

Genetic algorithms application in water distribution systems for leakages detection

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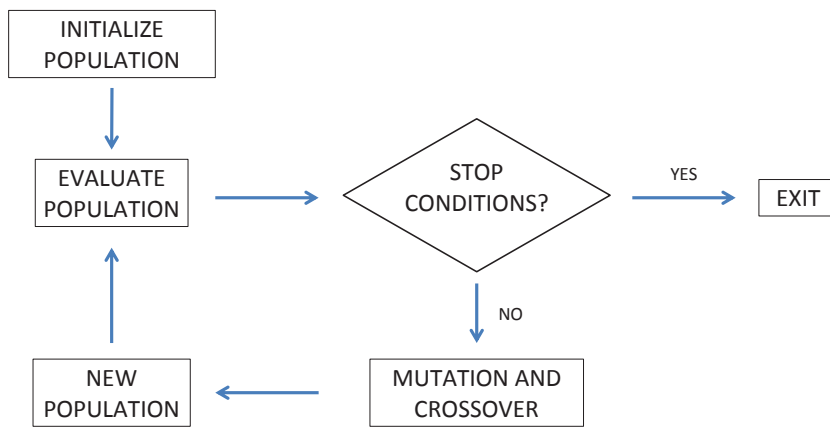
PROBLEM:

Water losses are a major problem affecting every Water Distribution System (WDS) that causes a reduction of revenues for companies and environmental problems.

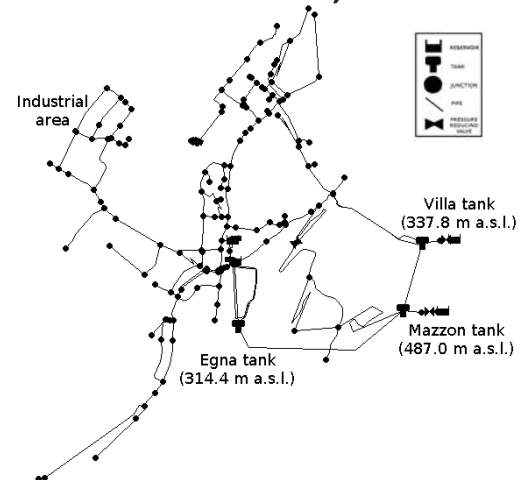
AIM OF THE WORK:

Application of NSGA-II^(a) genetic algorithm (GA) in order to identify leakage locations in a real WDS.

GENETIC ALGORITHM:

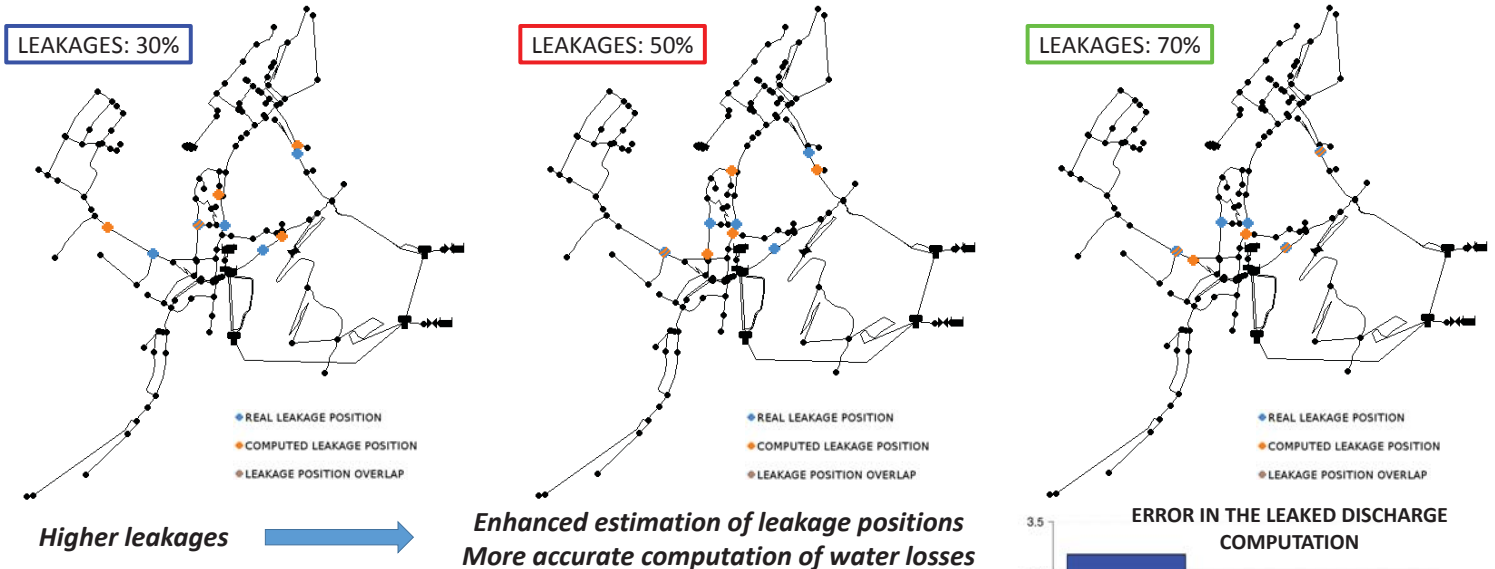


CASE STUDY: EGNA, ITALY



The layout of Egnà's water distribution system.

RESULTS: SENSITIVITY ANALYSIS OF NSGA-II GENETIC ALGORITHM USING FIVE EMITTERS

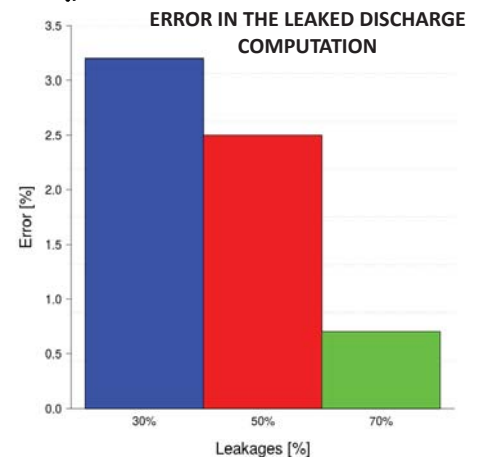


CONCLUSIONS:

- ✓ The algorithm has high sensitivity to major water losses
- ✓ Easier identification of area where to conduct water audits
- ✓ More targeted interventions on the field
- ✓ Saving of time resources and money
- ✓ Reliable for any water district

FUTURE DEVELOPMENT

- ✓ Reduce computation time increasing the efficiency
- ✓ Perform the analysis with different GAs or with Particle Swarm



^(a) K. Deb, A. Pratap, S. Agarwal and T. Meyarivan (2002). A fast and elitist multiobjective genetic algorithm: NSGA-II. IEEE Transactions on Evolutionary Computation.