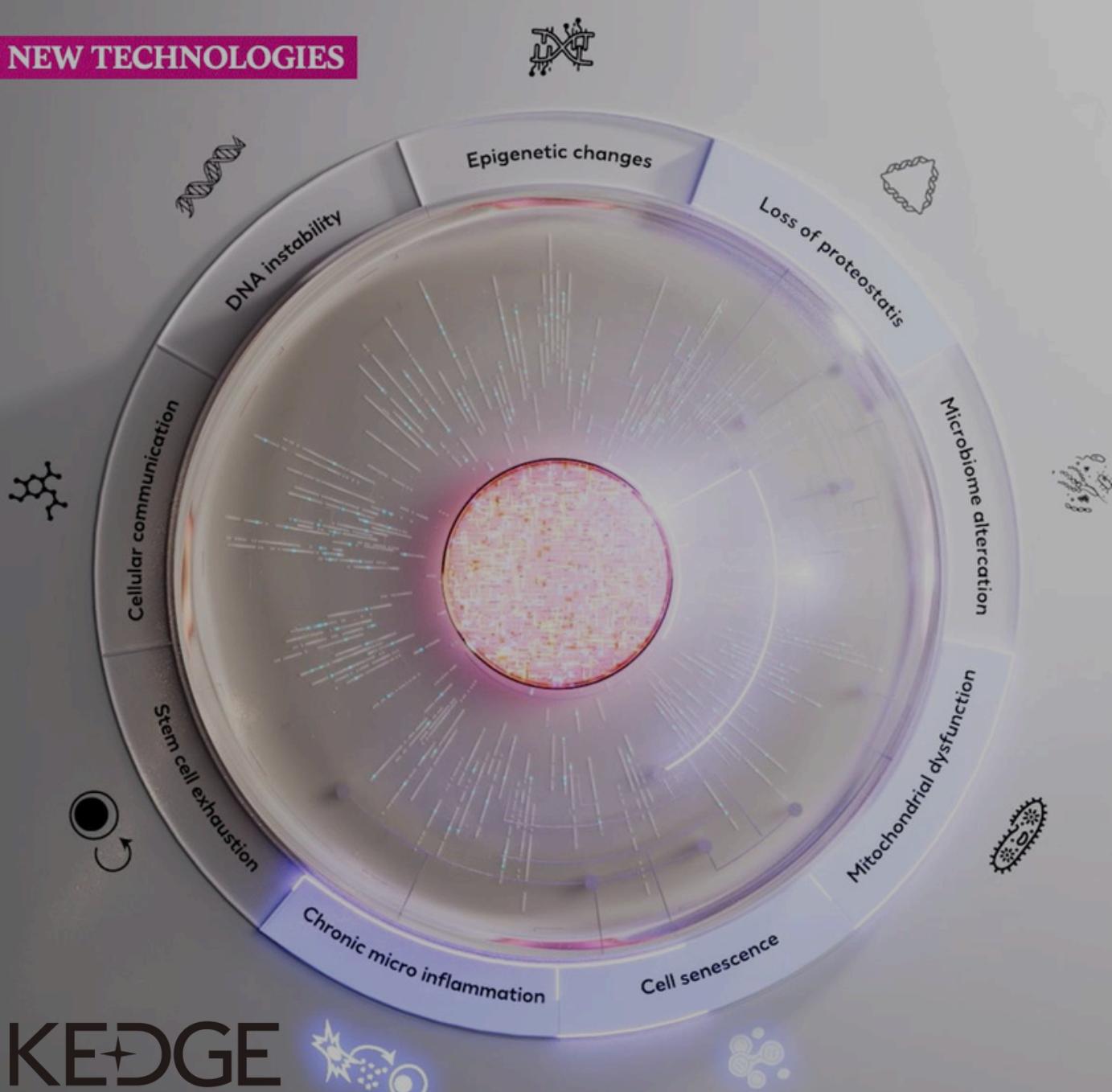




L'ORÉAL

Skin Condition
Classification
Hackathon



TEAM MEMBERS

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Building Sustainable AI

Classifying skin conditions from product descriptions whilst maximising accuracy and minimising environmental impact through innovative AI solutions

