, 69) | 0.169265264 | (51, 72) | 0.130600845 | (45, 66) | 0.10313203 |
| | (90, 113) | 0.020655762 | (93, 116) | 0.024019818 | (87, 110) | 0.070501372 |
| | M.V. | 0.094960513 | | 0.077310332 | | 0.086816701 |
| R#7 | (67, 87) | 0.029193873 | (70, 90) | 0.030622716 | (64, 84) | 0.039181211 |
| | (107, 126) | 0.044311421 | (110, 129) | 0.029043213 | (104, 123) | 0.056494002 |
| | M.V. | 0.036752647 | | 0.029832964 | | 0.047837606 |
| | (0, 136) | 0.023043072 | (3, 136) | 0.019823583 | (0, 133) | 0.023657279 |

**Table S19.** GE DTW distance between close and numTweets time series. Mean Value (M.V.) of the intervals that consist of a rule.

| | **Patterns Close** | **DTW (Close-numTweets)** | **(+3)** | | **(−3)** | |
|---|---|---|---|---|---|---|
| GE | | | | | | |
| R#1 | (6, 34) | 0.056392129 | (9, 37) | 0.049361357 | (3, 31) | 0.052749245 |
| | (91, 114) | 0.034657273 | (94, 117) | 0.036015897 | (88, 111) | 0.053220773 |
| | M.V. | 0.045524701 | | 0.042688627 | | 0.052985009 |
| R#2 | (20, 39) | 0.052515785 | (23, 42) | 0.053296727 | (17, 36) | 0.051696612 |
| | (40, 62) | 0.034134798 | (43, 65) | 0.03518041 | (37, 59) | 0.043435076 |
| | M.V. | 0.043325291 | | 0.044238568 | | 0.047565844 |
| R#3 | (35, 54) | 0.04620278 | (38, 57) | 0.04895125 | (32, 51) | 0.048808206 |
| | (74, 92) | 0.040649169 | (77, 95) | 0.029187242 | (71, 89) | 0.028842742 |
| | M.V. | 0.043425975 | | 0.039069246 | | 0.038825474 |
| R#4 | (48, 66) | 0.034807474 | (51, 69) | 0.023372183 | (45, 63) | 0.035363266 |
| | (104, 122) | 0.078872031 | (107, 125) | 0.09011902 | (101, 119) | 0.049502482 |
| | M.V. | 0.056839752 | | 0.056745602 | | 0.042432874 |
| R#5 | (8, 32) | 0.052968079 | (11, 35) | 0.044349616 | (5, 29) | 0.05648991 |
| | (52, 68) | 0.022820018 | (55, 71) | 0.017159714 | (49, 65) | 0.030340809 |
| | (92, 113) | 0.037317327 | (95, 116) | 0.017159714 | (89, 110) | 0.070432108 |
| | M.V. | 0.037701808 | | 0.026223014 | | 0.052420942 |
| R#6 | (58, 77) | 0.01892078 | (61, 80) | 0.018714993 | (55, 74) | 0.01704395 |
| | (78, 95) | 0.032581759 | (81, 98) | 0.032820935 | (75, 92) | 0.042679808 |
| | M.V. | 0.02575127 | | 0.025767964 | | 0.029861879 |
| R#7 | (64, 82) | 0.017206689 | (67, 85) | 0.023258879 | (61, 79) | 0.01892348 |
| | (84, 100) | 0.040673974 | (87, 103) | 0.052788932 | (81, 97) | 0.030693041 |
| | M.V. | 0.028940331 | | 0.038023905 | | 0.024808261 |
| | (0, 136) | 0.057028997 | (3, 136) | 0.060151508 | (0, 133) | 0.049364107 |

**Table S20.** IBM DTW distance between close and numTweets time series. Mean Value (M.V.) of the intervals that consist of a rule.

