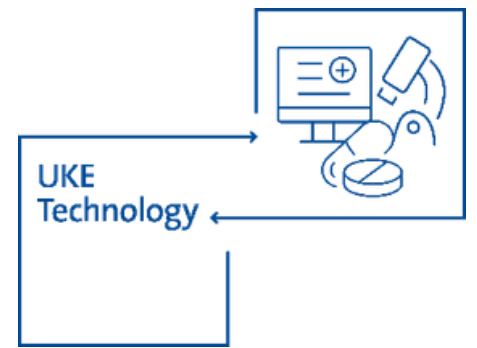




3D Face Scanning for Predicting Difficult Facemask

Background & Innovation

Difficult facemask ventilation remains one of the most critical challenges in anesthesia, emergency medicine and intensive care.

Current prediction approaches largely rely on clinical examinations and manually collected risk scores. Although these tests represent the current standard of care, they are time-consuming and observer-dependent.

The presented technology introduces a **software-based technology for objectively predicting difficult facemask ventilation** using preoperative **three-dimensional face and neck scans**. By analyzing patient-specific anatomical information, the approach enables an **automated, quantitative and reproducible risk classification** that can complement established clinical assessment and support more personalized airway management



Fig. 1: Digital processing of preoperative 3D face scan data for software-based airway risk assessment.

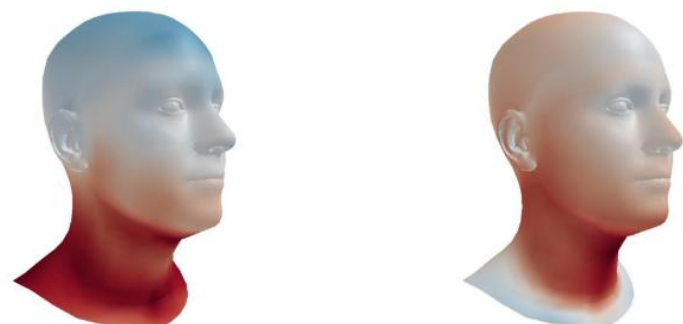


Fig. 2: Average face meshes with superimposed colour mapping (red: higher risk for difficult facemask ventilation), stratified by sex (left: male, right: female)

How it works

Prior to anesthesia, a non-invasive **three-dimensional scan of the patient's face and neck is acquired** as part of the preoperative assessment.

After postprocessing, the scan data are fitted to an established, non-clinical facial model to identify interpretable shape features relevant to facemask ventilation. Based on these features, the software generates a standardized risk classification indicating whether a patient may be at increased risk of difficult facemask ventilation.

Published clinical data show that preoperative three-dimensional face scans predicted difficult facemask ventilation at least as well as the DIFFMASK score. Integrating selected facial shape features **enriched the DIFFMASK score and improved its diagnostic value**.

The resulting risk information can be displayed to the clinical team, stored in the patient record and **integrated into clinical documentation or hospital information systems to support airway management planning and preparation**.

Competitive Advantage

- **Objective, AI-supported prediction of difficult facemask ventilation**
- **Non-invasive, rapid and standardized preoperative assessment**
- **Observer-independent and reproducible risk classification**
- **Objective analysis of patient-specific face and neck morphology**
- **Complementary to established clinical airway assessment**
- **Support for anesthesia, emergency and intensive care teams**

FOCUS SECTORS

- Medtech
- Anesthesia
- Emergency and intensive care medicine
- Clinical decision support
- Preoperative risk assessment

PROJECT KEY WORDS

- Difficult facemask ventilation
- 3D face & neck scanning
- Airway risk prediction
- DIFFMASK score

DEVELOPMENT STATUS

- TRL 4 – Clinical feasibility evaluated in a published prospective development study using preoperative 3D face scan data

PATENT PROCEDURE STATUS

- EP patent application filed

POTENTIAL FOR COOPERATION

- R&D Cooperation
- Licensing
- Transfer of rights

PUBLICATIONS

[V. A. Wunsch, P. Breitfeld, M. Petzoldt, et. al., Anaesthesia \(2026\)](#)



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