Challenge Overview:

Dataset

- ▷ 6240 records, 1 product description, 33 labels

Objective

- ▷ Maximize accuracy - Minimize Size

Constraint

- ▷ Balance performance - sustainability - resources



Data Strategy & Engineering

Pruning Logic

- Removed samples with over 20 labels to **reduce noise**
- Improve **model focus** on meaningful patterns

Text Preprocessing

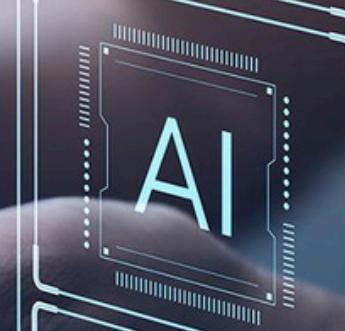
- Custom **cleaning** functions

Handling Imbalance

- Oversampled **rare** labels
- **Dynamic** class weights implemented



BETiq



L'ORÉAL



Baseline Model: Setup

RoBERTa-large

➢ 355M parameters, 1.32 GB size post training

Training Configuration

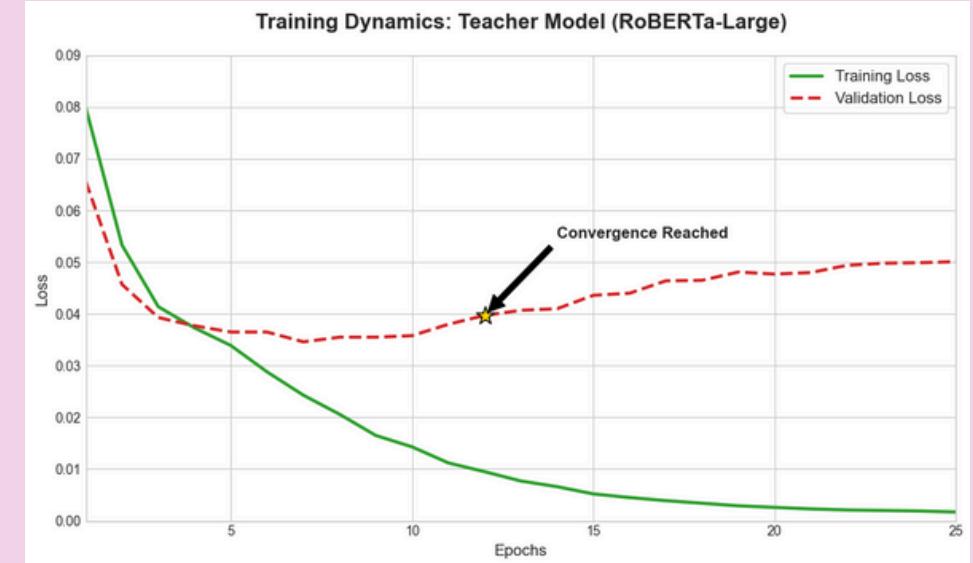
➢ 25 epochs - Focal Loss - Threshold optimization

Benchmark Achievement

➢ 78.17% average f1-score, 55.79% Jaccard index



Base Model: Training



Epoch	State	Train Loss	Val Loss	F1 Score
1	<i>Initial Learning</i>	0.0799	0.0656	44.0%
12	<i>Convergence</i>	0.0095	0.0396	75.6%
25	<i>Peak Performance</i>	0.0017	0.0500	77.2%

Base Model: Evaluation

- 🎯 Weighted F1: 78.17%
- 📊 Macro F1: 76.98%
- 📈 Micro F1: 78.21%
- ✓ Jaccard Score: 55.79%
- 🌿 Model emissions: 0.031781 kg CO₂
- ⌚ Time: 3 hours 34 min

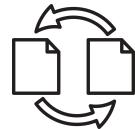


Knowledge Distillation



Teacher Configuration

RoBERTa-large
generates soft knowledge
through **logits**



Knowledge Transfer

Temperature=3.0,
Alpha=0.9 optimised
through experimentation



Student Model

DistilRoBERTa (82M
params) retains 96.8%
of teacher's accuracy

This innovative approach shifted focus to **resource efficiency**
whilst maintaining exceptional performance, proving that smaller
models can deliver enterprise-grade results