| | **Patterns Close** | **DTW (Close-numTweets)** | **(+3)** | | **(−3)** | |
|---|---|---|---|---|---|---|
| IBM | | | | | | |
| R#1 | (0, 17) | 0.583991176 | (3, 20) | 0.679655365 | (0, 14) | 0.566732112 |
| | (112, 129) | 0.023631725 | (115, 132) | 0.02535549 | (109, 126) | 0.031039412 |
| | M.V. | 0.30381145 | | 0.352505428 | | 0.298885762 |
| R#2 | (11, 30) | 0.66361989 | (14, 33) | 0.656591085 | (8, 27) | 0.689054541 |
| | (51, 70) | 0.184524115 | (54, 73) | 0.134062744 | (48, 67) | 0.157562991 |
| | M.V. | 0.424072003 | | 0.395326915 | | 0.423308766 |
| R#3 | (16, 43) | 0.567196213 | (19, 46) | 0.538519271 | (13, 40) | 0.587309406 |
| | (40, 57) | 0.399105209 | (43, 60) | 0.432785083 | (37, 54) | 0.409138001 |
| | (57, 76) | 0.132156477 | (60, 79) | 0.432785083 | (54, 73) | 0.134062744 |
| | (66, 86) | 0.068968089 | (69, 89) | 0.069087224 | (63, 83) | 0.070730822 |
| | (78, 98) | 0.039536655 | (81, 101) | 0.023769614 | (75, 95) | 0.027502395 |
| | M.V. | 0.241392529 | | 0.299389255 | | 0.245748674 |

**Table S20.** Cont.

| | Patterns Close | DTW (Close-numTweets) | (+3) | | (−3) | |
|---|---|---|---|---|---|---|
| R#4 | (38, 57) | 0.405364283 | (41, 60) | 0.429787786 | (35, 54) | 0.403852345 |
| | (56, 76) | 0.116258565 | (59, 79) | 0.12557485 | (53, 73) | 0.14269275 |
| | (64, 86) | 0.053912021 | (67, 89) | 0.053348422 | (61, 83) | 0.099883769 |
| | (75, 98) | 0.023951141 | (78, 101) | 0.037377025 | (72, 95) | 0.041124226 |
| | M.V. | 0.149871503 | | 0.161522021 | | 0.171888272 |
| R#5 | (46, 65) | 0.179756375 | (49, 68) | 0.148621305 | (43, 62) | 0.453427903 |
| | (105, 126) | 0.024169504 | (108, 129) | 0.021311005 | (102, 123) | 0.016206804 |
| | M.V. | 0.101962939 | | 0.084966155 | | 0.234817353 |
| R#6 | (56, 78) | 0.111435758 | (59, 81) | 0.129911682 | (53, 75) | 0.140858177 |
| | (64, 89) | 0.011600668 | (67, 91) | 0.051330846 | (61, 86) | 0.076236543 |
| | (75, 99) | 0.023450839 | (78, 102) | 0.034414123 | (72, 96) | 0.040935982 |
| | M.V. | 0.048829088 | | 0.07188555 | | 0.086010234 |
| R#7 | −96,117 | 0.00634601 | (99, 120) | 0.007556179 | (93, 114) | 0.005189735 |
| | −115,136 | 0.027567568 | (118, 139) | 0.048175613 | (112, 133) | 0.022398952 |
| | M.V. | 0.016956789 | | 0.027865896 | | 0.013794343 |
| | (0, 136) | 0.049062472 | (3, 136) | 0.127010102 | (0, 133) | 0.050433566 |

**Table S21.** MSFT DTW distance between close and numTweets time series. Mean Value (M.V.) of the intervals that consist of a rule.

| | Patterns Close | DTW (Close-numTweets) | (+3) | | (−3) | |
|---|---|---|---|---|---|---|
| MSFT | | | | | | |
| R#1 | (0, 18) | 0.047599115 | (3, 21) | 0.077207399 | (0, 15) | 0.033013226 |
| | (54, 74) | 0.049248895 | (57, 77) | 0.047282855 | (51, 71) | 0.050771811 |
| | (66, 85) | 0.053604365 | (69, 88) | 0.030572206 | (63, 82) | 0.05401956 |
| | (98, 117) | 0.014337389 | (101, 120) | 0.015443528 | (95, 114) | 0.014119204 |
| | M.V. | 0.041197441 | | 0.042626497 | | 0.03798095 |
| R#2 | (8, 24) | 0.05830396 | (11, 27) | 0.053994787 | (5, 21) | 0.093267577 |
| | (71, 87) | 0.032263632 | (74, 90) | 0.023431958 | (68, 84) | 0.088687082 |
| | M.V. | 0.045283796 | | 0.038713372 | | 0.090977329 |
| R#3 | (15, 35) | 0.073922345 | (18, 38) | 0.070369843 | (12, 32) | 0.049137212 |
| | (22, 44) | 0.037274223 | (25, 47) | 0.025306239 | (19, 41) | 0.04607261 |
| | M.V. | 0.055598284 | | 0.047838041 | | 0.047604911 |
| R4 | (30, 48) | 0.027137771 | (33, 51) | 0.019008002 | (27, 45) | 0.03863653 |
| | (84, 101) | 0.011875873 | (87, 104) | 0.005385237 | (81, 98) | 0.022988314 |
| | M.V. | 0.019506822 | | 0.012196619 | | 0.030812422 |
| R#5 | (38, 60) | 0.024734577 | (41, 63) | 0.026714002 | (35, 57) | 0.026965282 |
| | (75, 98) | 0.019589698 | (78, 101) | 0.02380254 | (72, 81) | 0.099912183 |
| | M.V. | 0.022162138 | | 0.025258271 | | 0.063438732 |

