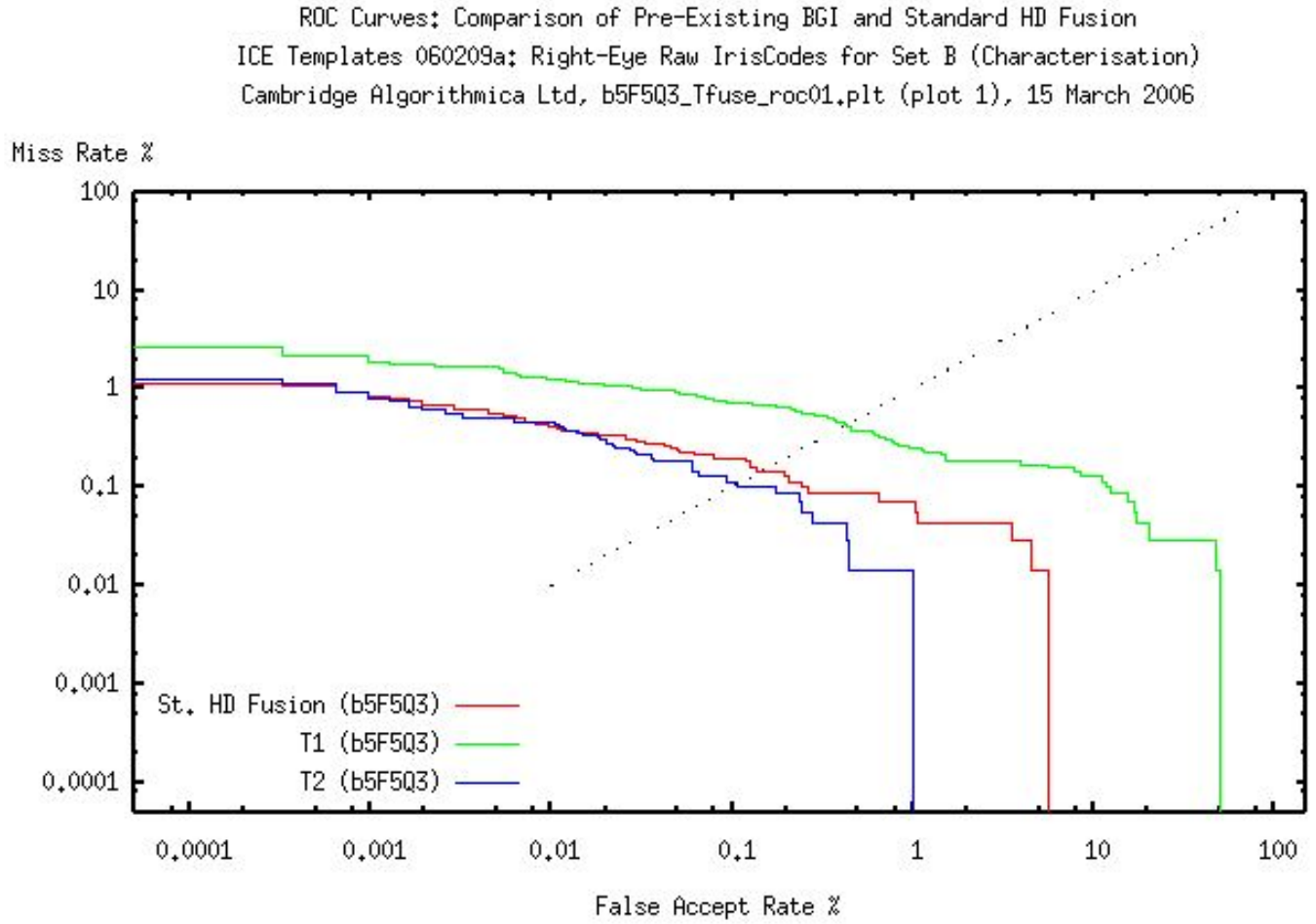
Note on Datasets Used

- **In this work, the BGI multi-algorithmic fusion uses some pattern matching results to characterise the PDFs of raw scores (HD_{raw}) for genuine matches and for impostor matches.**
- **It is appropriate to separate the evaluation dataset from the characterisation dataset.**
- **Accordingly, the IrisCodes from all right-iris images have been divided into 2 Sets.**

