

Smart Bathroom System



From left to right: Shaakir Banow, Simon Shimek, Cody Kyro, and Zoe Thoma

PROJECT BACKGROUND & DESIGN GOAL:

Patients with chronic urinary issues currently struggle with manually logging bathroom usage data. Our team designed and prototyped an automated bathroom system that predicts urinary volume while prioritizing automation, privacy, and simple interfaces. **To develop a system that automatically measures urination volume that maintains user privacy.**

DESIGN OUTCOMES:

- Experimental setup captures fluid flow audio
- Programmed BLE® capabilities to transfer data from microcontroller to mobile app
- Created a mobile app for neural network data sound to volume processing which converts to a corresponding flow rate to quantify volume
- Developed a neural network with at least 80% accuracy to urine flowrate corresponding volume predictions.



System Electrical Enclosure Attachment

Medtronic

Sponsored by Medtronic

TEAM 19

INDUSTRY REPRESENTATIVE

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DESIGN CONSTRAINTS:

- Estimate urine volume with $\geq 80\%$ accuracy
- No cameras or video recording allowed to respect privacy
- Log data only for the patient, not other users
- Include a BLE® 5 radio for data transfer from a microcontroller to a smartphone
- Automatically collect bathroom usage data using a microprocessor
- Software must support smartphones