**Table S21.** Cont.

| | Patterns Close | DTW (Close-numTweets) | (+3) | | (−3) | |
|---|---|---|---|---|---|---|
| R#6 | (46, 64) | 0.042871625 | (49, 67) | 0.041813931 | (43, 61) | 0.041627609 |
| | (103, 122) | 0.038100857 | (106, 125) | 0.039058206 | (99, 119) | 0.012815018 |
| | M.V. | 0.040486241 | | 0.040436068 | | 0.027221313 |
| R#7 | (50, 74) | 0.045716831 | (53, 77) | 0.062366705 | (47, 71) | 0.043931528 |
| | (64, 85) | 0.060468397 | (67, 88) | 0.004835652 | (61, 82) | 0.055197394 |
| | M.V. | 0.053092614 | | 0.033601178 | | 0.049564461 |
| R#8 | (91, 110) | 0.009700367 | (94, 113) | 0.011747901 | (88, 107) | 0.009311814 |
| | (117, 133) | 0.088828596 | (120, 136) | 0.011747901 | (114, 130) | 0.023323831 |
| | M.V. | 0.049264481 | | 0.011747901 | | 0.016317823 |
| R#9 | (64, 80) | 0.088828596 | (67, 83) | 0.050941855 | (61, 77) | 0.067247882 |
| | (108, 128) | 0.06318534 | (111, 131) | 0.025278145 | (105, 125) | 0.040060883 |
| | M.V. | 0.076006968 | | 0.03811 | | 0.053654382 |
| R#10 | (22, 42) | 0.034583759 | (25, 45) | 0.026476759 | (19, 39) | 0.049813617 |
| | (40, 58) | 0.022414899 | (43, 61) | 0.041627609 | (37, 55) | 0.032307981 |
| | (78, 96) | 0.030062522 | (81, 99) | 0.021000558 | (75, 93) | 0.025314172 |
| | M.V. | 0.029020394 | | 0.029701642 | | 0.035811923 |
| | (0, 136) | 0.020301539 | (3, 136) | 0.021285475 | (0, 133) | 0.015839046 |

**Table S22.** ORCL DTW distance between close and numTweets time series. Mean Value (M.V.) of the intervals that consist of a rule.

| | Patterns Close | DTW (Close-numTweets) | (+3) | | (−3) | |
|---|---|---|---|---|---|---|
| ORCL | | | | | | |
| R#1 | (6, 25) | 0.700353837 | (9, 28) | 0.716077481 | (3, 22) | 0.684796561 |
| | (45, 64) | 0.100326064 | (48, 67) | 0.071193188 | (42, 61) | 0.168982993 |
| | M.V. | 0.40033995 | | 0.393635335 | | 0.426889777 |
| R#2 | (11, 30) | 0.695941385 | (14, 33) | 0.706471142 | (8, 27) | 0.6989355 |
| | (92, 112) | 0.004278926 | (95, 115) | 0.004280017 | (89, 109) | 0.003873202 |
| | M.V. | 0.350110156 | | 0.35537558 | | 0.351404351 |
| R#3 | (17, 40) | 0.700925525 | (20, 43) | 0.347404141 | (14, 37) | 0.68915031 |
| | (79, 101) | 0.027570148 | (82, 104) | 0.02249862 | (76, 98) | 0.029330206 |
| | M.V. | 0.364247836 | | 0.18495138 | | 0.359240258 |
| R#4 | (8, 25) | 0.700938285 | (11, 28) | 0.703537785 | (5, 23) | 0.702296075 |
| | (26, 43) | 0.404498517 | (29, 46) | 0.34646886 | (23, 40) | 0.681372444 |
| | (47, 64) | 0.092766367 | (50, 67) | 0.060965561 | (44, 61) | 0.177981106 |
| | M.V. | 0.399401056 | | 0.370324069 | | 0.520549875 |
| R#5 | (31, 59) | 0.247145534 | (34, 62) | 0.184828605 | (28, 56) | 0.280237863 |
| | (51, 73) | 0.060927683 | (54, 76) | 0.155428119 | (48, 70) | 0.065565255 |
| | M.V. | 0.154036608 | | 0.170128362 | | 0.172901559 |
| R#6 | (89, 106) | 0.004400398 | (92, 109) | 0.004695309 | (86, 103) | 0.010157287 |
| | (104, 125) | 0.00606291 | (107, 128) | 0.006520761 | (101, 122) | 0.012575766 |
| | M.V. | 0.005231654 | | 0.005608035 | | 0.011366526 |

