

Periodic Weight Measurement for Bedridden Patients Using a Pressurized Liquid-Filled Channel System Integrated with Hospital Beds



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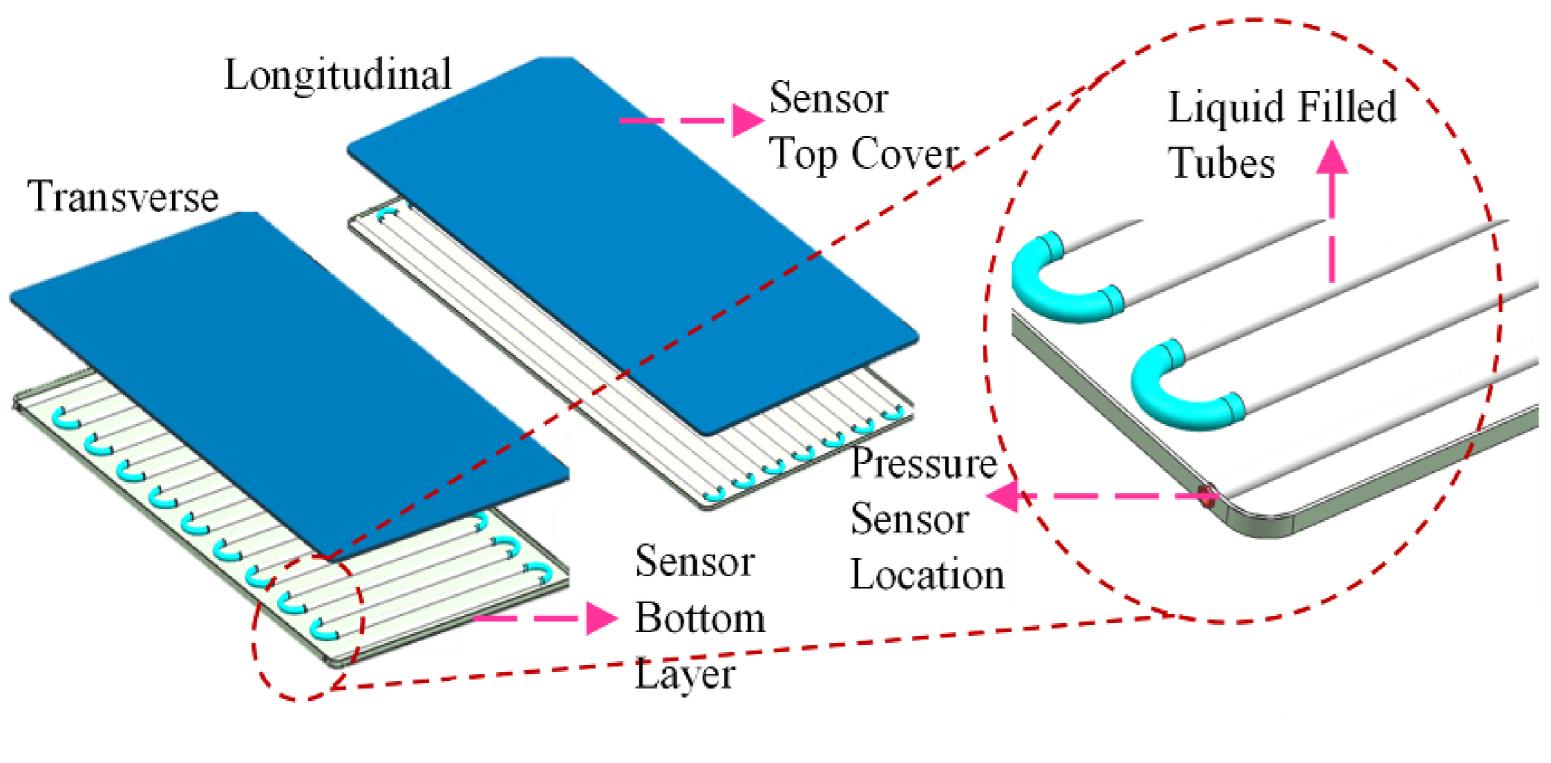
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How to measure the body weight & track its changes for a bed-ridden patient?

