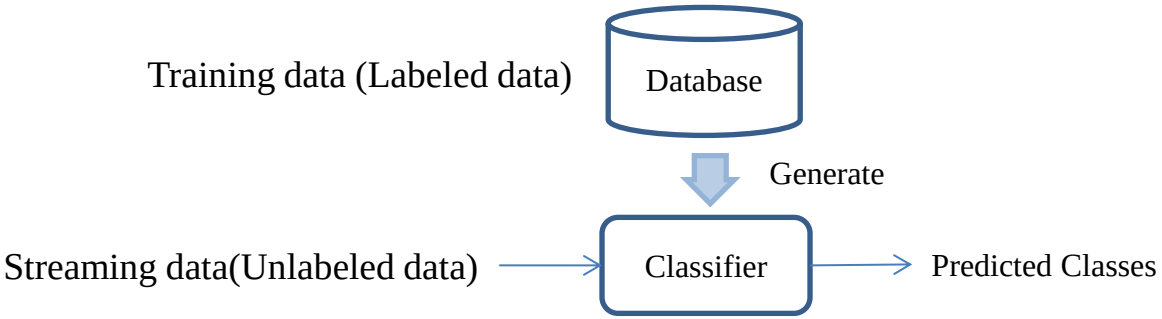
Analysis of Particle Filtering as an Effective Approach to Handling Concept Drift in Streaming Data

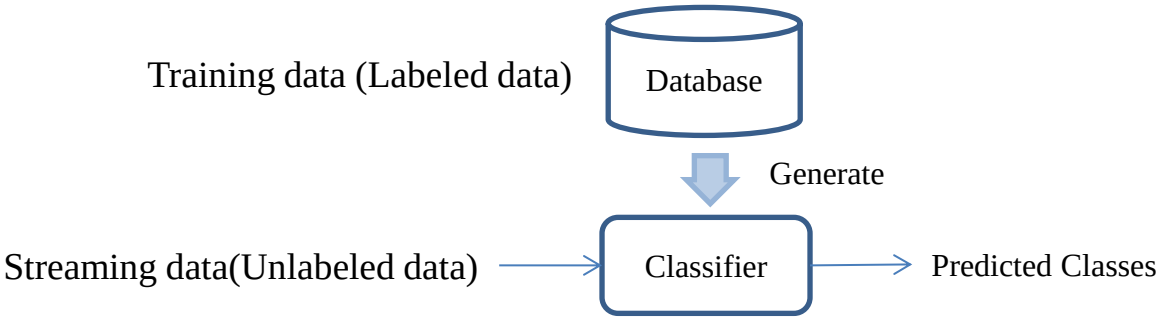
Tegjyot Singh Sethi

https://github.com/tegjyotsingh/Incremental-Classification

Streaming Data and Concept Drift



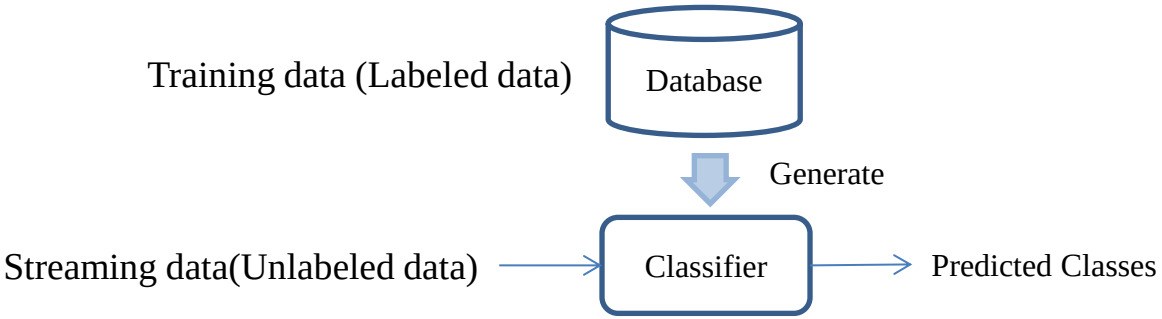
Streaming Data and Concept Drift



Challenges in Stream Mining

- Scalability and Response Time
- Robustness
- Concept Drift

Streaming Data and Concept Drift



Concept Drift: $P_t(y|x_i) \neq P_{t+1}(y|x_i)$.

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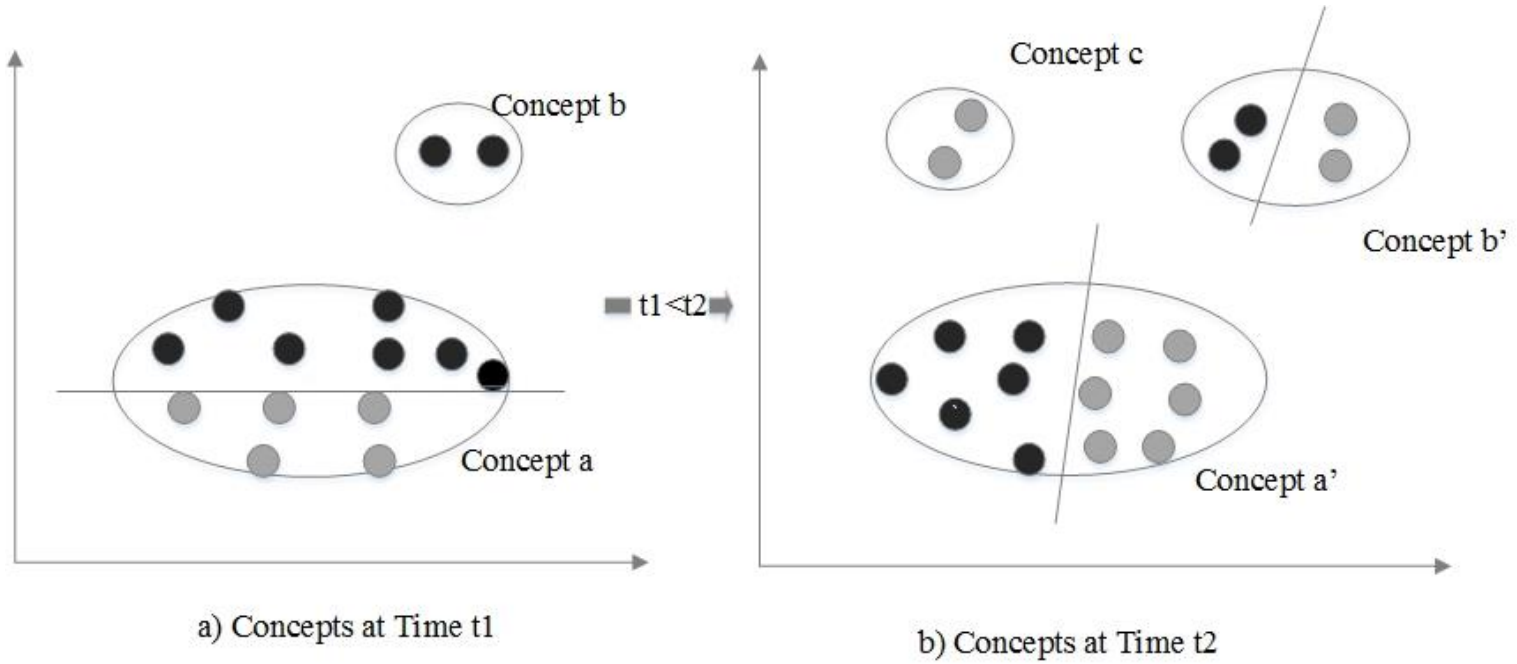

