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| Improved Distributed PCA Detection |
| 1. letbe the max projection distance from the first pc of node; |
| 2. letbe the median projection distance of ’s neighboring nodes’; |
| 3. letbe the median projection distance of the set ; |
| 4. letbe the amount of data measurements for learning theand first pc; |
| 5. letbe a new data measurement arrive at ; |
| 6. letbe the new data measurements arriving at’s neighboring nodes at the same time interval, respectively; |
| 7. let be the maximum projection distance from the first pc at node ; |
| 8. let  be the median projection distance offrom their own first pc; |
| 9. procedure learning and first pc  ①each node collects m data measurements for learning its own first pc and compute, then broadcasts the distance information to its spatially neighboring nodes;  ②each node then computesand ;  ③initiate IsOutlier(,) for each node;  return; |
| 10. procedure IsOutlier(,) for  when arrives at  computes ;  if (>&>)  indicates an outlier;  SourceOfOutlier(,,,) for;  else  indicates a normal one;  endif  return; |
| 11. procedure SourceOfOutlier(,,,);  ①collects the projection distance from its neighbor respectfully and compute the median projection distance;  ②if (>&>)  if (>&>)  may indicates an event;  else  may indicates an erroneous data measurement;  endif;  else  may indicates an erroneous data measurement;  endif;  return; |