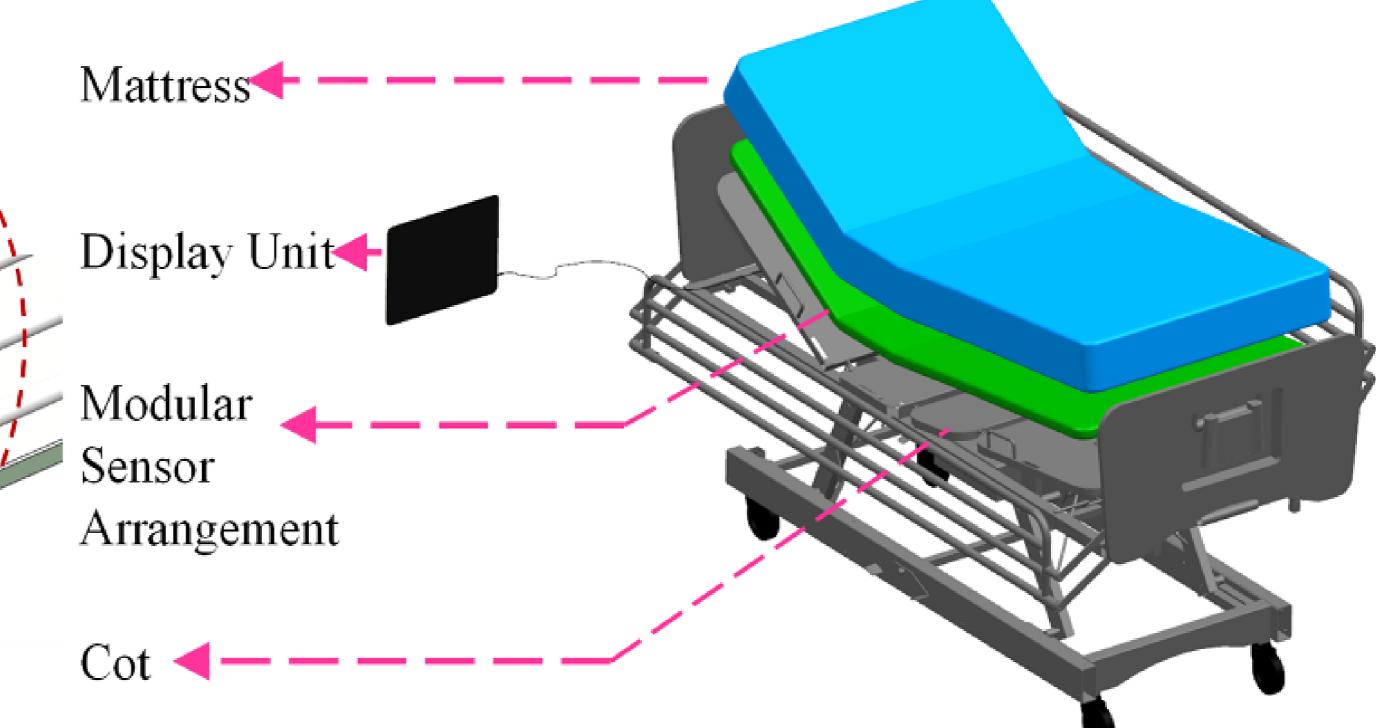
MONITORING BODY WEIGHT & ITS VARIATIONS IS A <u>DIRECT INDICATOR OF FLUID BALANCE</u> EFFECTIVENESS AND OVERALL HEALTH STATUS.

State-of-the-art & Challenges?

- Strain gauge / load cells lifting scales or rollon scales — **not intended for continuous use**.
- Need multiple units of sensing element need for matched sensors.
- Measures the heavy bed + patient weight requires high range sensors.
- Required personals for attaching/detaching the measurement units practical challenges.



PROOF OF CONCEPT **APPLIED PRESSURISED** FLEXIBLE TUBES WEIGHT **PRESSURE** (INPUT) (SYSTEM) OUTPUT **PROPORTIONAL** CONTROLLER **CALIBRATION** CURVE (PISTON PUMP) DISPLACEMENT OF PISTON PUMP (mm) SET PRESSURE TO LINEARIZE THE SYSTEM



Key Results & Observations

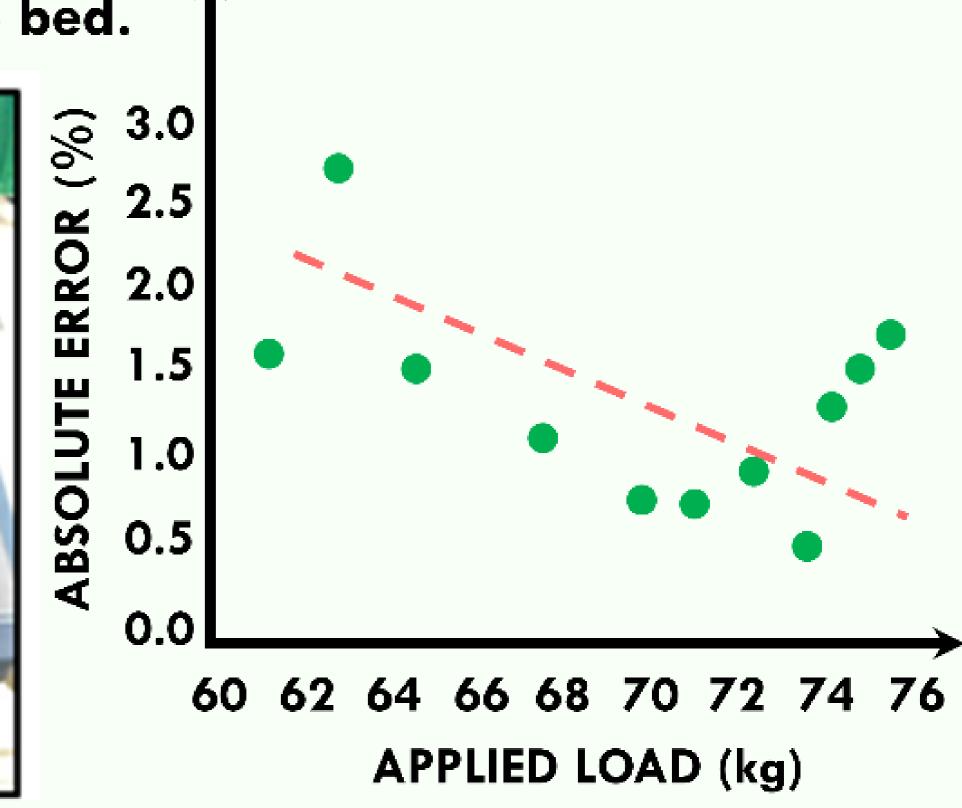
- Highest sensitivity was achieved at 50 mmHg set pressure of the system.
- Current prototype tested for up to 100 kg, easily expandable to higher ranges using a larger piston pump.
- Absolute error < 3% in the weight range of 45 kg to 90 kg, with CoV < 4%.
- Resolution of the system limited to 0.5 kg.

Emulated experiment for a practical scenario

Initial dry weight of 60 kg.

 Small incremental weights of 500 g to 1 kg added to the bed.





Medical
Measurements &
Applications