Student Model: Evaluation

- 🎯 Weighted F1: 76.26%
- 📊 Macro F1: 74.52%
- 📈 Micro F1: 76.36%
- ↗️ Jaccard: 52.63%
- 🌿 Student emissions: 0.001097 kg CO₂
- ⌚ Training time reduction: 89.8%



A complex, abstract molecular structure composed of numerous translucent blue spheres of varying sizes, some connected by thin white lines, set against a dark blue background.

Production Deployment Optimisation

Dynamic Quantization

- Converted model weights to **INT8** format

CPU Inference

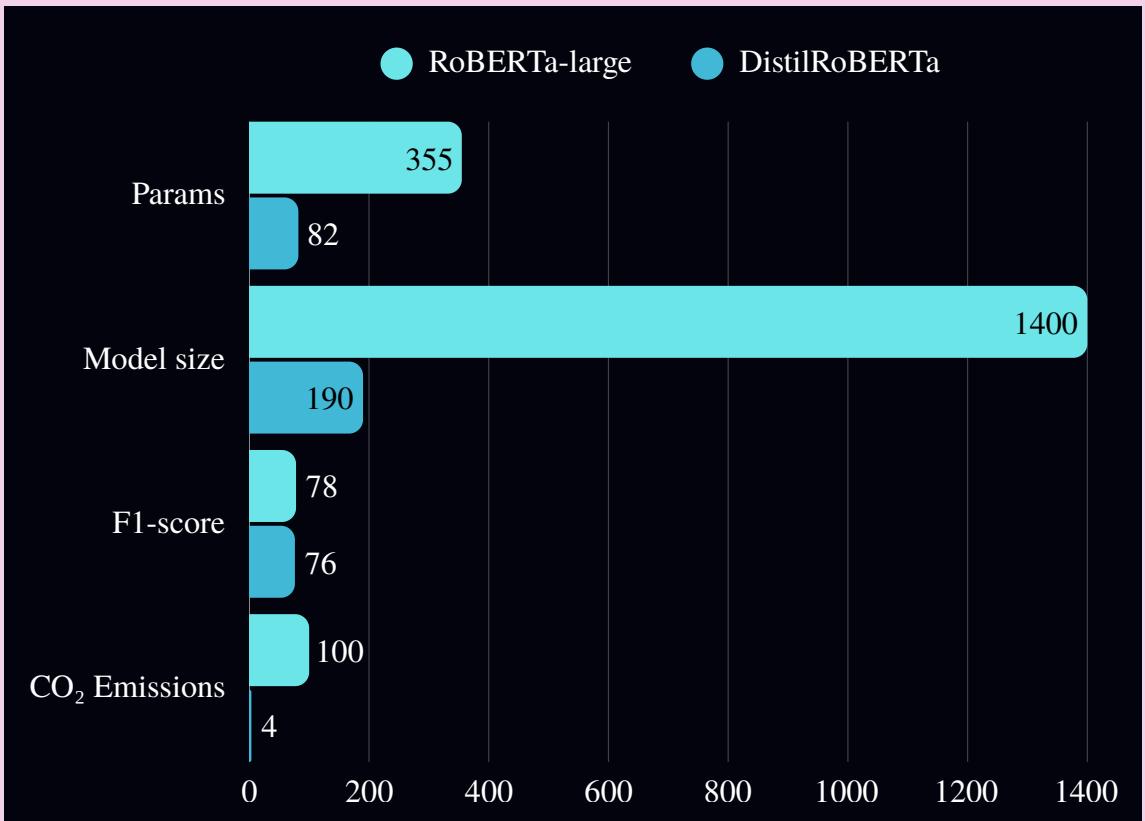
- Fast inference enables **scalable**, quick deployment