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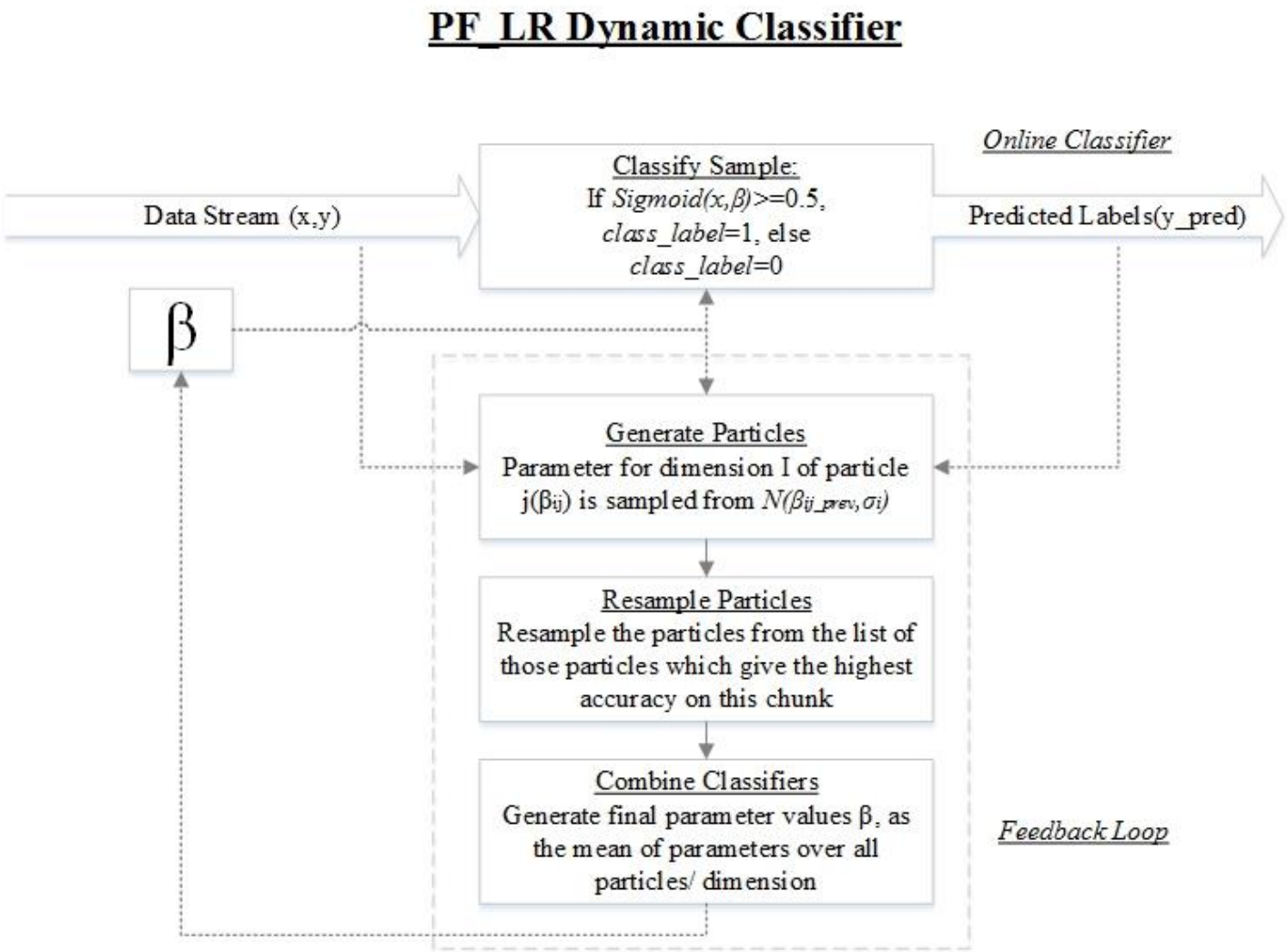
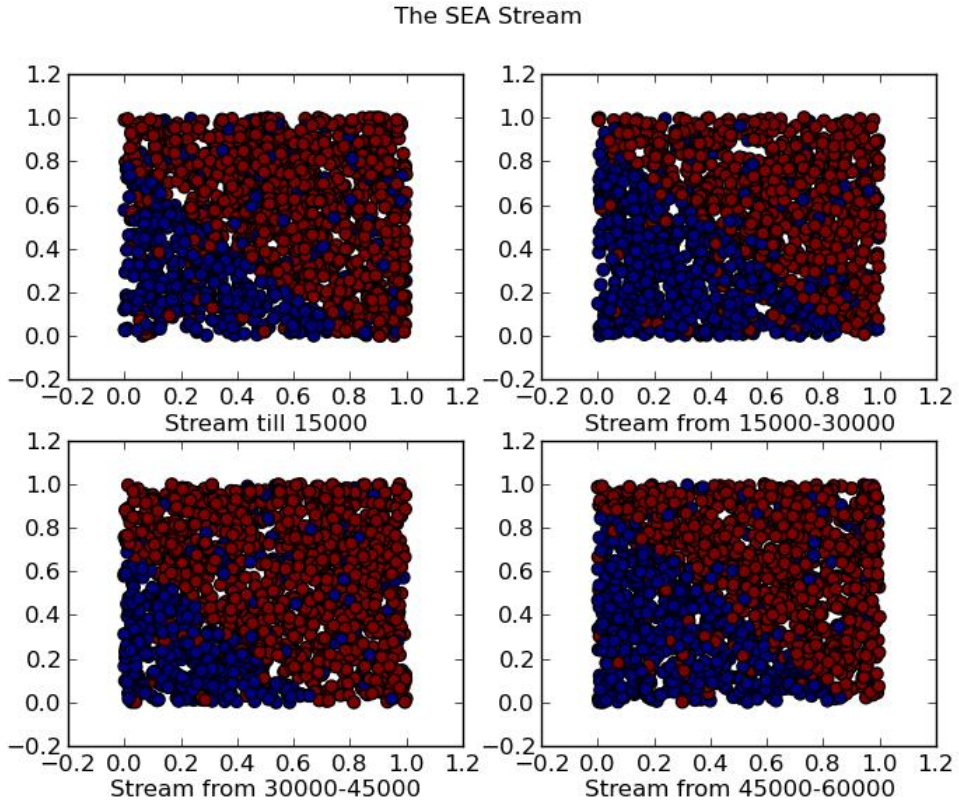
Particle Filtering for Stream Classification



Experimentation : Datasets Used

> SEA Stream:



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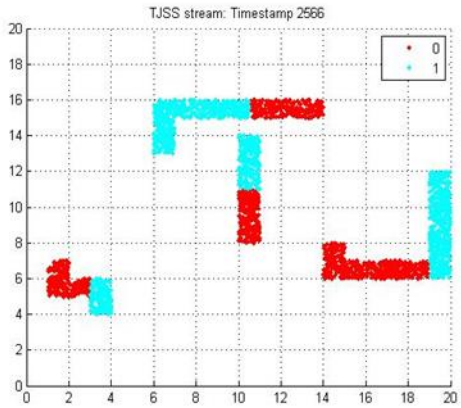
> TJSS Stream:



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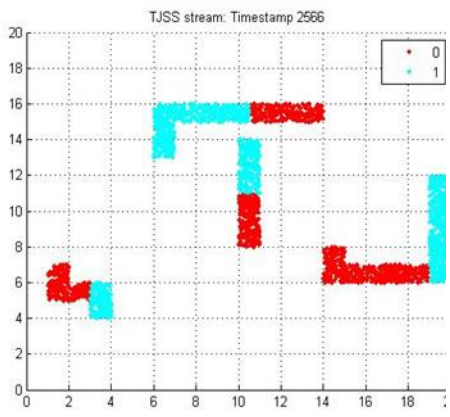

