Within Philips Grooming & Beauty, Intense Pulsed Light (IPL) devices are developed for long-term hair reduction. IPL uses pulses of broad-spectrum light that are absorbed by melanin in the hair and converted into heat, thereby reducing future hair growth. Effective treatment also depends on systematically covering the intended skin area while avoiding both missed spots and unnecessary overlap.

A previous Master’s project developed a framework for generating realistic and controllable motion trajectories of handheld beauty devices. Synthetic motion can reduce reliance on time-consuming and costly user studies while enabling repeatable experiments through simulation or robotic replay. The work explored several generative modeling approaches and demonstrated the feasibility of generating realistic device movements with control over specific motion characteristics.

The next challenge is to extend these methods to capture the more complex and varied motion patterns observed in real-world device use, while maintaining realism and controllability.

This project will investigate the generation of complex motion patterns, including sequences of movements, transitions, direction changes, and combinations of different movement types. The focus will be on neuro-symbolic approaches that allow generative models to be guided by explicit requirements or constraints on the desired motion. The primary objective is to generate realistic, diverse, physically plausible, and controllable motion trajectories. Depending on progress, the project may also explore the use of generated trajectories for repeatable robotic testing or simulation.

The assignment offers considerable scope for scientific exploration and independent research and is particularly suitable for students interested in generative AI, sequential data, and robotics.