	Subjects	IrisCodes	Genuine Matches	Impostor Matches
Set A (B, C combined)	132	1,426	12,221	1,003,804
Set B (characterisation)	66	796	7,024	309,386
Set C (evaluation)	66	630	5,197	192,938
Sum: Set B + Set C	132	1,426	12,221	[502,324]

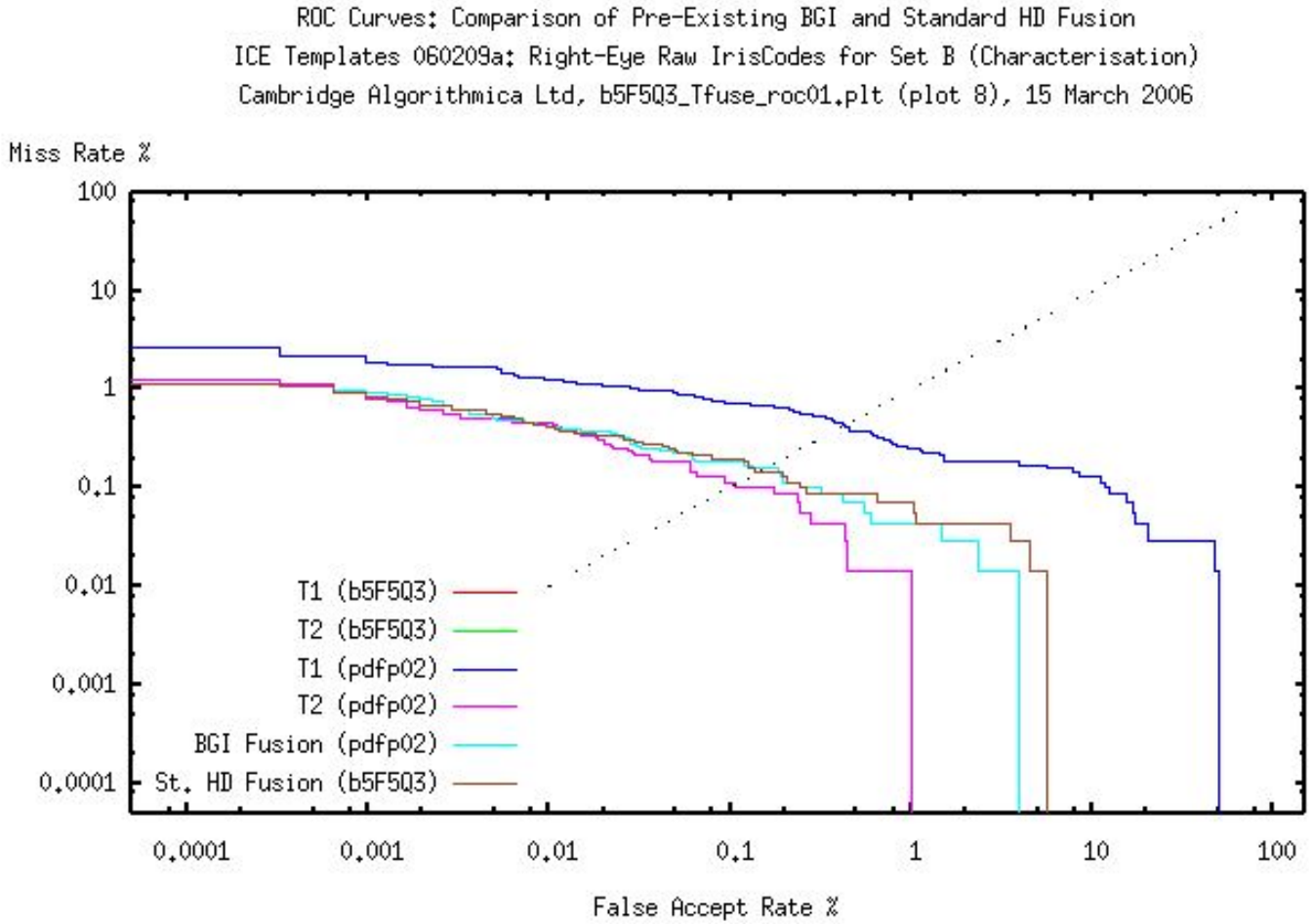
BGI Fusion: The Starting Point

ROC curves for T1 and T2 Subsets, and for All, each with 1-stage normalisation (and correction of the number of micro-rotations). Note re-labelling the "all" case as "Standard HD Fusion".



