DWRG
DRINKING WATER RESEARCH GROUP

Working together for innovation in drinking water quality, treatment, and distribution

Application of Artificial Neural Networks (ANNs) for Filter Optimization

Principal Investigators:
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Municipalities
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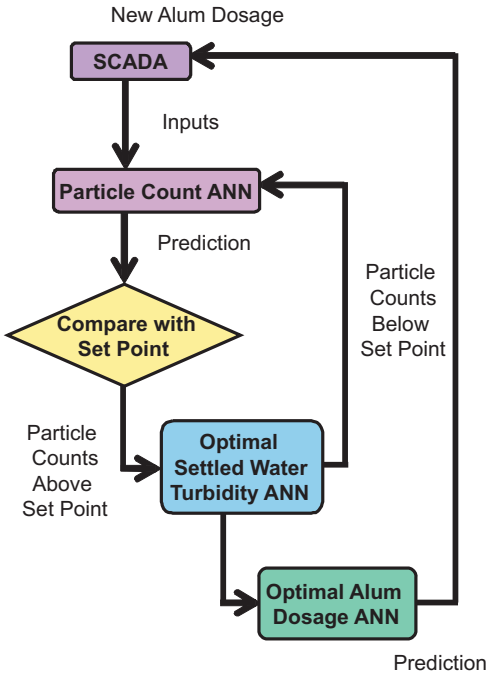
Monitoring filtration performance is important to ensure appropriate removal of particle-bound pathogens such as *Giardia* and *Cryptosporidium*. Many water treatment facilities monitor post-filtration particle counts; however, the data is almost never used to assess treatment performance even though particle counts are highly sensitive to filtration operation and have been correlated with the removal of *Giardia* and *Cryptosporidium*. The overall objective of this study is to optimize filtration performance in terms of post-filtration particle counts through the development of plant specific process models.

Artificial Neural Networks (ANNs) can be applied to develop these plant specific process models. ANNs are ideal for modeling complex non-linear relationships between many variables where no mathematical formulae exist. ANNs learn by experience through training with a large set of historical data.

We are developing ANNs to predict settled water turbidity, particle breakthrough, and the optimal alum dosage required to attain post-filter target particle counts. In the future, these models will be implemented into a control system that can interact directly with SCADA in real-time for the prediction and minimization of particle breakthrough, as well as for process control (i.e. alum dosage). Development of an on-line control system that can be used to adjust the operational parameters of an influent would be very useful for the optimization of chemical costs and the control of potential pathogens. This control system will be integrated on-line into a pilot-scale testing facility to evaluate its potential, prior to moving to full-scale at a treatment facility



Application of an ANN for Full Scale Filtration Optimization

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