**AI3 – Original paper**

**Early Detection of Diabetic Retinopathy Using a Compact, Data-Efficient AI Model**

**Abstract (Hadise)**

* Objective
* Approach
* Key findings
* Clinical relevance

**Introduction (Hadise)**

* Background and problem definition
* Importance of early detection of diabetic retinopathy
* Limitations of current approaches
* Aim and contributions

**Related Work (Hadise)**

* AI in medical imaging
* Retinal image analysis methods
* Lightweight and data-efficient models
* Reporting standards in AI for healthcare

**Methods**

* Data and Ethics (shaygan)
  + Datasets used (internal and public)
  + Inclusion/exclusion criteria
  + Ethical considerations
* Preprocessing and Quality Control (shaygan)
  + Image cleaning and normalization
  + Augmentation strategies
  + Handling class imbalance
* Model Design (Nasouri)
  + Compact backbone choice
  + Teacher–student distillation
  + On-device constraints
* Data-Efficient Learning Strategy (Nasouri)
  + Transfer learning and initialization
  + Few-shot adaptation
  + Semi-supervised/self-training methods
  + Calibration
* Training Protocol (Nasouri)
  + Loss functions
  + Hyperparameters
  + Training setup and reproducibility

**Results (shaygan)**

* Primary metrics (AUROC, sensitivity, specificity)
* Secondary metrics (AUPRC, F1, calibration)
* Robustness and external validation
* Subgroup analyses
* Ablation studies
* Model compression and deployment results

**Discussion (Hadise)**

* Key outcomes and contributions
* Comparison with prior work
* Clinical implications
* Limitations
* Future work

**Conclusion (Hadise)**

* Summary of findings
* Implications for screening and triage
* Outlook for deployment

**References**