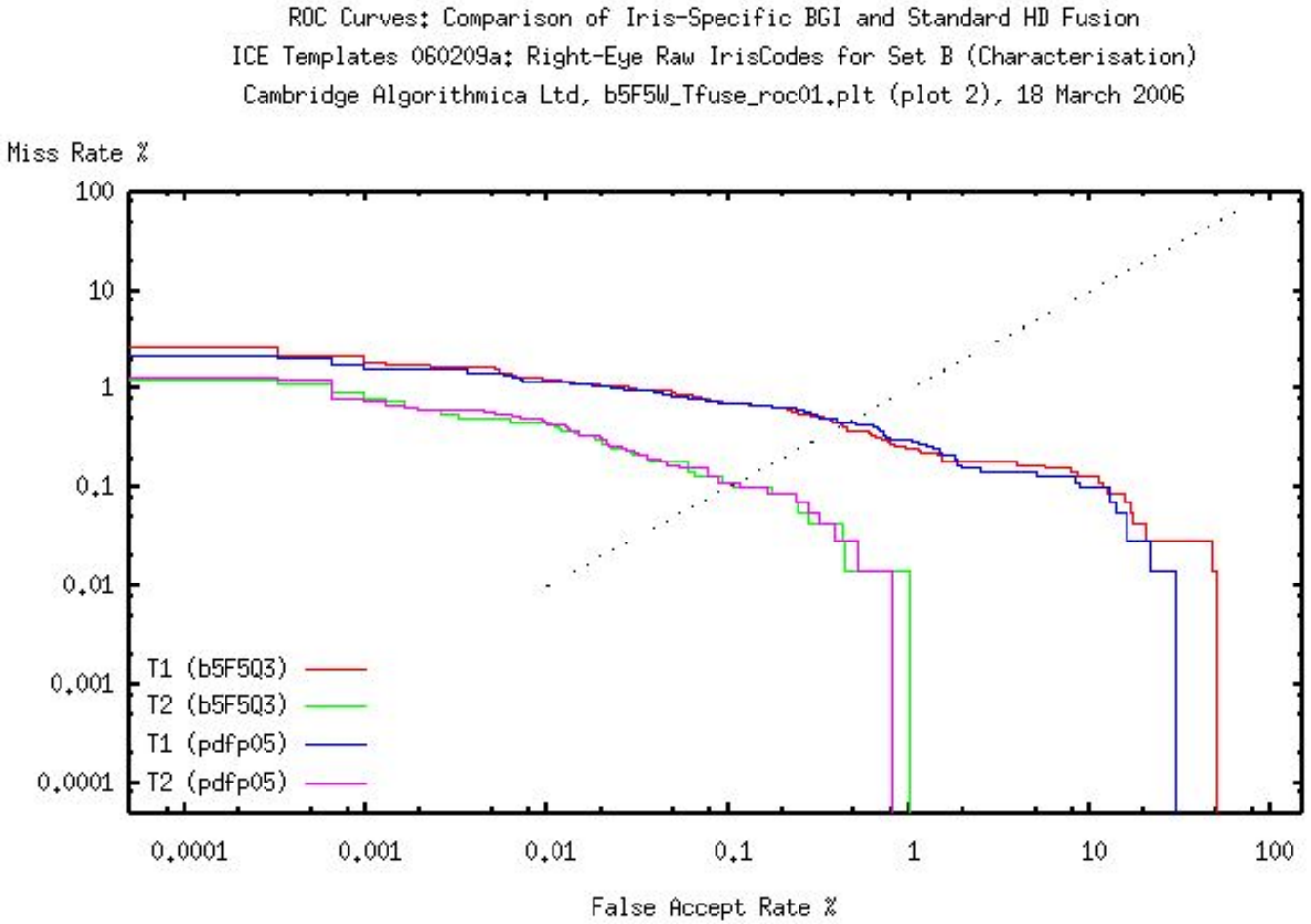
BGI Fusion: PDF Modelling using Best Pre-Existing Approach (from BSSR1 work)

Selected pre-existing PDF models (pdfp02, [2]) fail to do better than T2 Subset only. Performance very close to Standard HD fusion.



