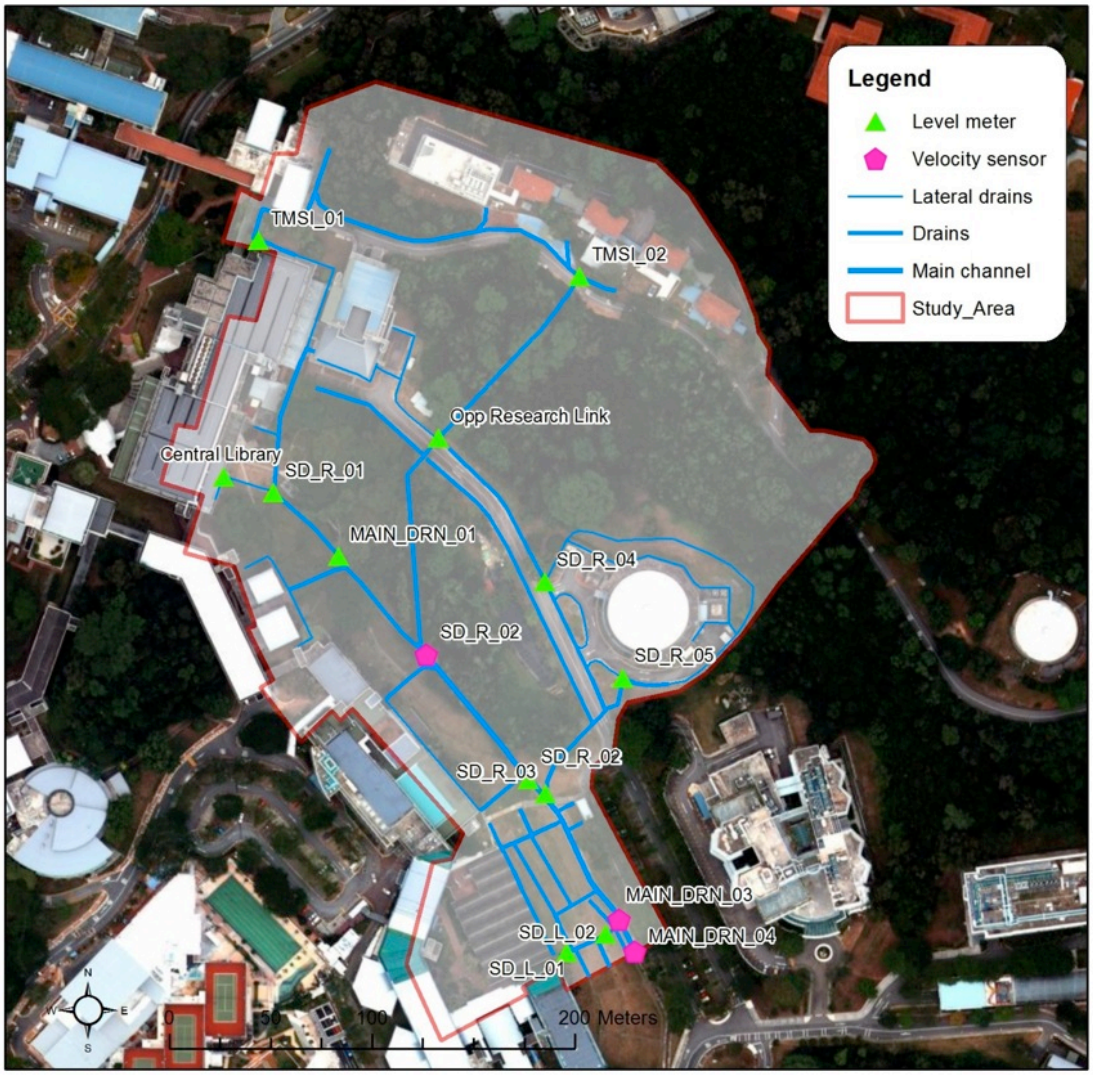
CE 5310 Hydroinformatics, AY 2017-18

Assignment: Rainfall runoff modelling using Artificial Neural Networks
October 10, 2017

In order to derive at a more accurate description of rainfall runoff processes in Singapore, a monitoring programme at pilot catchment (Kent Ridge Catchment at campus of National University of Singapore) was established to collect dense hydrological data over a representative area. The monitoring program collects hydrological data during entire year. The data are used to provide background information for development of an accurate hydrological distributed model for the pilot catchment.