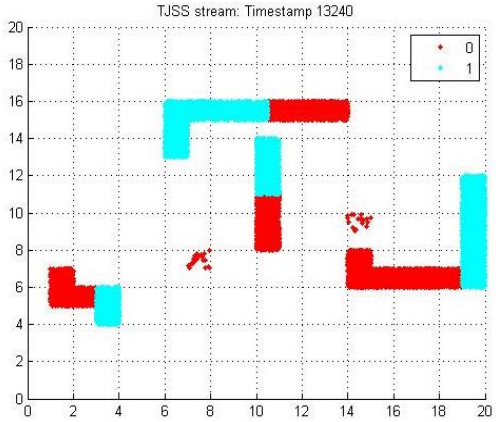

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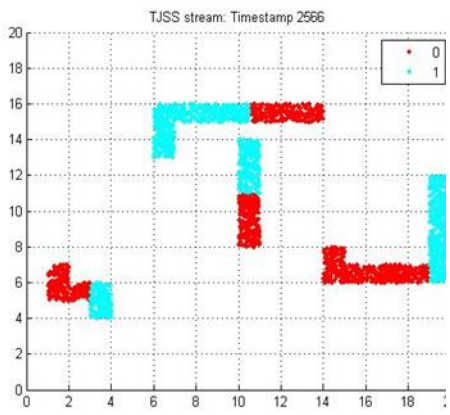

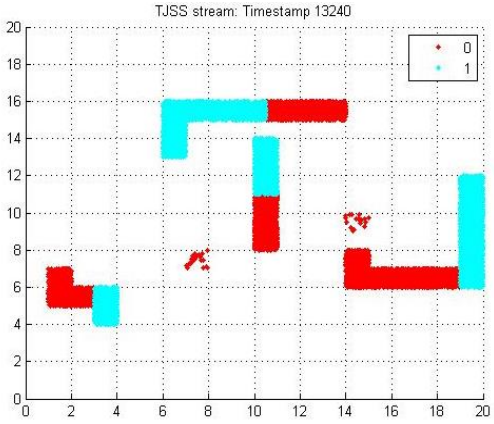

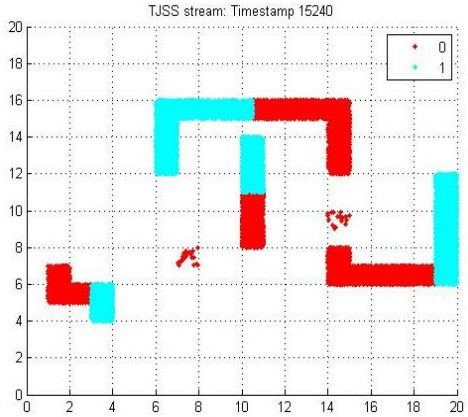

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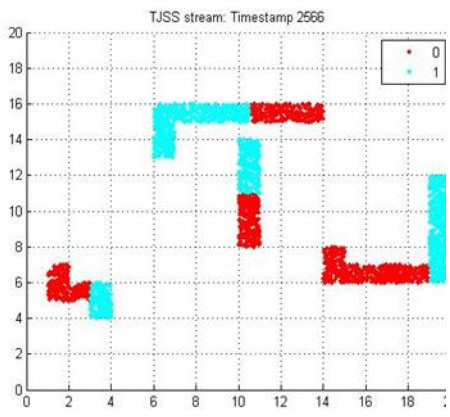

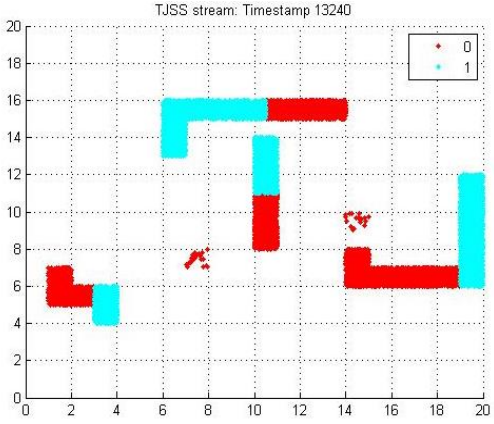

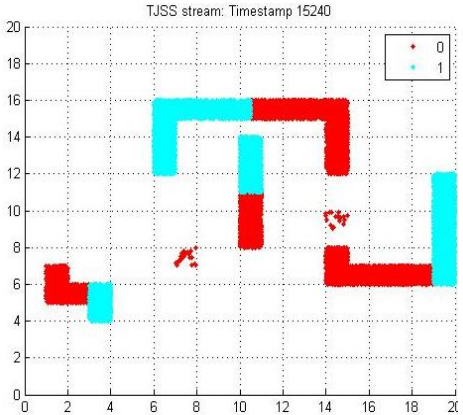

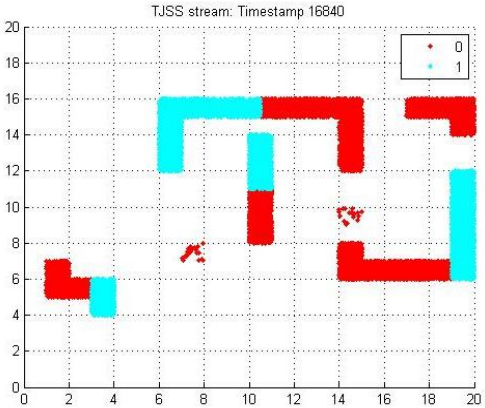

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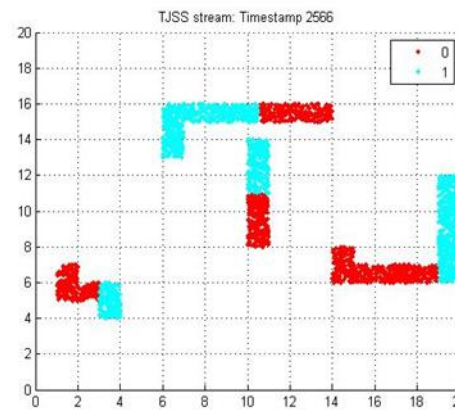