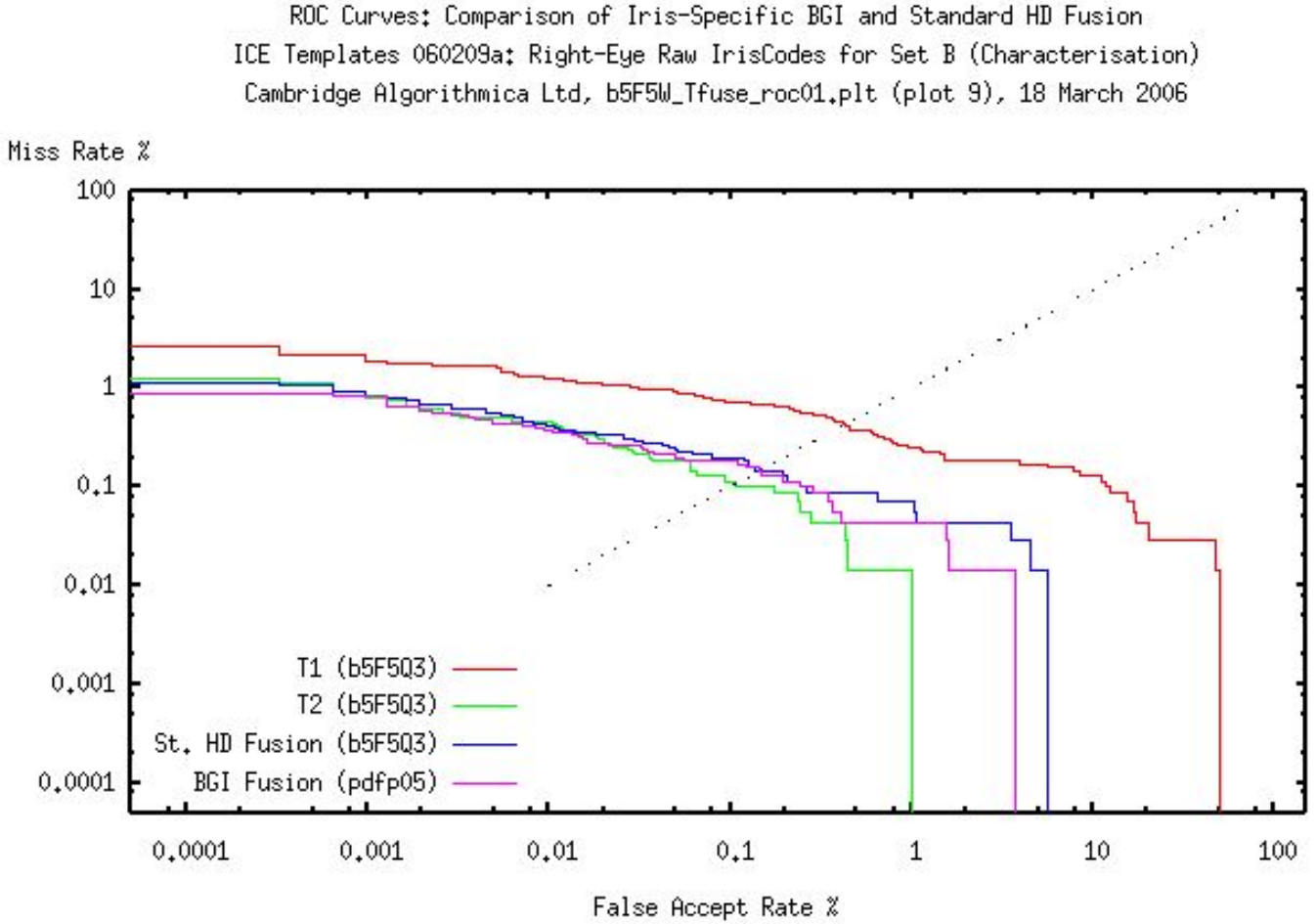
BGI Fusion: New IrisCode-Specific PDF Modelling

These PDF models (pdfp05) are shown here normalising T1 and T2 Subsets. These normalisations are not monotonic. Therefore the ROC curves before/after normalisation do not exactly overlay each other.