**Table S22.** Cont.

| | Patterns Close | DTW (Close-numTweets) | (+3) | | (−3) | |
|---|---|---|---|---|---|---|
| R7 | (98, 118) | 0.008839565 | (101, 121) | 0.013817203 | (95, 115) | 0.004280017 |
| | (117, 134) | 0.025725324 | (120, 136) | 0.02737527 | (114, 131) | 0.010687124 |
| | M.V. | 0.017282444 | | 0.020596237 | | 0.007483571 |
| R#8 | (17, 34) | 0.702113634 | (20, 37) | 0.676442458 | (14, 31) | 0.708303784 |
| | (35, 59) | 0.19816808 | (38, 62) | 0.137240105 | (32, 56) | 0.234870829 |
| | (56, 73) | 0.161512861 | (59, 76) | 0.145985905 | (53, 70) | 0.045268696 |
| | (79, 98) | 0.033627402 | (82, 101) | 0.026393766 | (76, 95) | 0.030793366 |
| | M.V. | 0.273855494 | | 0.246515559 | | 0.254809169 |
| | (0, 136) | 0.096979763 | (3, 136) | 0.090078612 | (0, 133) | 0.097935936 |

**Table S23.** Random windows length $w$ for close—numTweets time series. Mean Value (M.V.) of DTW distance between the two time series.

| **Window Size = 10** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
|---|---|---|---|---|---|
| (0 to 9) | 0.132594944 | 0.029407011 | 0.092242161 | 0.077443956 | 0.421920571 |
| (10 to 19) | 0.220766056 | 0.074360434 | 0.118744716 | 0.001840917 | 0.406115196 |
| (20 to 29) | 0.30832706 | 0.056872127 | 0.25752526 | 0.008708723 | 0.545575005 |
| (30 to 39) | 0.255556822 | 0.130645331 | 0.09814162 | 0.00856189 | 0.41815446 |
| (40 to 49) | 0.092403903 | 0.048857659 | 0.089159528 | 0.017389937 | 0.159801089 |
| (50 to 59) | 0.092051367 | 0.02218414 | 0.046321985 | 0.039845794 | 0.07968165 |
| (60 to 69) | 0.145747555 | 0.010902172 | 0.051924713 | 0.024259335 | 0.020463904 |
| (70 to 79) | 0.031126111 | 0.00644333 | 0.038545699 | 0.006645506 | 0.049387201 |
| (80 to 89) | 0.034904158 | 0.02980676 | 0.037502497 | 0.015615256 | 0.029621275 |
| (90 to 99) | 0.011650497 | 0.019715245 | 0.032379206 | 0.015197023 | 0.00168897 |
| (100 to 109) | 0.008491675 | 0.010327482 | 0.029034686 | 0.023148428 | 0.0125765 |
| (110 to 119) | 0.002896972 | 0.027893341 | 0.020737998 | 0.009708541 | 0.008276105 |
| (120 to 129) | 0.010765293 | 0.078999909 | 0.03583258 | 0.007960564 | 0.005079089 |
| (130 to 136) | 0.036694448 | 0.391818808 | 0.144921426 | 0.040453866 | 0.014416648 |
| M.V. | 0.09885549 | 0.067016696 | 0.078072434 | 0.021198553 | 0.155196976 |
| **Window Size = 15** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
| (0 to 14) | 0.109940139 | 0.026756657 | 0.057772954 | 0.051912832 | 0.402811968 |
| (15 to 29) | 0.167979319 | 0.04952271 | 0.231559283 | 0.003933699 | 0.512928547 |
| (30 to 44) | 0.233999892 | 0.11806591 | 0.099284731 | 0.005833092 | 0.211565198 |
| (45 to 59) | 0.077718213 | 0.035824153 | 0.053105705 | 0.023147338 | 0.088357876 |
| (60 to 74) | 0.059333059 | 0.009938994 | 0.036173 | 0.015673704 | 0.024701819 |
| (75 to 89) | 0.012929441 | 0.017677232 | 0.036219332 | 0.007465024 | 0.012936454 |
| (90 to 104) | 0.007124996 | 0.009022719 | 0.019207299 | 0.009172702 | 0.004291232 |
| (105 to 119) | 0.002583163 | 0.01872367 | 0.016538332 | 0.010676578 | 0.00726314 |
| (120 to 134) | 0.014989892 | 0.161936701 | 0.116833957 | 0.029490723 | 0.004185029 |
| (135 to 149) | 0.043969151 | 0.51037172 | 0.08409094 | 0.068615823 | 0.025628153 |
| M.V. | 0.073056726 | 0.095784046 | 0.075078553 | 0.022592152 | 0.129466942 |
| **Window Size = 20** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
| (0 to 19) | 0.140765058 | 0.038802565 | 0.069209532 | 0.041315812 | 0.414017883 |
| (20 to 39) | 0.243761634 | 0.057791944 | 0.099271397 | 0.006589108 | 0.481864732 |
| (40 to 59) | 0.061237306 | 0.027366395 | 0.064257965 | 0.017935151 | 0.073489052 |
| (60 to 79) | 0.047460404 | 0.006010785 | 0.036069286 | 0.013210629 | 0.02276052 |