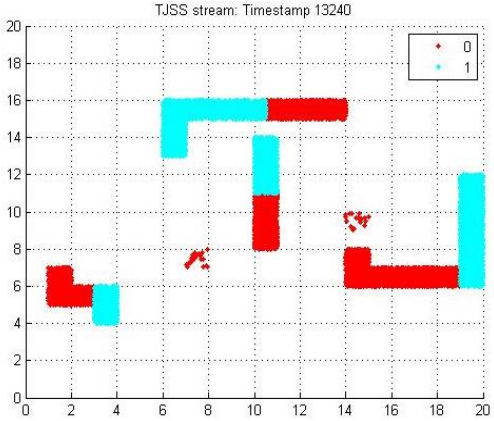

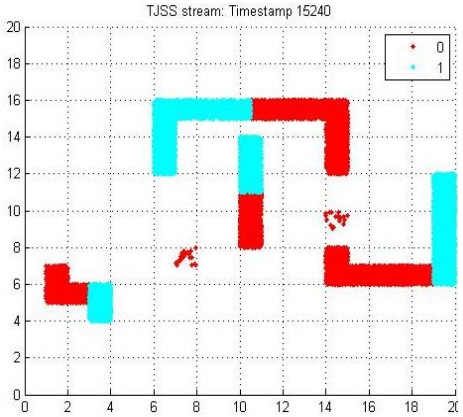

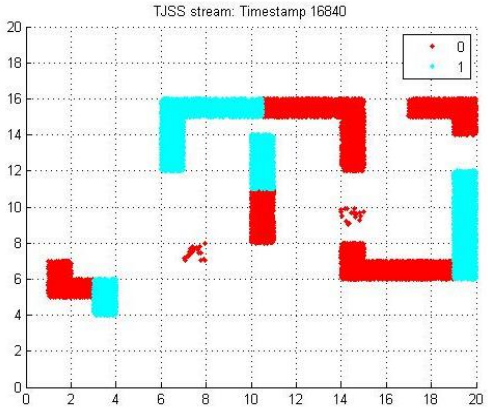

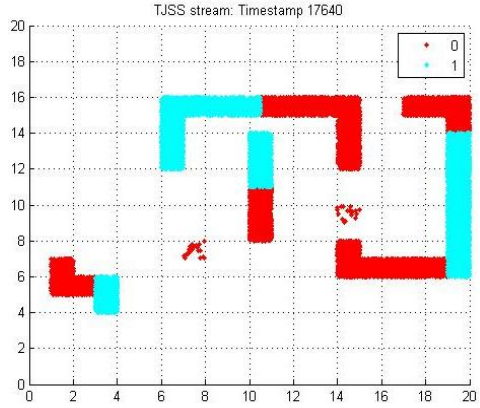

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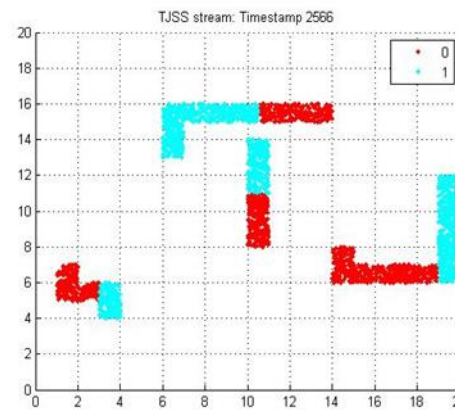

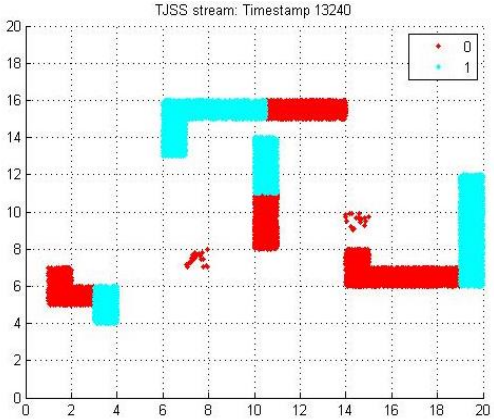

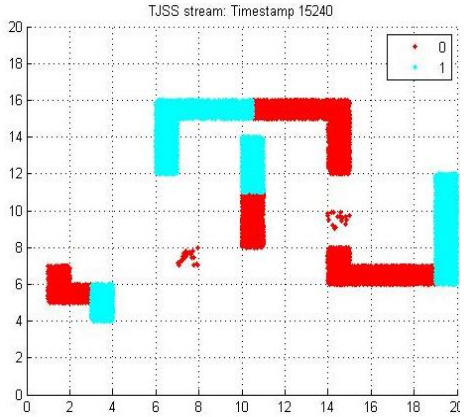

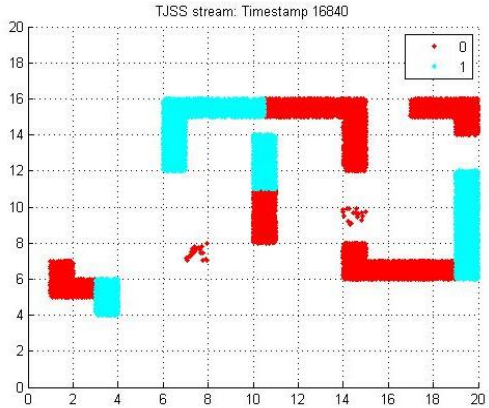

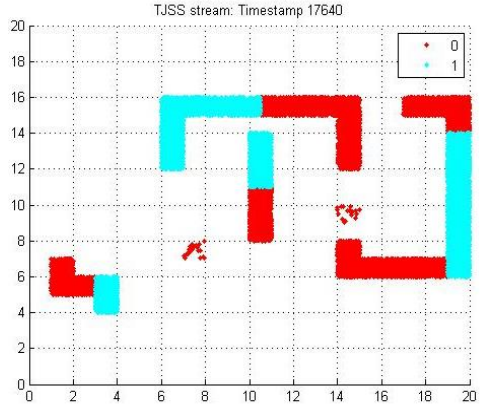

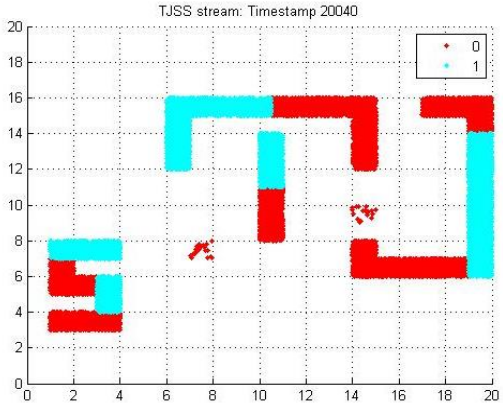

Experimentation : Datasets Used

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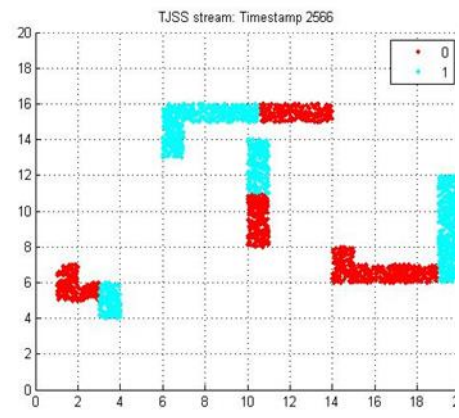