Production Ready

- **Light weight** solution



Technical Summary



Sustainability Impact

96.5%
CO₂
Reduction

86.0%
Size
Reduction

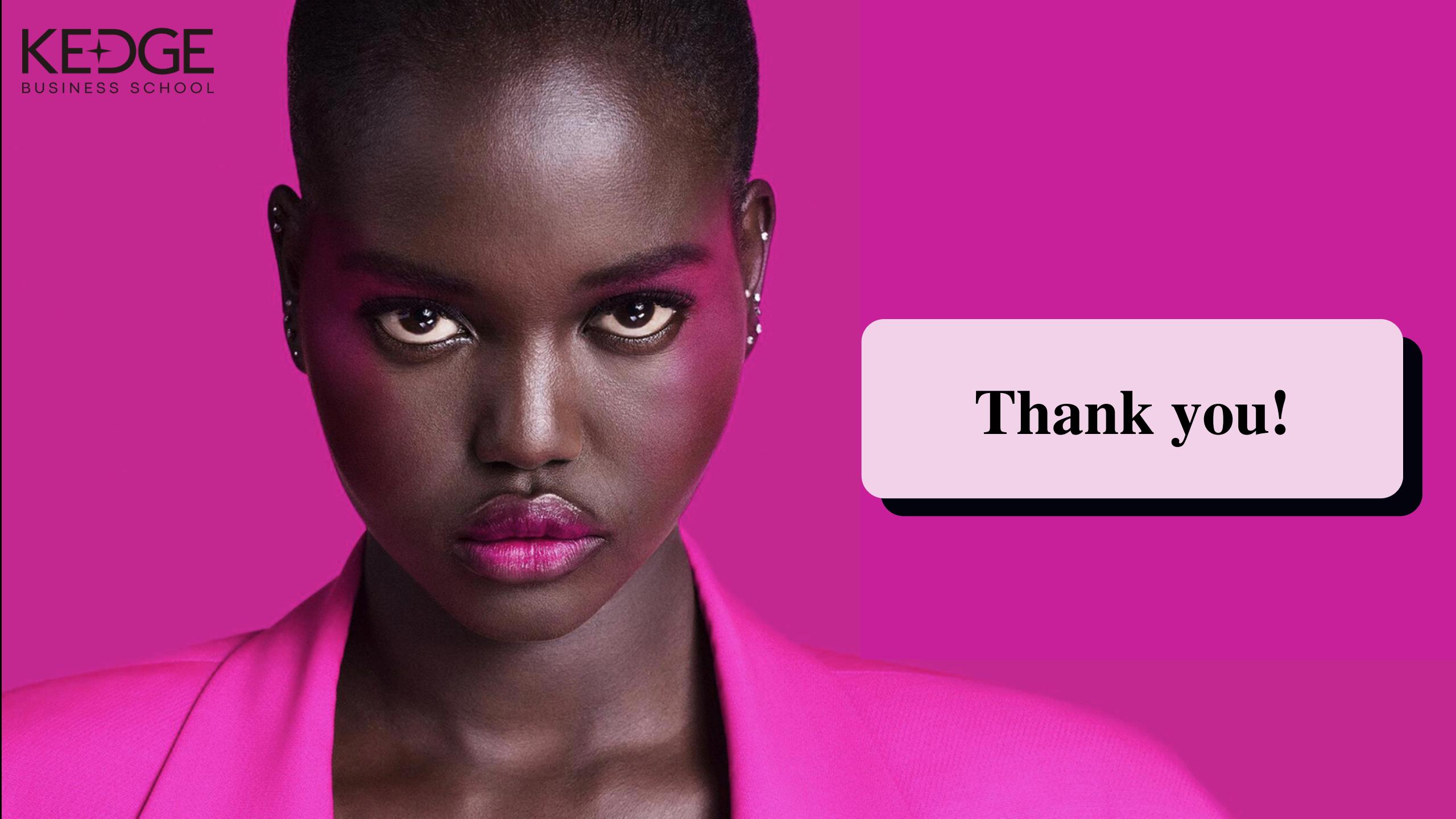
96.8%
Accuracy
Retention

Performance Comparision

Teacher F1: 78.1%

Student F1: 76.2%

Negligible: 1.9% difference



Thank you!