**Table S23.** Cont.

| Window Size = 10 | AAPL | GE | IBM | MSFT | ORCL |
|---|---|---|---|---|---|
| (80 to 99) | 0.024232003 | 0.01016897 | 0.018693446 | 0.013040824 | 0.013184924 |
| (100 to 119) | 0.00265609 | 0.015736948 | 0.016447408 | 0.005750519 | 0.005851461 |
| (120 to 139)–>(120 to 136) | 0.015284347 | 0.119681172 | 0.063828398 | 0.037343638 | 0.005971956 |
| M.V. | 0.076485263 | 0.03936554 | 0.052539633 | 0.01931224 | 0.14530579 |
| **Window Size = 50** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
| (0 to 49) | 0.087563615 | 0.023222385 | 0.040792067 | 0.018401021 | 0.181187229 |
| (50 to 99) | 0.020892696 | 0.009804916 | 0.024100138 | 0.014454492 | 0.009804755 |
| (100 to 136) | 0.007553615 | 0.058670432 | 0.035772381 | 0.012782511 | 0.005917864 |
| M.V. | 0.038669975 | 0.030565911 | 0.033554862 | 0.015212674 | 0.065636616 |
| **Window Size = 70** | **AAPL** | **GE** | **IBM** | **MSFT** | **ORCL** |
| (0 to 69) | 0.05828581 | 0.00922796 | 0.023147534 | 0.015571096 | 0.105280792 |
| (70 to 136) | 0.009824072 | 0.034843632 | 0.024369371 | 0.008509838 | 0.009100912 |
| M.V. | 0.034054941 | 0.022035796 | 0.023758453 | 0.012040467 | 0.057190852 |

**Table S24.** The rules, of all companies, in which there is a correlation (small DTW distance) between the closing price (close) and number of tweets (numTweets) time series.

| | AAPL | GE | IBM | MSFT | ORCL |
|---|---|---|---|---|---|
| Rules | R#2, R#4, R#5, R#6, R#7 | R#1, R#2, R#3, R#4, R#5, R#6, R#7 | R#4, R#5, R#6, R#7 | R#1, R#2, R#3, R#4, R#5, R#6, R#7, R#8, R#9, R#10 | R5, R6, R#7 |

**Table S25.** The rules that are used to examine if the sentiment score of news and the number of tweets improve the prediction of the next closing price. The rules with the smaller DTW distance.

| | AAPL | GE | IBM | MSFT | ORCL |
|---|---|---|---|---|---|
| Rules | R#2, R#5, R#6, R#7 | R#4, R#5, R#6, R#7 | R#4, R#5, R#6, R#7 | R#1, R#2, R#3, R#4 | R#5, R#6, R#7 |