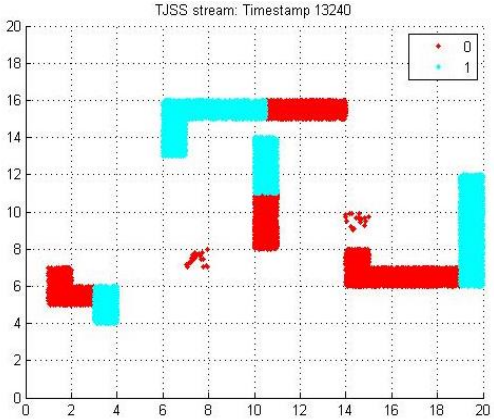

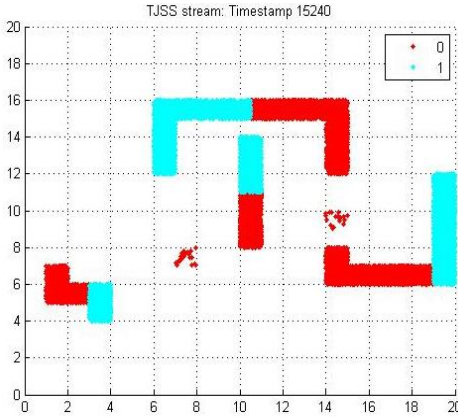

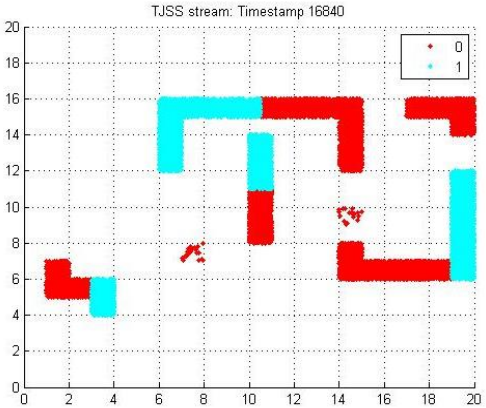

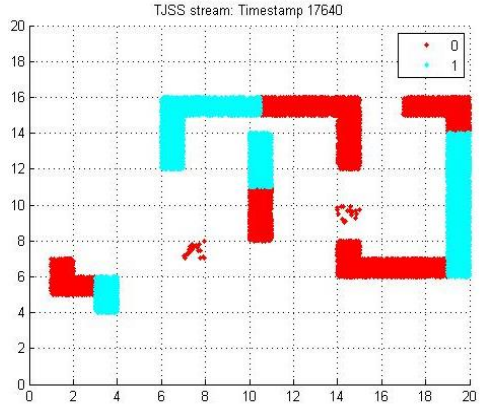

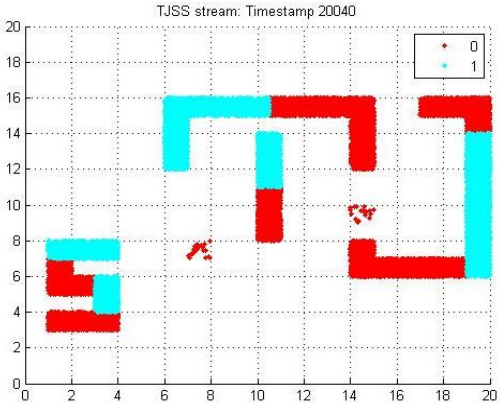

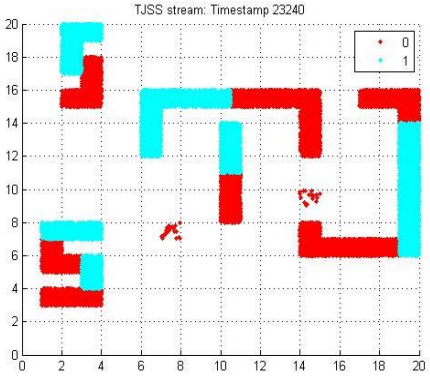

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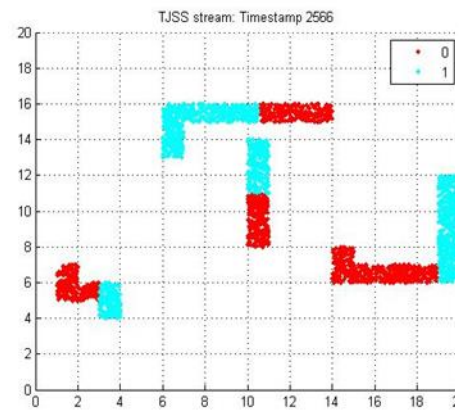
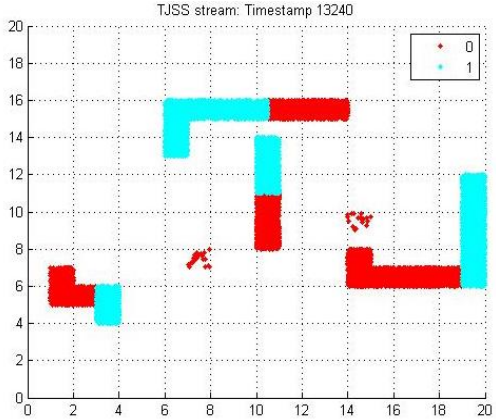
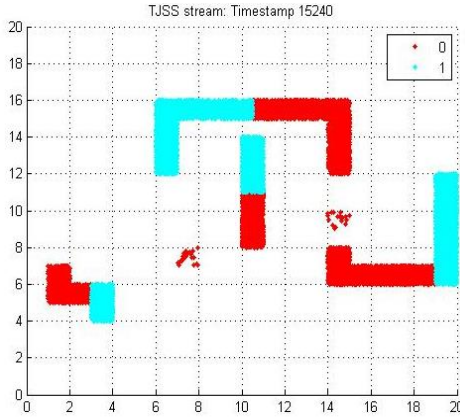
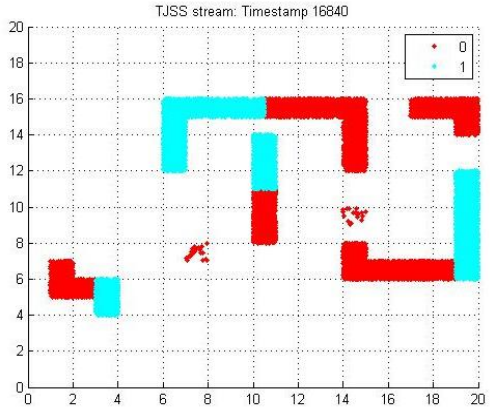
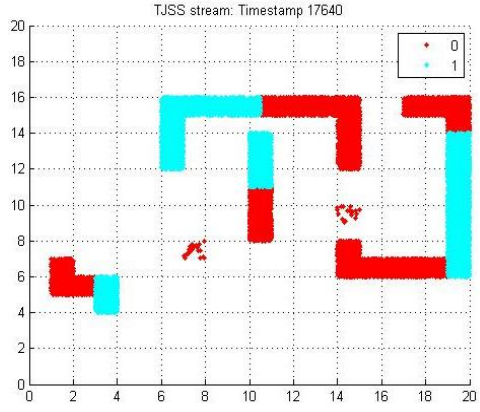
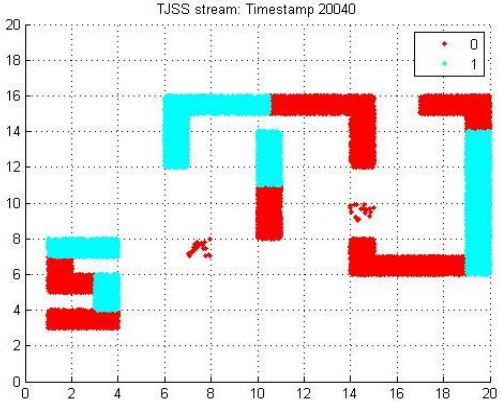