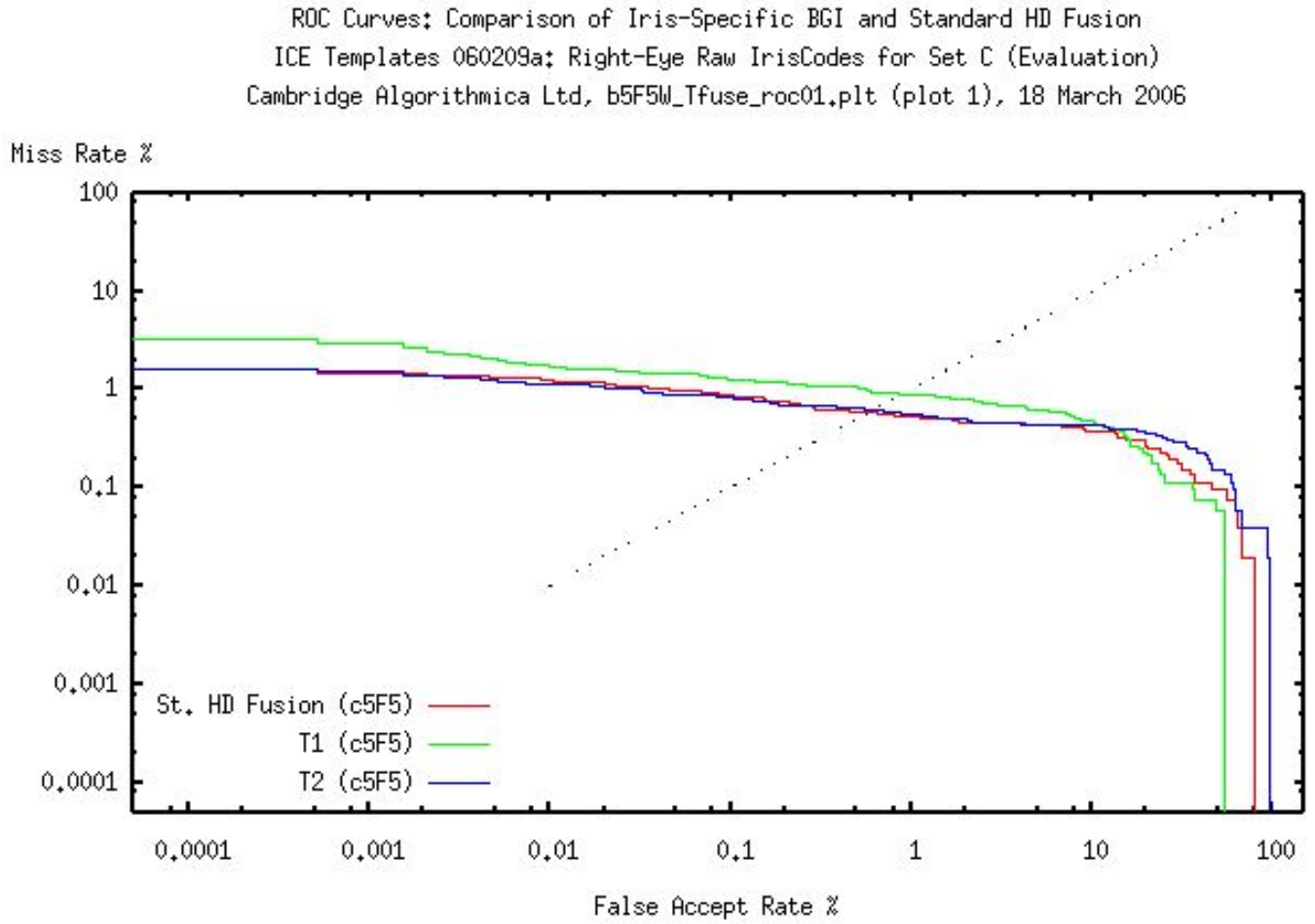
BGI Fusion: ROC Curve for Fusion after IrisCode-Specific Normalisation

These PDF models (pdfp05) also do not give better performance than the T2 Subset, just as with pdfp02 models and with Standard HD Fusion. [Note: not shown, pdfp05 models may do slightly better than pdfp02.]



