Predicting crest settlement in concrete face rockfill dams using adaptive neuro-fuzzy inference system and gene expression programming intelligent methods

基于自适应模糊神经网络推理系统和基因表达式编程智能方法的混凝土面板堆石坝沉降预测

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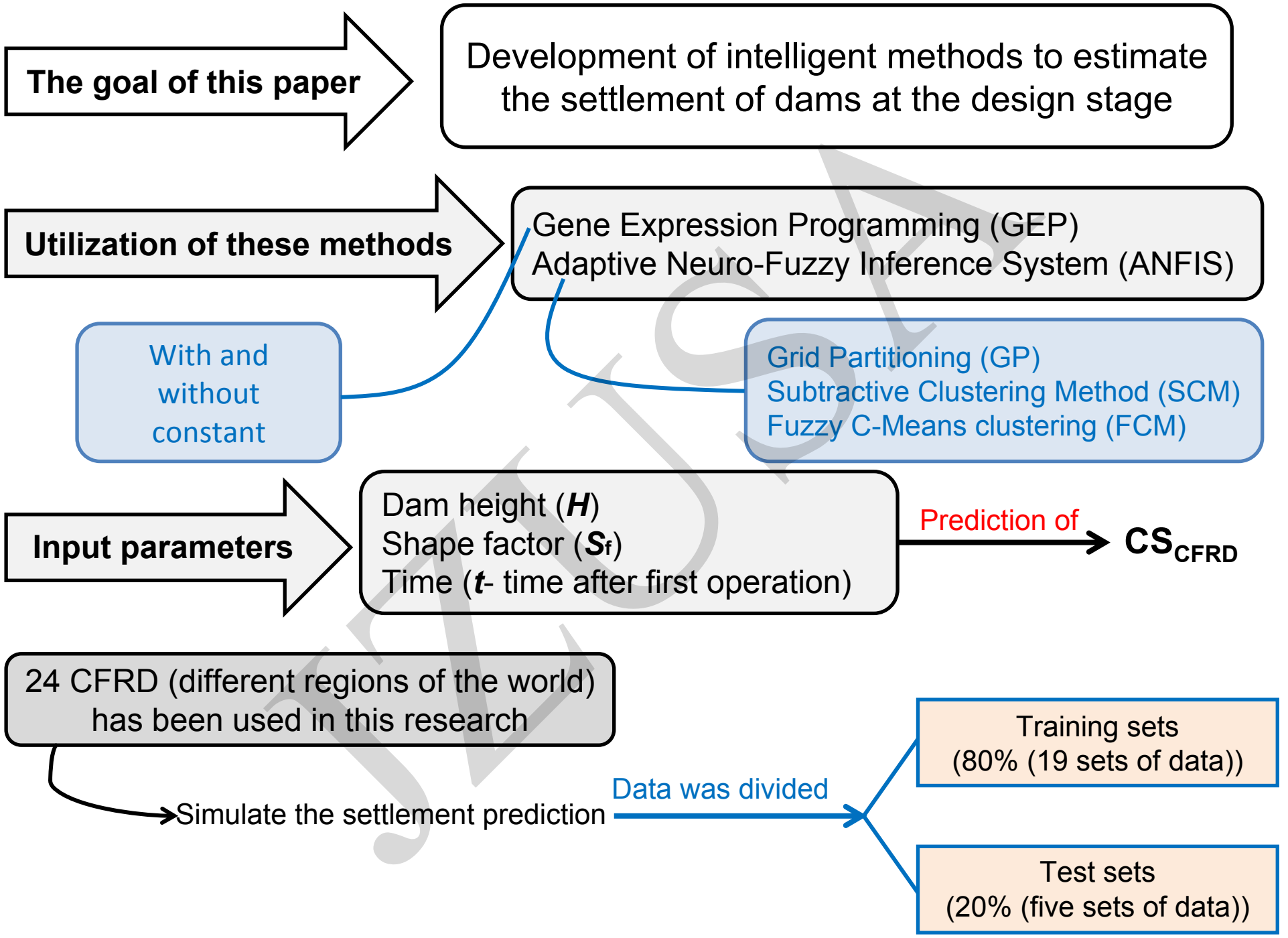
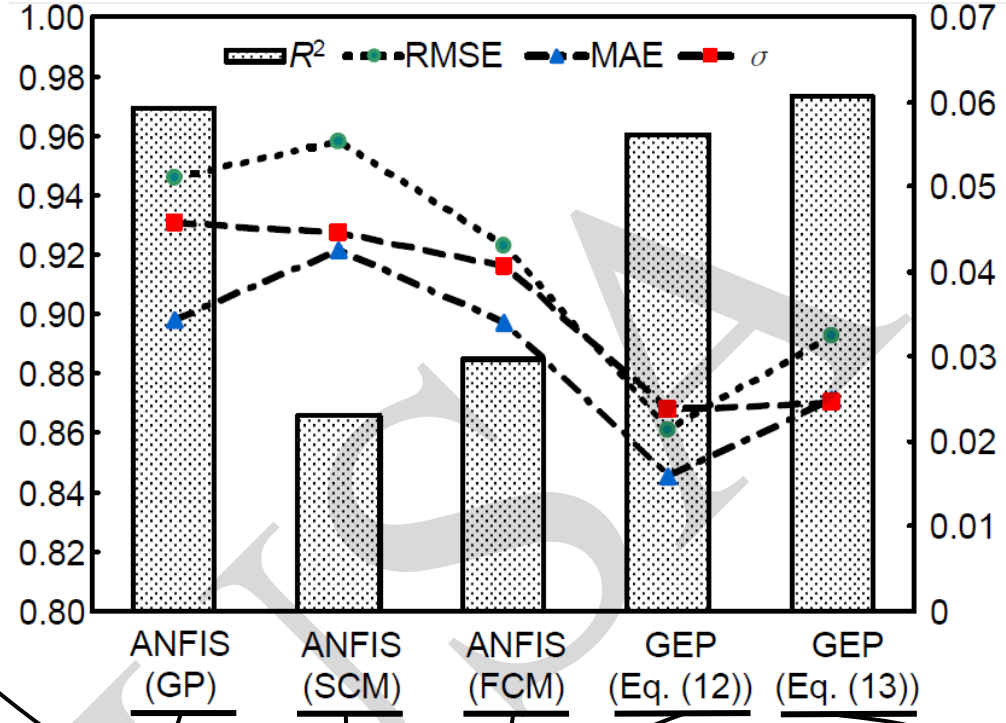

The goal of this paper
Development of intelligent methods to estimate the settlement of dams at the design stage
Utilization of these methods
Gene Expression Programming (GEP)
Adaptive Neuro-Fuzzy Inference System (ANFIS)
With and without constant
Grid Partitioning (GP)
Subtractive Clustering Method (SCM)
Fuzzy C-Means clustering (FCM)
Input parameters
Dam height (H)
Shape factor (Sf)
Time (t- time after first operation)
Prediction of
CSCFRD
24 CFRD (different regions of the world) has been used in this research
Simulate the settlement prediction
Data was divided
Training sets (80% (19 sets of data))
Test sets (20% (five sets of data))

Results of this study



R^2=0.9693
RMSE=0.0510
MAE=0.0342
σ=0.0457

R^2=0.8657
RMSE=0.0553
MAE=0.0425
σ=0.0445

R^2=0.8848
RMSE=0.0430
MAE=0.0341
σ=0.0407

R^2=0.9603
RMSE=0.0213
MAE=0.0158
σ=0.0238

R^2=0.9734
RMSE=0.0325
MAE=0.0248
σ=0.0245

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