**Table S26.** Closing prices for the 5 companies.

| Date | AAPL Close | GE Close | IBM Close | MSFT Close | ORCL Close |
|---|---|---|---|---|---|
| 20/04/15 | 127.6 | 27.02 | 166.16 | 42.905 | 43.32 |
| 21/04/15 | 126.91 | 26.62 | 164.26 | 42.635 | 43.42 |
| 22/04/15 | 128.62 | 26.91 | 165.36 | 42.985 | 43.55 |
| 23/04/15 | 129.67 | 26.85 | 170.24 | 43.34 | 43.39 |
| 24/04/15 | 130.28 | 26.8 | 169.78 | 47.87 | 43.08 |
| 27/04/15 | 132.65 | 26.88 | 170.73 | 48.03 | 43.61 |
| 28/04/15 | 130.56 | 27.12 | 173.92 | 49.155 | 44.5 |
| 29/04/15 | 128.64 | 27.09 | 174.4 | 49.06 | 44.73 |
| 30/04/15 | 125.15 | 27.08 | 171.29 | 48.64 | 43.62 |
| 01/05/15 | 128.95 | 27.31 | 173.67 | 48.655 | 44.37 |
| 04/05/15 | 128.7 | 27.27 | 173.97 | 48.24 | 44.59 |
| 05/05/15 | 125.8 | 26.92 | 173.08 | 47.6 | 43.92 |
| 06/05/15 | 125.01 | 26.81 | 170.05 | 46.28 | 43.26 |
| 07/05/15 | 125.26 | 27.04 | 170.99 | 46.7 | 43.48 |
| 08/05/15 | 127.62 | 27.36 | 172.68 | 47.75 | 44.01 |
| 11/05/15 | 126.32 | 26.92 | 171.12 | 47.37 | 43.84 |
| 12/05/15 | 125.865 | 27.03 | 170.55 | 47.35 | 43.57 |
| 13/05/15 | 126.01 | 27.21 | 172.28 | 47.625 | 43.79 |

**Table S26.** Cont.

| Date | AAPL Close | GE Close | IBM Close | MSFT Close | ORCL Close |
|---|---|---|---|---|---|
| 14/05/15 | 128.95 | 27.41 | 174.05 | 48.72 | 44.38 |
| 15/05/15 | 128.77 | 27.27 | 173.26 | 48.295 | 44.15 |
| 18/05/15 | 130.19 | 27.31 | 173.06 | 48.01 | 44.24 |
| 19/05/15 | 130.07 | 27.35 | 173.48 | 47.58 | 44.32 |
| 20/05/15 | 130.06 | 27.64 | 173.76 | 47.58 | 44.29 |
| 21/05/15 | 131.39 | 27.72 | 173.34 | 47.42 | 44.28 |
| 22/05/15 | 132.54 | 27.68 | 172.22 | 46.9 | 43.93 |
| 26/05/15 | 129.62 | 27.52 | 170.13 | 46.59 | 43.33 |
| 27/05/15 | 132.045 | 27.52 | 172 | 47.61 | 44.14 |
| 28/05/15 | 131.78 | 27.63 | 171.71 | 47.45 | 43.86 |
| 29/05/15 | 130.28 | 27.27 | 169.65 | 46.86 | 43.49 |
| 01/06/15 | 130.535 | 27.28 | 170.18 | 47.23 | 43.79 |
| 02/06/15 | 129.96 | 27.33 | 169.65 | 46.92 | 43.7 |
| 03/06/15 | 130.12 | 27.53 | 169.92 | 46.85 | 43.97 |
| 04/06/15 | 129.36 | 27.26 | 168.38 | 46.36 | 43.77 |