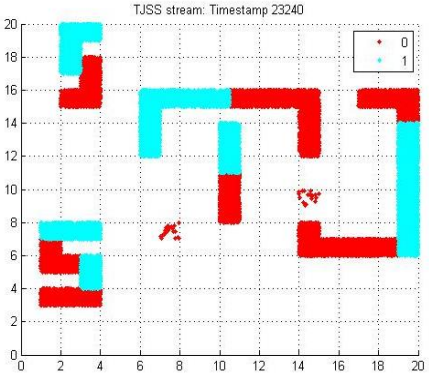


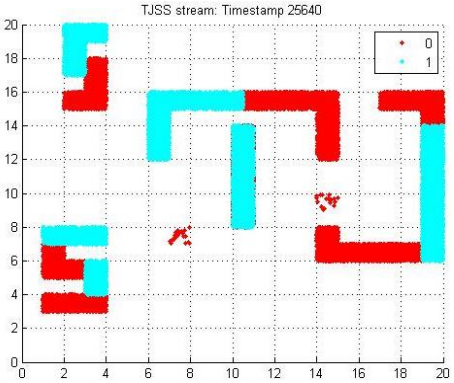






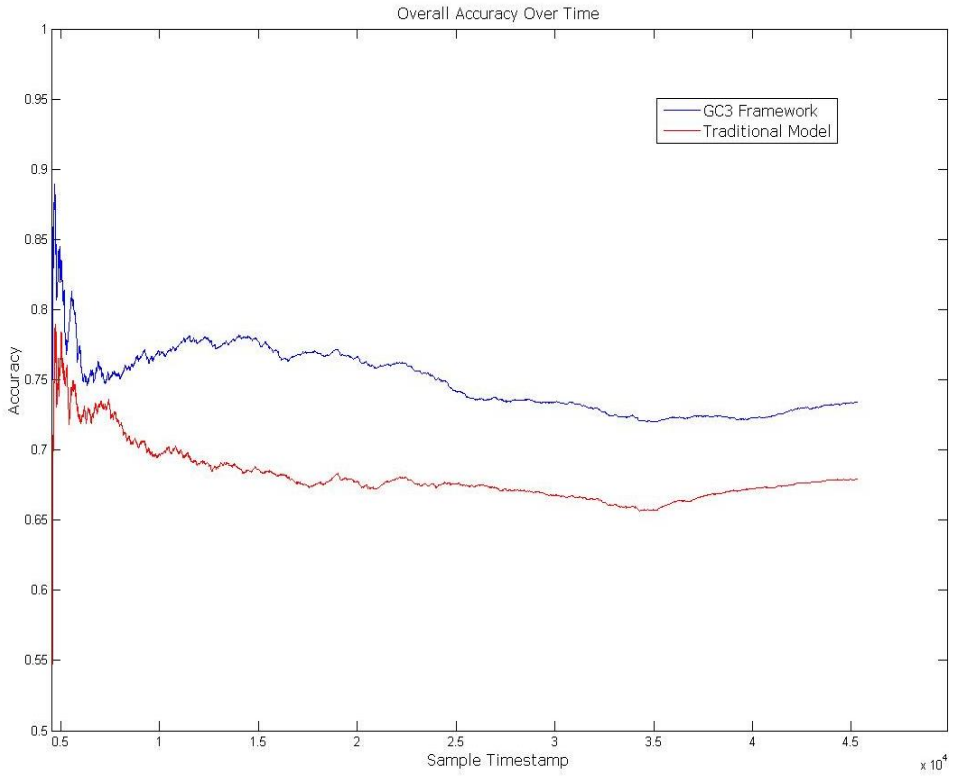




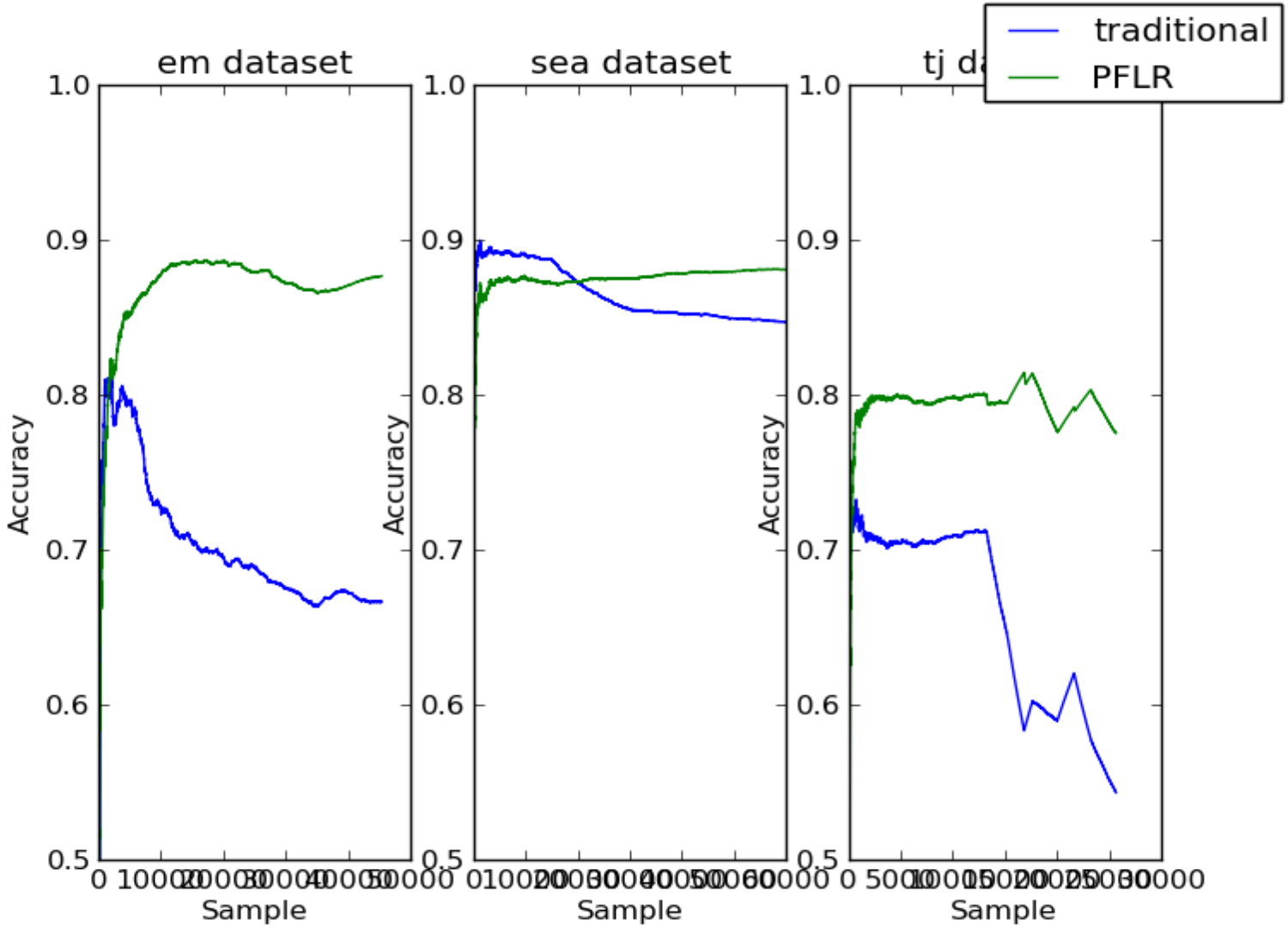


Experimentation : Datasets Used

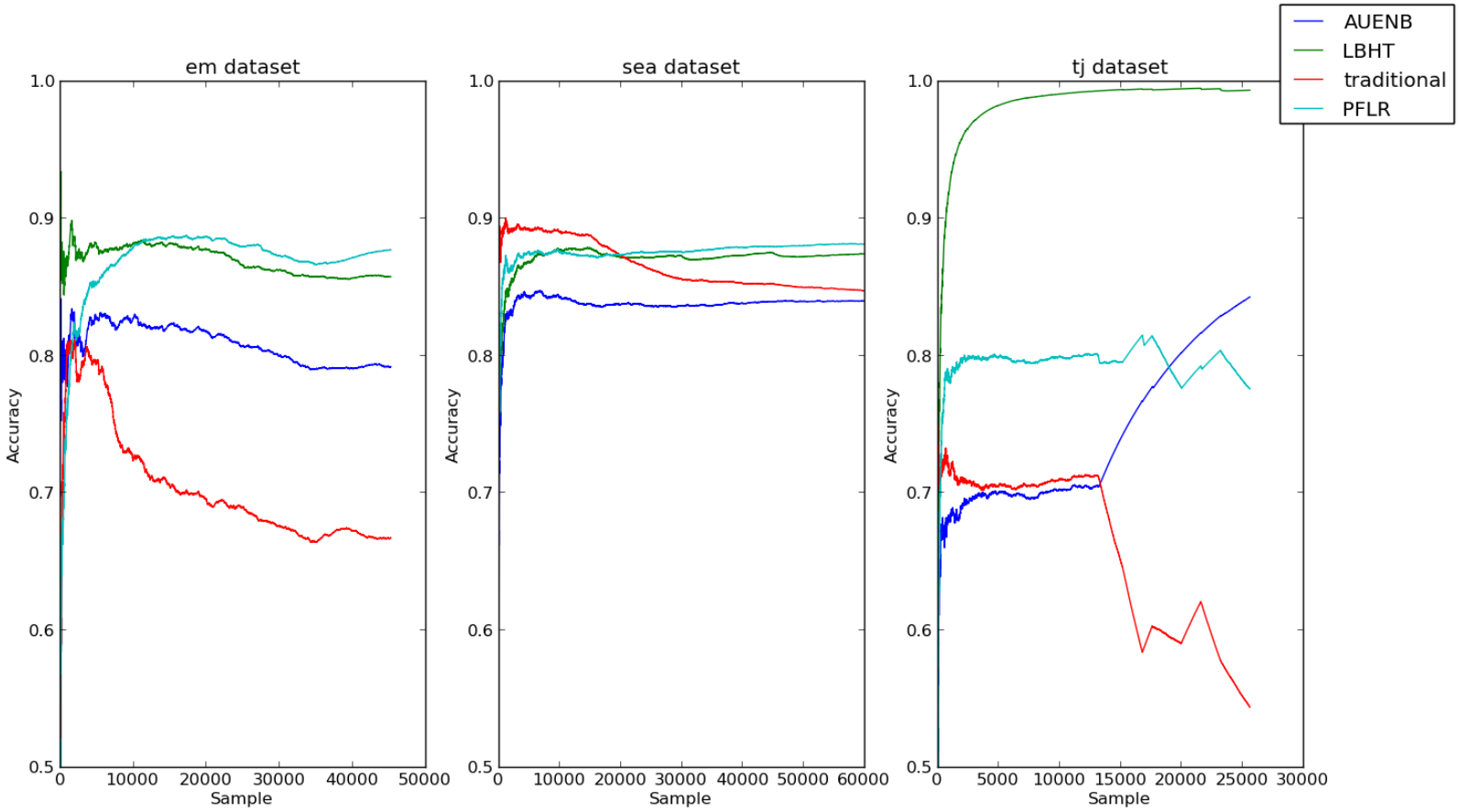