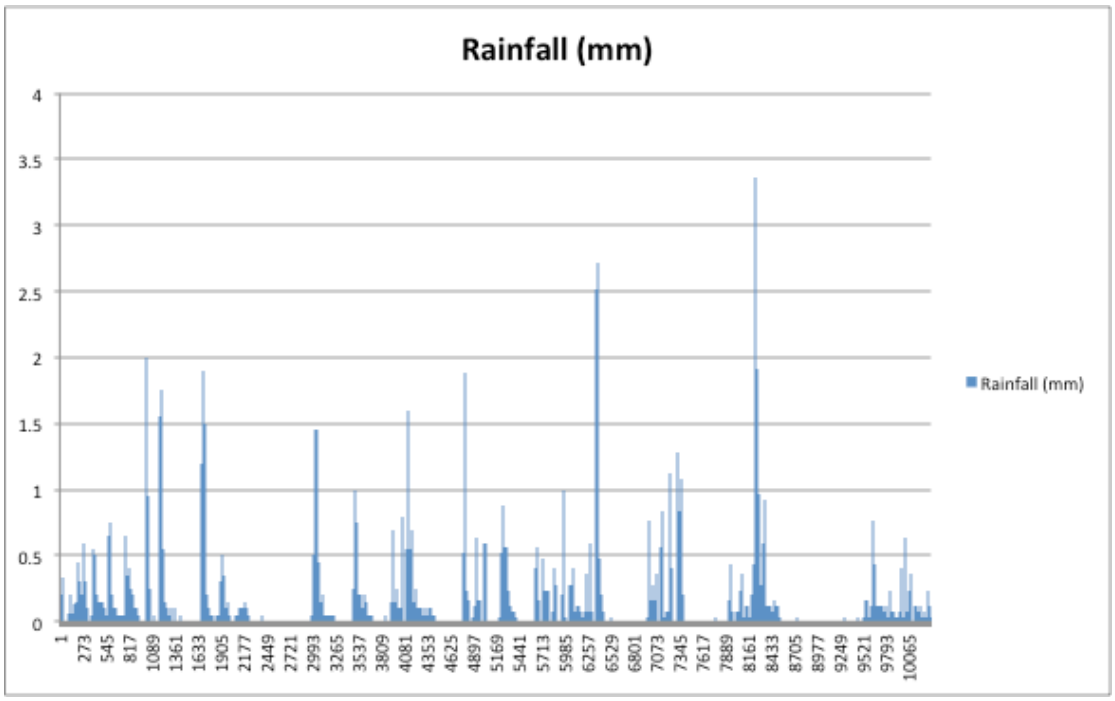


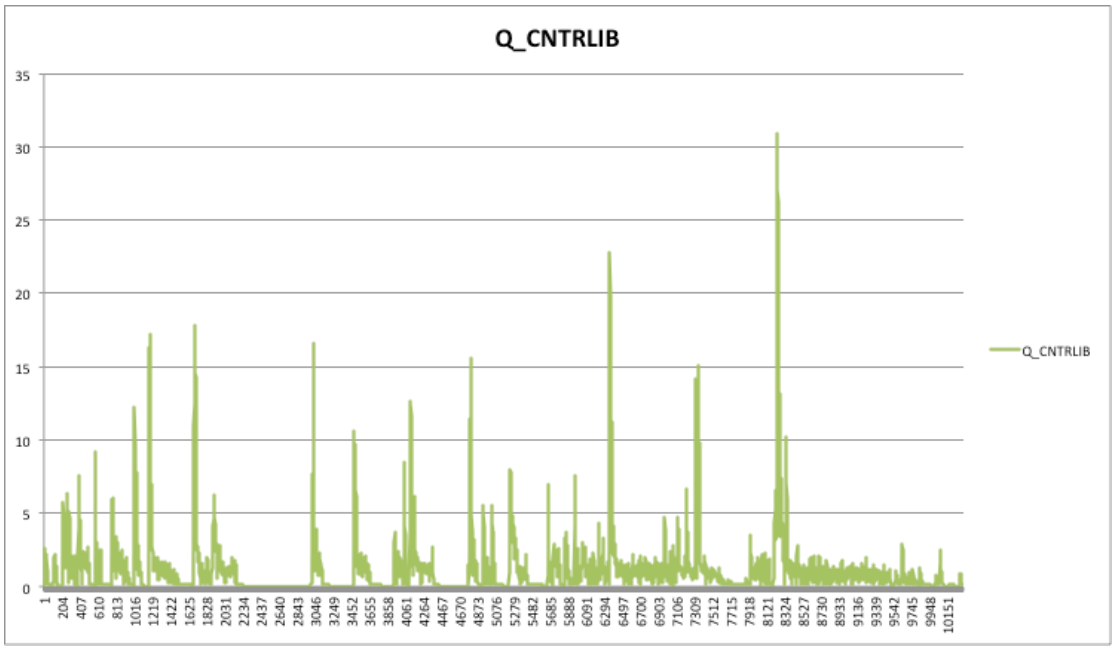
A sample of data consisting of 55 events collected throughout year 2011 are available on IVLE web site in Excel spreadsheet entitled KentRidgeRRData-55events.xls. The data consists of time series at resolution of 1 minutes of following quantities:

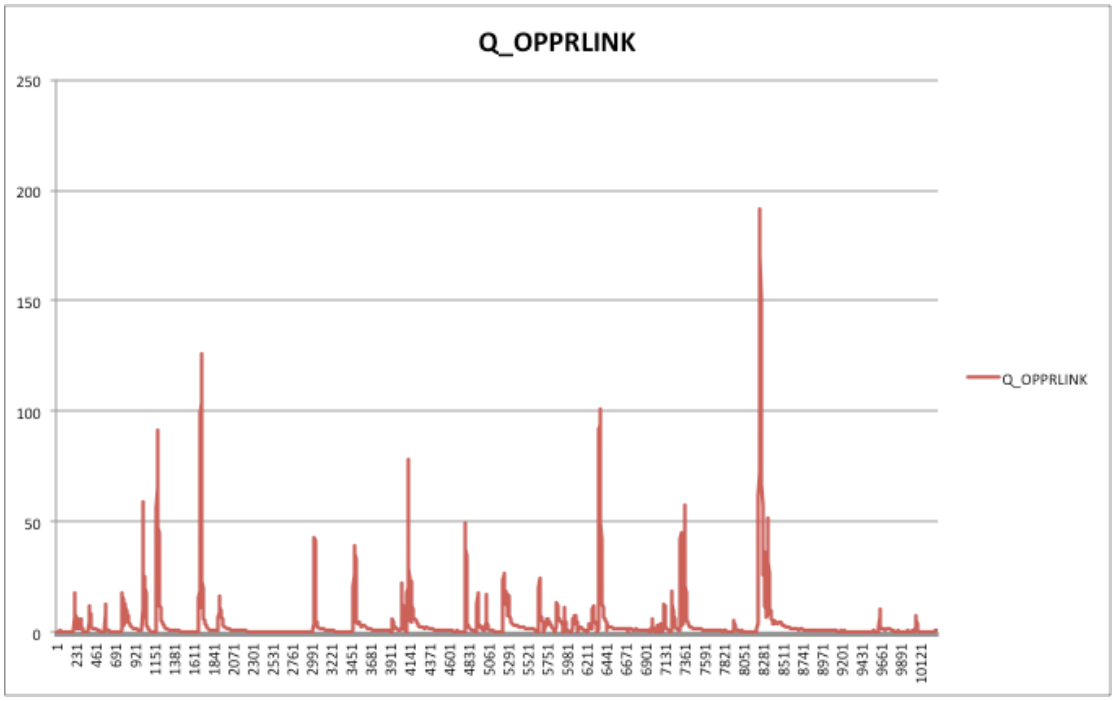
- catchment averaged rainfall intensities;

- time series of discharges at location Central Library, OPPRLink, Main_Drain_01, Main_Drain_02;
- time series of discharges at location Main_DRN_04

Relevant data time series are plotted in sequel.