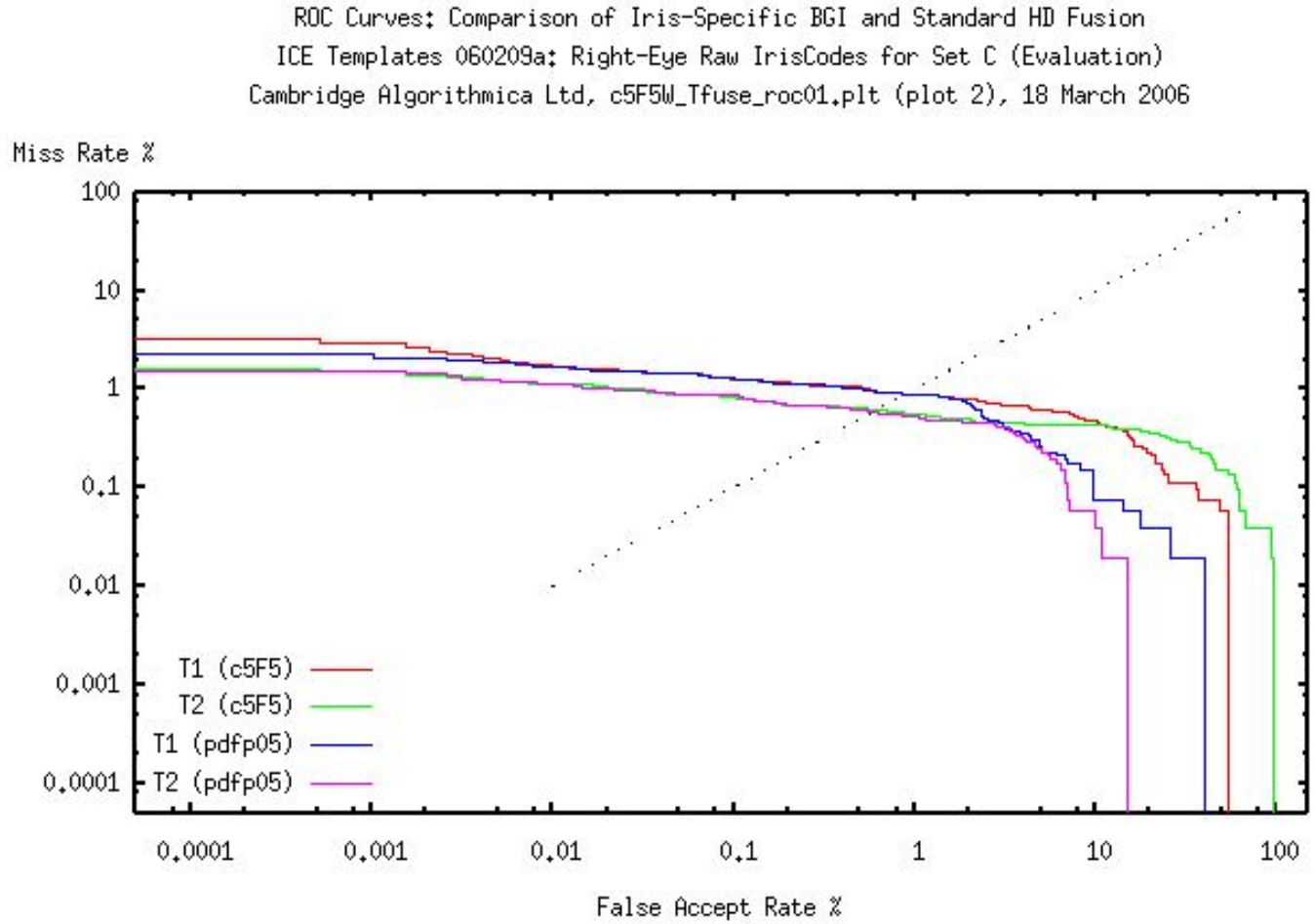
BGI Fusion: Starting Point ROC Curves for Evaluation Dataset (Set C)

These curves show different performance from the Characterisation Dataset (Set B). Overall performance is worse. The T2 Subset is no longer better than Standard HD Fusion. The T1 subset is better, over part of the range.