| 05/06/15 | 128.65 | 27.29 | 167.4 | 46.14 | 43.81 |
| 08/06/15 | 127.8 | 27.24 | 165.34 | 45.73 | 43.1 |
| 09/06/15 | 127.42 | 27.33 | 165.68 | 45.65 | 43.07 |
| 10/06/15 | 128.88 | 27.63 | 168.92 | 46.61 | 43.94 |
| 11/06/15 | 128.59 | 27.51 | 168.78 | 46.44 | 44.28 |
| 12/06/15 | 127.17 | 27.39 | 166.99 | 45.97 | 44.34 |
| 15/06/15 | 126.92 | 27.21 | 166.26 | 45.475 | 43.72 |
| 16/06/15 | 127.6 | 27.22 | 166.84 | 45.83 | 44.64 |
| 17/06/15 | 127.3 | 27.27 | 167.17 | 45.97 | 44.91 |
| 18/06/15 | 127.88 | 27.37 | 168.25 | 46.72 | 42.74 |
| 19/06/15 | 126.6 | 27.24 | 166.99 | 46.1 | 41.59 |
| 22/06/15 | 127.61 | 27.42 | 167.73 | 46.23 | 41.49 |
| 23/06/15 | 127.03 | 27.55 | 168.62 | 45.91 | 41.71 |
| 24/06/15 | 128.11 | 27.26 | 166.97 | 45.635 | 41.2 |
| 25/06/15 | 127.5 | 27.04 | 166.08 | 45.65 | 41.06 |
| 26/06/15 | 126.75 | 27.09 | 165.46 | 45.26 | 40.99 |
| 29/06/15 | 124.53 | 26.64 | 162.97 | 44.37 | 40.42 |
| 30/06/15 | 125.425 | 26.57 | 162.66 | 44.15 | 40.3 |
| 01/07/15 | 126.6 | 26.66 | 164.49 | 44.445 | 40.24 |
| 02/07/15 | 126.44 | 26.78 | 165.09 | 44.4 | 40.36 |
| 06/07/15 | 126 | 26.31 | 164.73 | 44.39 | 40.15 |
| 07/07/15 | 125.69 | 26.47 | 165 | 44.3 | 40.16 |
| 08/07/15 | 122.57 | 25.89 | 163.16 | 44.24 | 39.77 |
| 09/07/15 | 120.07 | 26.02 | 163.85 | 44.52 | 40.18 |
| 10/07/15 | 123.28 | 26.27 | 166.95 | 44.61 | 40.36 |
| 13/07/15 | 125.66 | 26.47 | 169.38 | 45.54 | 40.8 |
| 14/07/15 | 125.61 | 26.66 | 168.61 | 45.62 | 40.78 |
| 15/07/15 | 126.82 | 26.77 | 168.53 | 45.76 | 40.79 |
| 16/07/15 | 128.51 | 27.04 | 171 | 46.66 | 40.96 |
| 17/07/15 | 129.62 | 27.24 | 172.51 | 46.62 | 40.4 |
| 20/07/15 | 132.07 | 27.14 | 173.22 | 46.92 | 39.93 |
| 21/07/15 | 130.75 | 26.85 | 163.07 | 47.28 | 39.57 |
| 22/07/15 | 125.22 | 26.63 | 160.35 | 45.54 | 39.42 |
| 23/07/15 | 125.16 | 26.26 | 161.73 | 46.11 | 39 |
| 24/07/15 | 124.5 | 25.75 | 159.75 | 45.94 | 39 |
| 27/07/15 | 122.77 | 25.95 | 159.07 | 45.35 | 38.51 |
| 28/07/15 | 123.38 | 26.1 | 160.05 | 45.34 | 39.28 |
| 29/07/15 | 122.99 | 26.26 | 161.09 | 46.29 | 39.79 |
| 30/07/15 | 122.37 | 26.12 | 160.96 | 46.88 | 39.65 |

