

NFIQ 2.0 Framework

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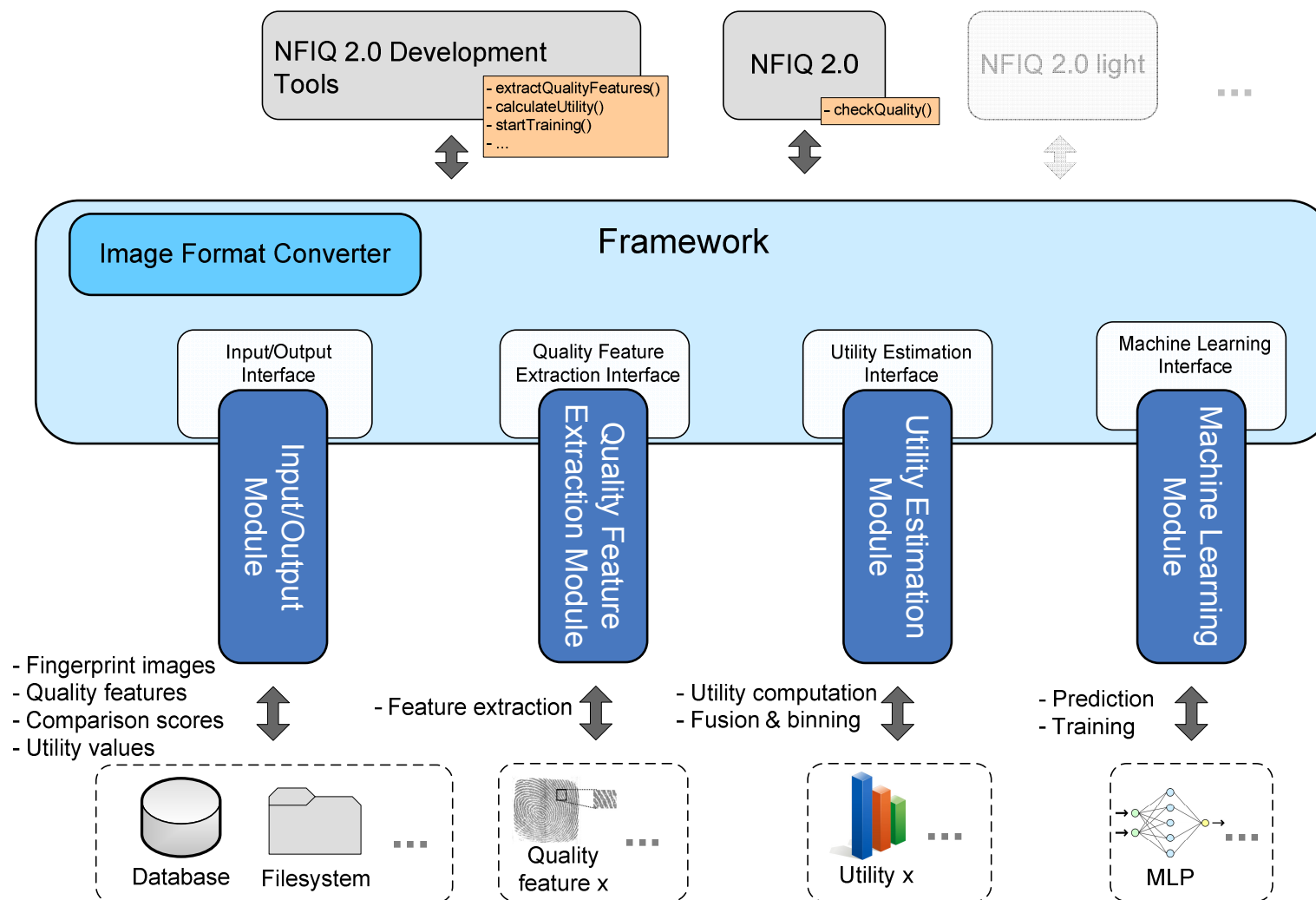


Motivation for NFIQ2.0 Framework

- Lessons learned from NFIQ re-training in 2009/2010
 - NBIS source code changes necessary for adaptation of
 - machine learning algorithm
 - feature vectors used
- Modular approach for NFIQ2.0 development is desired
 - to be flexible regarding the implementation
 - to have a common basis of functionality needed for NFIQ2.0 development which might then be extended by exchange of certain modules
 - because project team is distributed and located all over the world
 - because only certain project partners have access to certain fingerprint databases
 - because work can be shared and re-used by others
 - to simplify the development process



Architecture of NFIQ2.0 Framework





NFIQ2.0 development tools and interchange file format

- Implemented on top of the NFIQ2.0 Framework
 - ComputeQualityFeatureData
 - ComputeUtilityValues
 - StartTraining
 - ComputeQuality (final or intermediate NFIQ2.0 algorithm)
 - XMLExportImport
- XML interchange file format defined
 - exchange of training and evaluation data among project partners
 - fingerprint comparison scores of several databases
 - utility values and quality scores
 - quality features
 - referenced by unique IDs



Example: How to perform training with the NFIQ2.0 Framework I

- Assume that necessary data for training is stored in database X
- Compute quality features
`computeQualityFeatureData(X, <featureID_1>, ..., <featureID_M>)`
- Compute and fuse utility values
`computeUtilityValues(X, <providerID_1>, <utilityID>)`
...
`computeUtilityValues(X, <providerID_N>, <utilityID>)`
`fuseUtilityValues(X, <providerID_1>, ..., <providerID_N>, <utility_ID>)`
- Select images for training
`defineImagesForTraining(X, <trainingSet_X>, <testSet_X>)`
and/or
`partitionDataForTraining(X, <seed>, <N_train_X>, <N_test_X>)`
- Start training
`train(<providerID_1>, ..., <providerID_N>, <utility_ID>, <featureID_1>, ..., <featureID_M>, useWeights)`



Example: How to perform training with the NFIQ2.0 Framework II

- Select images for evaluation
`defineImagesForEvaluation(X, <evaluationSet_X>)`
and/or
`partitionDataForEvaluation(X, <seed>, <N_eval_X>)`
- Start evaluation
`evaluate(<providerID_1>, ..., <providerID_N>, <utility_ID>,
<featureID_1>, ..., <featureID_M>)`



Contact

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