> EM Stream:



Experimentation : Results



Experimentation : Results



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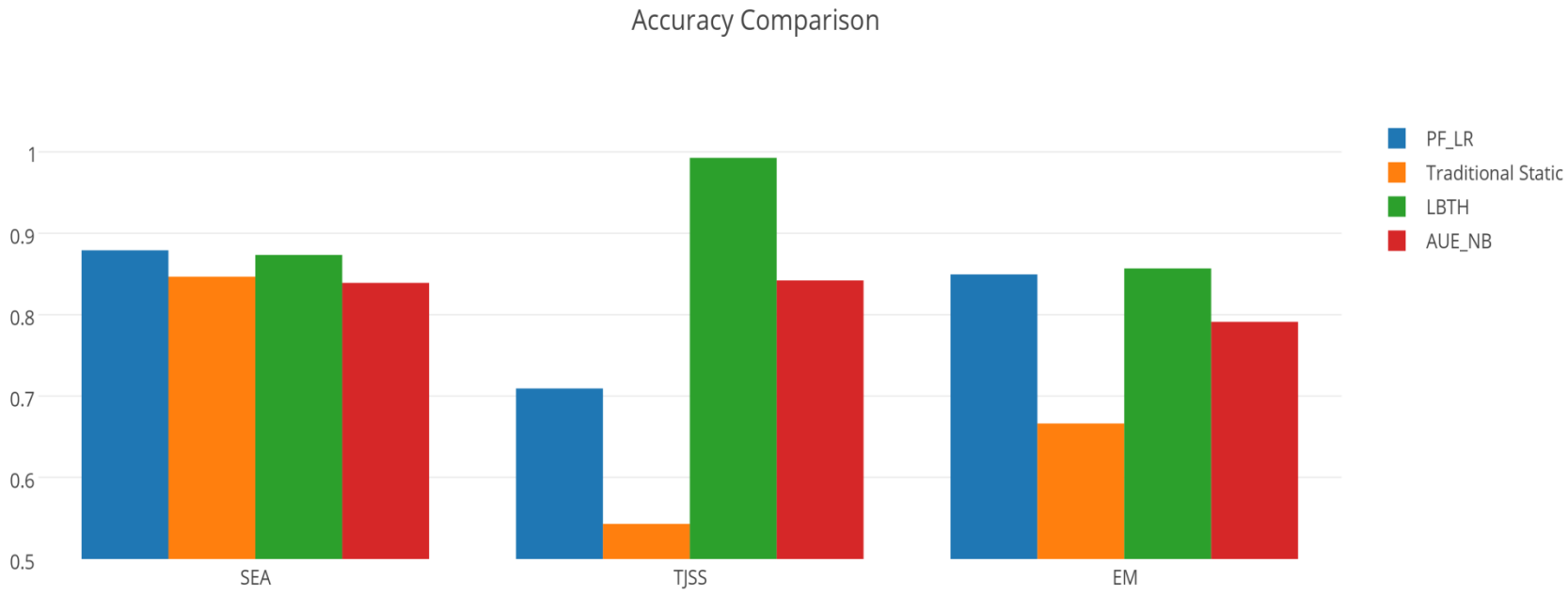
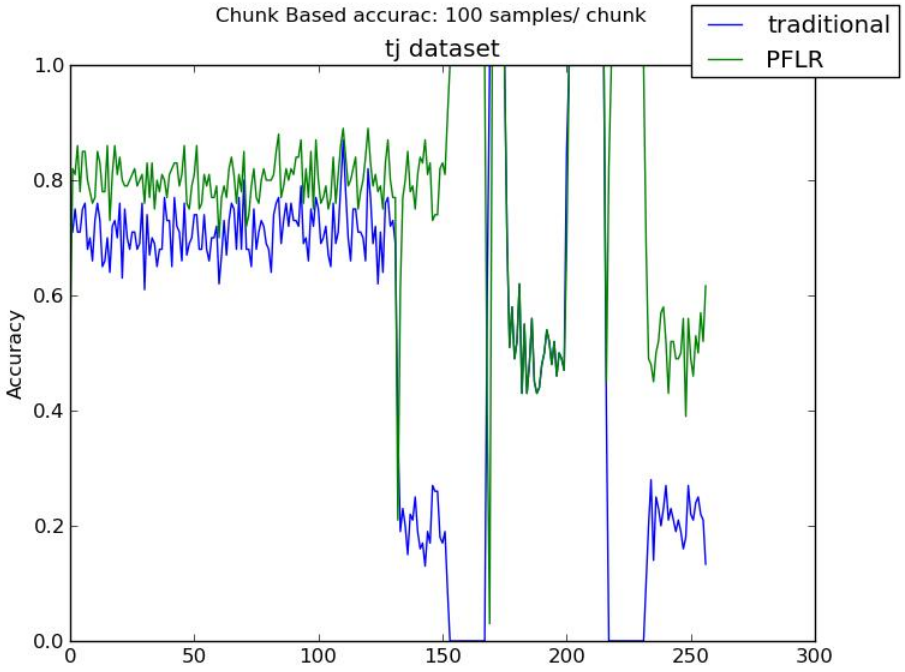
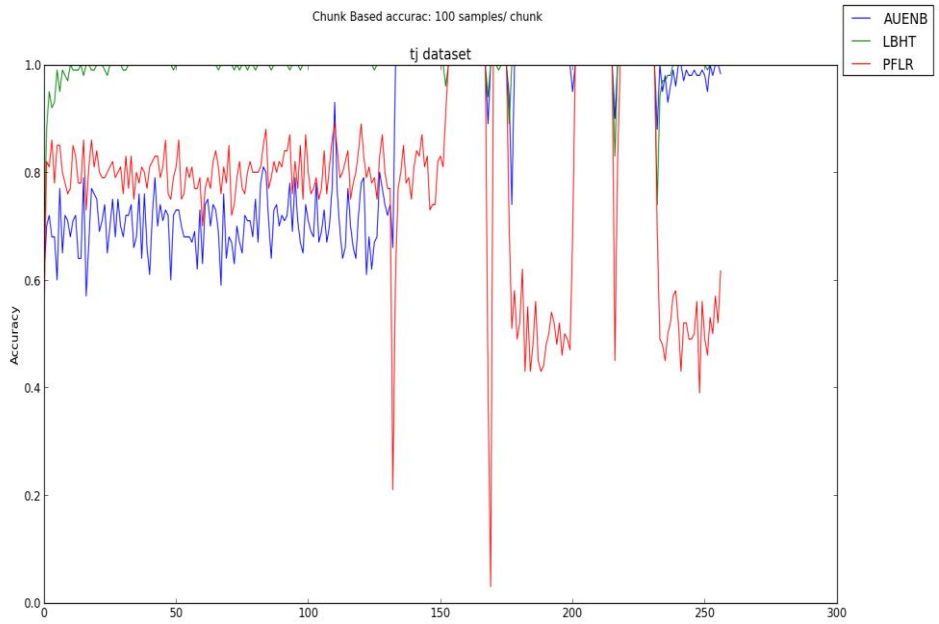