**Table S26.** Cont.

| Date | AAPL Close | GE Close | IBM Close | MSFT Close | ORCL Close |
|---|---|---|---|---|---|
| 31/07/15 | 121.3 | 26.1 | 161.99 | 46.7 | 39.94 |
| 03/08/15 | 118.44 | 25.87 | 158.71 | 46.81 | 39.71 |
| 04/08/15 | 114.64 | 25.9 | 157.6 | 47.54 | 39.66 |
| 05/08/15 | 115.4 | 26.1 | 157.9 | 47.58 | 39.64 |
| 06/08/15 | 115.13 | 26.03 | 156.32 | 46.62 | 39.32 |
| 07/08/15 | 115.52 | 26.03 | 155.12 | 46.74 | 39.56 |
| 10/08/15 | 119.72 | 26.24 | 156.75 | 47.33 | 39.89 |
| 11/08/15 | 113.49 | 25.71 | 155.51 | 46.41 | 39.17 |
| 12/08/15 | 115.24 | 25.86 | 156.16 | 46.74 | 39.28 |
| 13/08/15 | 115.15 | 25.79 | 155.07 | 46.73 | 39.31 |
| 14/08/15 | 115.96 | 26.08 | 155.75 | 47 | 39.41 |
| 17/08/15 | 117.16 | 26.21 | 156.31 | 47.32 | 39.72 |
| 18/08/15 | 116.5 | 26.07 | 156.01 | 47.27 | 39.83 |
| 19/08/15 | 115.01 | 25.73 | 153.94 | 46.61 | 39.53 |
| 20/08/15 | 112.65 | 25.19 | 152.66 | 45.66 | 38.63 |
| 21/08/15 | 105.76 | 24.59 | 148.85 | 43.07 | 37.55 |
| 24/08/15 | 103.12 | 23.87 | 143.47 | 41.68 | 36.08 |
| 25/08/15 | 103.74 | 23.27 | 140.96 | 40.47 | 35.45 |
| 26/08/15 | 109.69 | 24.01 | 146.7 | 42.71 | 36.91 |
| 27/08/15 | 112.92 | 25.01 | 148.54 | 43.9 | 36.82 |
| 28/08/15 | 113.29 | 25.16 | 147.98 | 43.93 | 37.46 |
| 31/08/15 | 112.76 | 24.82 | 147.89 | 43.52 | 37.09 |
| 01/09/15 | 107.72 | 23.88 | 142.68 | 41.82 | 36.01 |
| 02/09/15 | 112.34 | 24.57 | 145.05 | 43.36 | 36.75 |
| 03/09/15 | 110.37 | 24.51 | 146.78 | 43.5 | 36.9 |
| 04/09/15 | 109.27 | 24 | 143.7 | 42.61 | 36.27 |
| 08/09/15 | 112.31 | 24.96 | 147.23 | 43.89 | 37.68 |
| 09/09/15 | 110.15 | 24.55 | 145.05 | 43.07 | 37.09 |
| 10/09/15 | 112.57 | 24.68 | 146.2 | 43.29 | 37.61 |
| 11/09/15 | 114.21 | 24.95 | 147.37 | 43.48 | 37.92 |
| 14/09/15 | 115.31 | 24.77 | 145.65 | 43.04 | 37.56 |
| 15/09/15 | 116.28 | 25.3 | 147.53 | 43.98 | 37.99 |
| 16/09/15 | 116.41 | 25.93 | 148.41 | 44.3 | 38.27 |
| 17/09/15 | 113.92 | 25.35 | 148.14 | 44.25 | 36.74 |
| 18/09/15 | 113.45 | 24.8 | 144.51 | 43.48 | 36.38 |
| 21/09/15 | 115.21 | 25.09 | 146.48 | 44.11 | 36.83 |
| 22/09/15 | 113.4 | 25.11 | 144.43 | 43.9 | 36.19 |
| 23/09/15 | 114.32 | 25.14 | 143.66 | 43.87 | 35.99 |
| 24/09/15 | 115 | 24.91 | 144.41 | 43.91 | 36.06 |
| 25/09/15 | 114.71 | 24.92 | 145.42 | 43.94 | 36.05 |
| 28/09/15 | 112.44 | 24.31 | 142.52 | 43.29 | 35.44 |
| 29/09/15 | 109.06 | 24.57 | 142.47 | 43.44 | 35.51 |
| 30/09/15 | 110.3 | 25.22 | 144.97 | 44.26 | 36.12 |
| 01/10/15 | 109.58 | 25.19 | 143.59 | 44.61 | 36.24 |
| 02/10/15 | 110.38 | 25.47 | 144.58 | 45.57 | 36.89 |
| 05/10/15 | 110.78 | 26.82 | 149.04 | 46.63 | 37.59 |
| 06/10/15 | 111.31 | 27.29 | 148.78 | 46.75 | 37.73 |
| 07/10/15 | 110.78 | 27.77 | 150.09 | 46.8 | 37.66 |
| 08/10/15 | 109.5 | 28.03 | 152.28 | 47.45 | 37.89 |
| 09/10/15 | 112.12 | 28.07 | 152.39 | 47.11 | 38.1 |
| 12/10/15 | 111.6 | 28.09 | 151.14 | 47 | 38.04 |
| 13/10/15 | 111.79 | 27.87 | 149.62 | 46.89 | 37.82 |
| 14/10/15 | 110.21 | 27.6 | 150.01 | 46.68 | 37.26 |
| 15/10/15 | 111.86 | 28.03 | 150.09 | 47.01 | 37.55 |
| 16/10/15 | 111.04 | 28.98 | 150.39 | 47.51 | 37.37 |
| 19/10/15 | 111.73 | 28.99 | 149.22 | 47.62 | 36.87 |
| 20/10/15 | 113.77 | 28.78 | 140.64 | 47.77 | 36.86 |

**Table S26.** Cont.

| Date | AAPL Close | GE Close | IBM Close | MSFT Close | ORCL Close |
|---|---|---|---|---|---|
| 21/10/15 | 113.76 | 28.85 | 140.92 | 47.2 | 36.62 |
| 22/10/15 | 115.5 | 29.58 | 144.09 | 48.03 | 37.79 |
| 23/10/15 | 119.08 | 29.51 | 144.68 | 52.87 | 38.07 |
| 26/10/15 | 115.28 | 29.55 | 143.66 | 54.25 | 38.37 |
| 27/10/15 | 114.55 | 29.46 | 137.86 | 53.69 | 38.34 |
| 28/10/15 | 119.27 | 29.39 | 140.83 | 53.98 | 38.88 |
| 29/10/15 | 120.53 | 29.34 | 140.55 | 53.36 | 38.86 |
| 30/10/15 | 119.5 | 28.92 | 140.08 | 52.64 | 38.84 |