AI PROJECT SUMMARY

Eudes : In our AI project, we divided the tasks between Shaima and me to efficiently explore various approaches. My primary focus was on testing several neural network architectures, including NasNetMobile, NasNetLarge, Xception, and GoogleNet. This involved analyzing their performance and identifying their strengths and weaknesses in handling the dataset.

Shaima :The goal of this project was to develop a high-performance facial recognition system by exploring various neural network architectures and optimizing their settings. Through this process, I was able to apply both theoretical knowledge and practical experimentation to tackle complex challenges and improve the system's accuracy.

From the outset, I conducted an in-depth study of several well-known neural network architectures, including VGG16, InceptionV3, ResNet101, MobileNet, Xception, DenseNet, and Darknet53. Each network was thoroughly analyzed to identify its strengths and weaknesses in handling different aspects of facial recognition, such as background complexity, lighting variations, and perspective challenges. Among these, I selected Darknet53 for its strong potential and focused on optimizing it further.

To fine-tune each network and achieve the best possible performance, I used ExperimentManager to systematically test various parameter combinations. This tool allowed me to identify the optimal settings for each architecture efficiently. For Darknet53, I spent considerable time adjusting hyperparameters, freezing the initial convolutional layers, and selecting the most effective learning rate (0.00087). The breakthrough came with the introduction of L2 Regularization, which proved to be a game-changer and helped me achieve a remarkable accuracy of 82%.

Another significant aspect of my work was exploring how to combine the strengths of different architectures. I studied probabilistic fusion techniques to make the best use of the models' outputs. By running a bayesian optimization, I was able to determine the optimal coefficients for weighting the outputs, maximizing the overall recognition rate. This approach showed great promise in integrating multiple networks effectively.

Throughout the project, I also faced specific challenges, such as improving recognition for complex cases involving the faces of Camille, Nina, and Mickael. By applying targeted adjustments and refining the model, I was able to enhance the system's robustness and address these problematic examples.

In reflecting on this journey, I believe the project successfully demonstrated the importance of combining theoretical understanding with hands-on experimentation. The use of ExperimentManager was particularly helpful in managing the complexity of testing different

configurations. Achieving 82% accuracy with Darknet53 was a proud moment, as it validated the effectiveness of my optimizations, especially the use of L2 Regularization.