Experimentation : Analysis





Experimentation : Analysis

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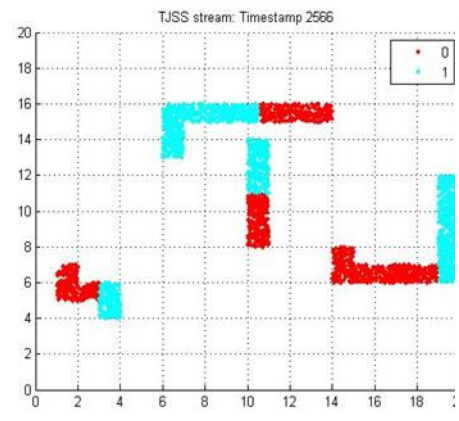

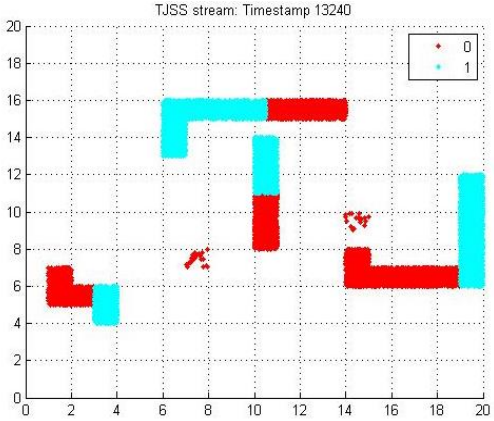

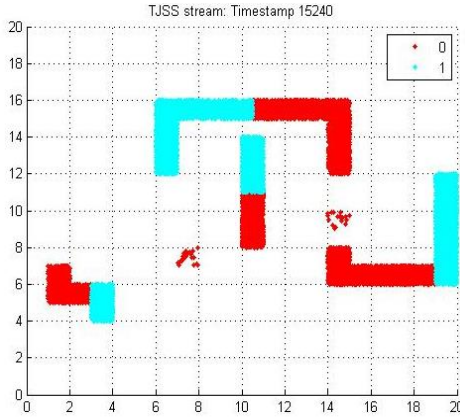

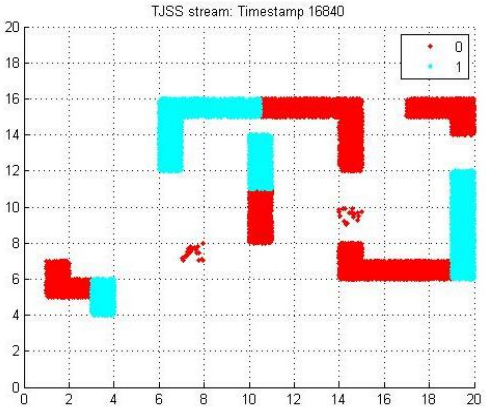

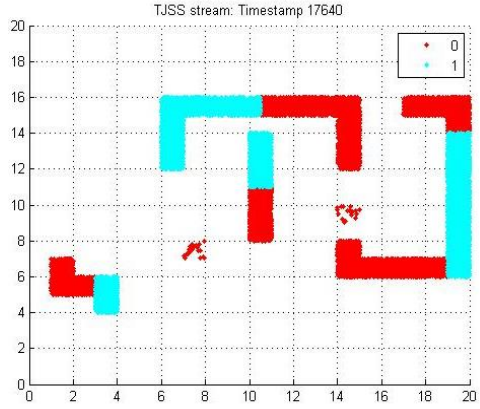

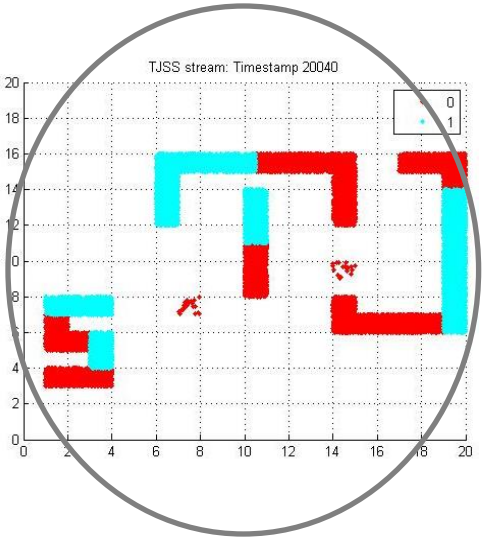

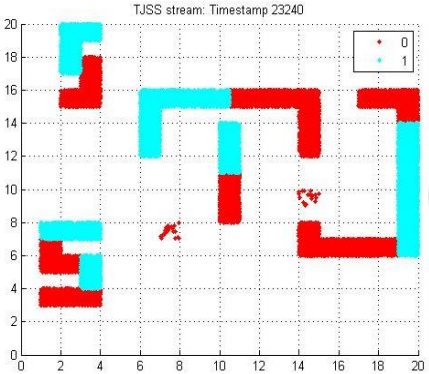

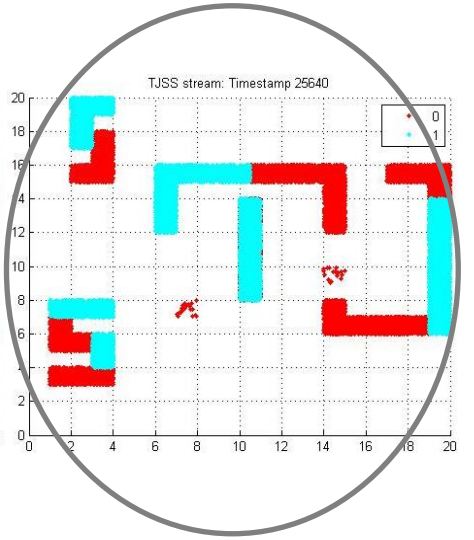

Conclusion

- PF can handle drifts in streaming data
- Good performance on EM stream– Robustness
- Difficulty detecting local drifts
- Linear time O(MN), no retraining needed


ANY
QUESTIONS
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https://github.com/tegjyotsingh/Incremental-Classification