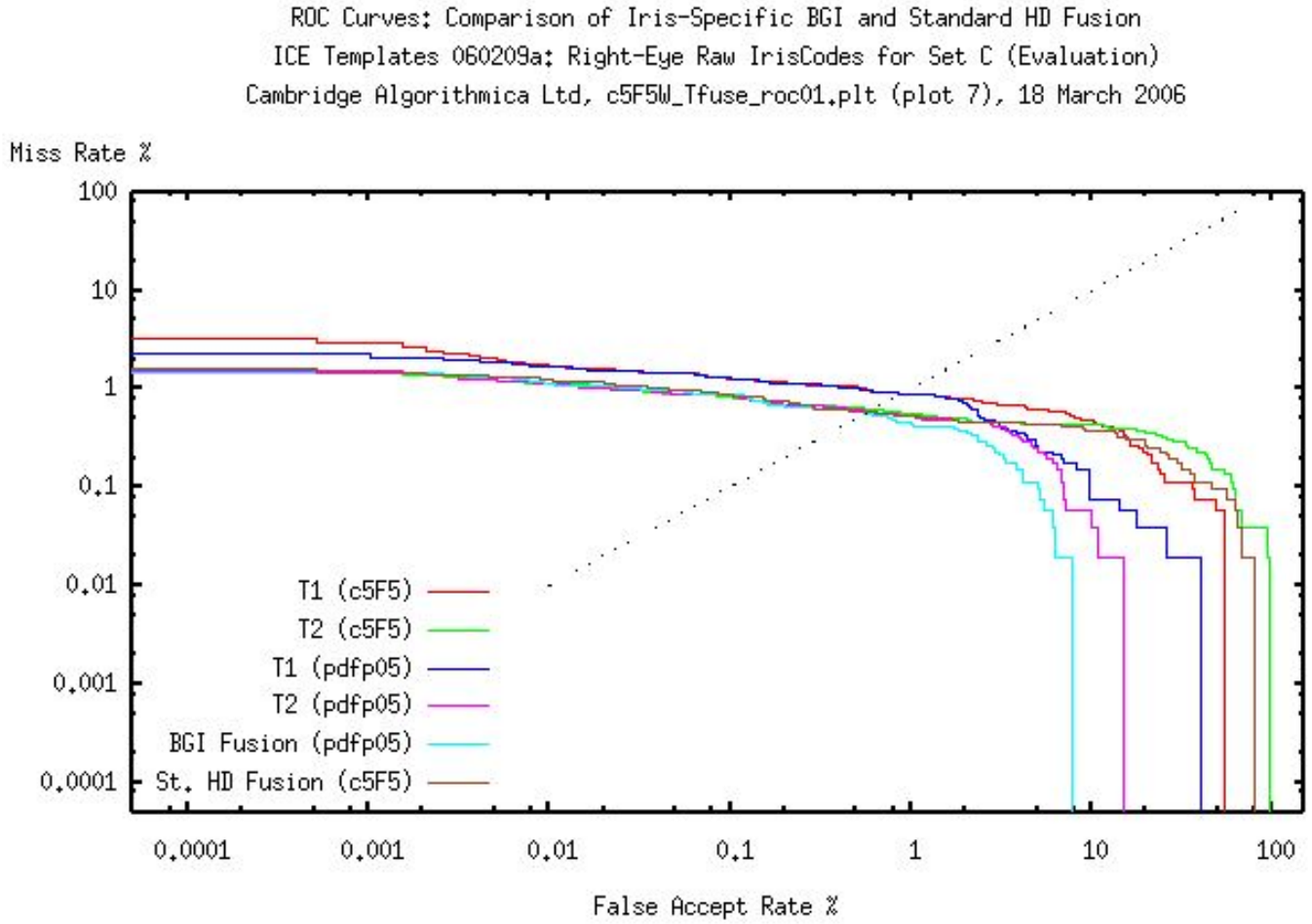
BGI Fusion: T1 and T2 Subset ROC Curves on Evaluation Dataset (Set C)

On the Evaluation Dataset, unlike for Set B, the pdfp05 normalised T1 and T2 Subsets show consistently better performance over some of the range.