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200
150
100
50
0
1
231
461
691
921
1151
1381
1611
1841
2071
2301
2531
2761
2991
3221
3451
3681
3911
4141
4371
4601
4831
5061
5291
5521
5751
5981
6211
6441
6671
6901
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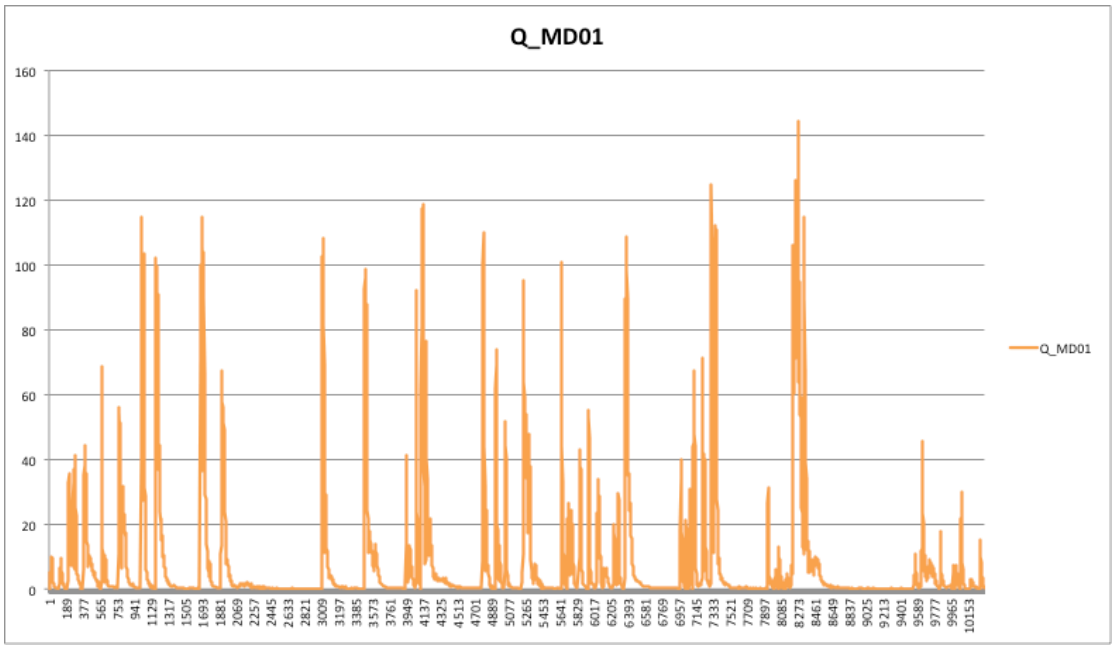
8971
9201
9431
9661
9891
10121
Q_OPPRLINK