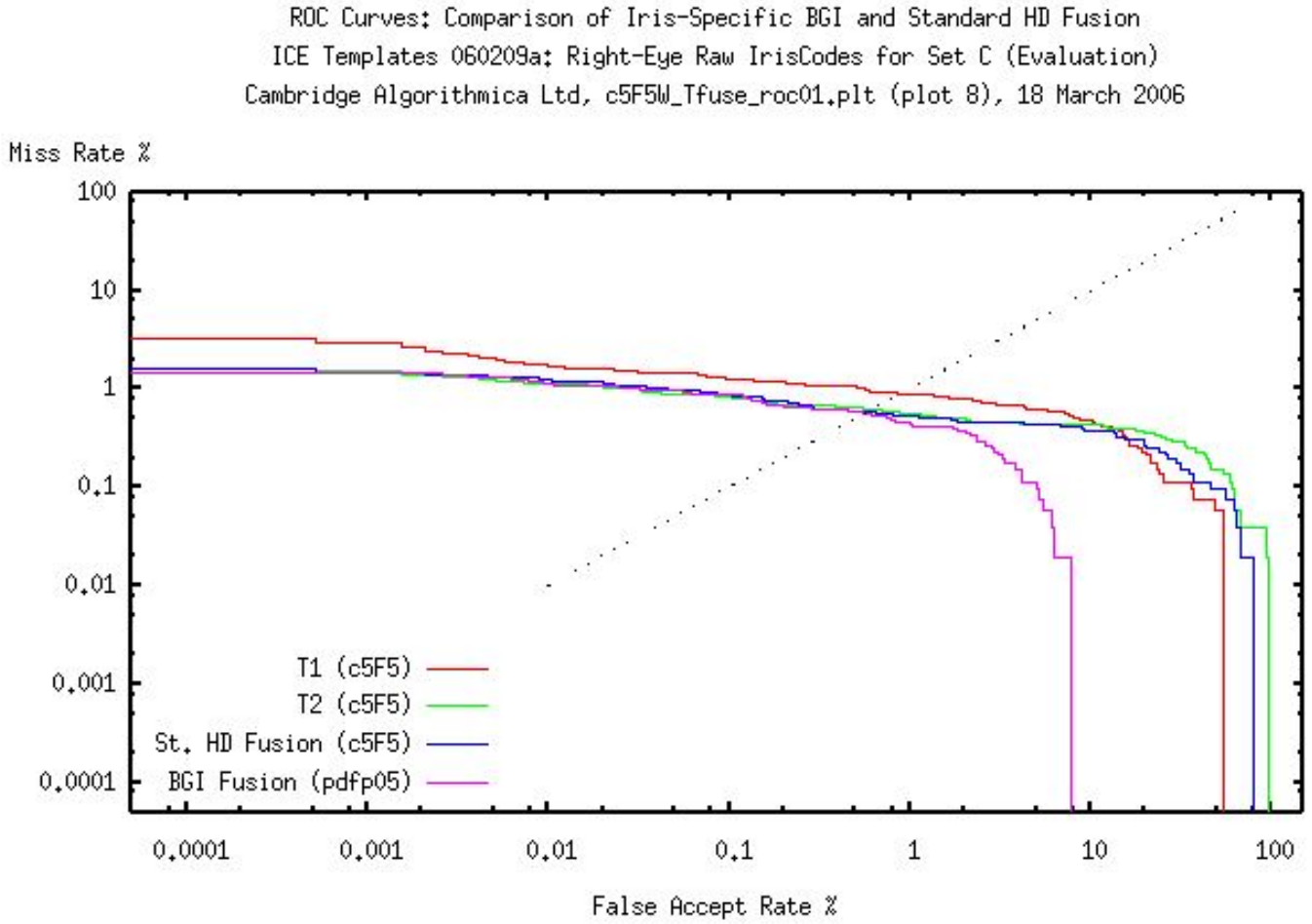
BGI Fusion: ROC Curves on Evaluation Dataset (Set C)

The Iris-Specific normalisation (pdfp05) clearly shows better performance over part of the range. Performance equals or exceeds, over the whole range, the better of the contributing multi-algorithmic features.



BGI Fusion: Final ROC Curves

Result B: BGI Iris-Specific Normalisation clearly shows better or equal performance over the whole ROC curve, on the Evaluation Dataset (Set C). Caveats: the datasets are not large; Set B gives conflicting results. The region of improvement is of most interest for multi-instance and multi-modal fusion.



References

[1] Nigel Sedgwick, ***The Need for Standardisation of Multi-Model Biometric Combination***, Cambridge Algorithmica Ltd, 6 November 2003, http://www.camalg.co.uk/s03017_pr0/s03017_pr0.pdf

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[6] John Daugman, ***Probing the Uniqueness and Randomness of IrisCodes: Results from 200 Billion Iris Pair Comparisons***, Cambridge University Computer Laboratory.