Q_MD01
160
140
120
100
80
60
40
20
0
1
189
377
565
753
941
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1317
1505
1693
1881
2069
2257
2445
2633
2821
3009
3197
3385
3573
3761
3949
4137
4325
4513
4701
4889
5077
5265
5453
5641
5829
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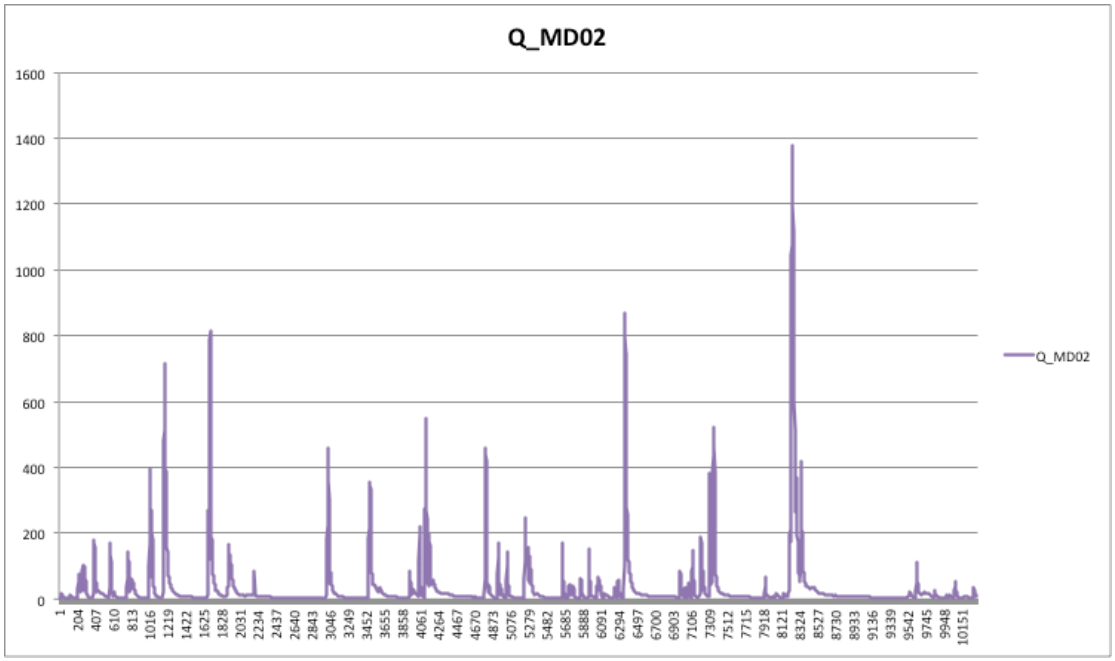
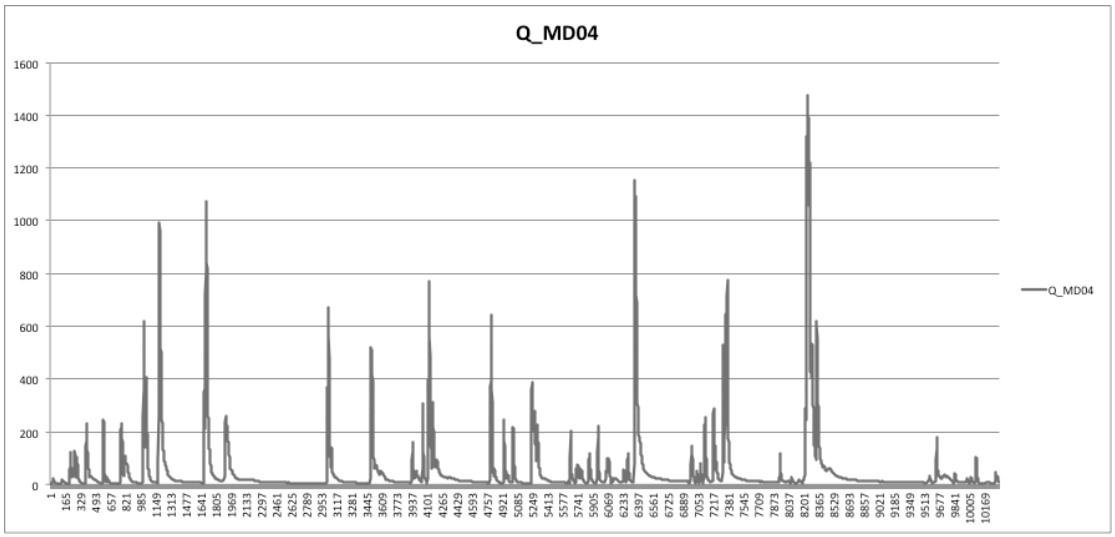
Q_MD01





Assignment:

- Use suitable artificial neural network architecture to produce 10, 20 and 60 minute forecast of flow rates at location Main Drain_04;
- Present and discuss forecast accuracy as function of lead time;
- Explain which neural network architecture did you use and why;
- Discuss choice of training, cross-validation and testing data sets;
- Present and discuss results using testing data set

Deadline for submission: Tuesday, October 24 2016, before noon. The deadline for submission of hardcopies is October 24, before 6pm.