

Opportunities and Challenges in Implementing a Virtual Ward for Heart Failure Management

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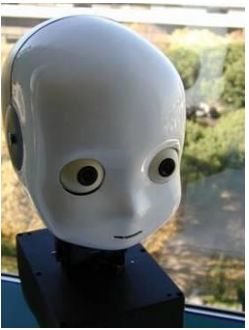
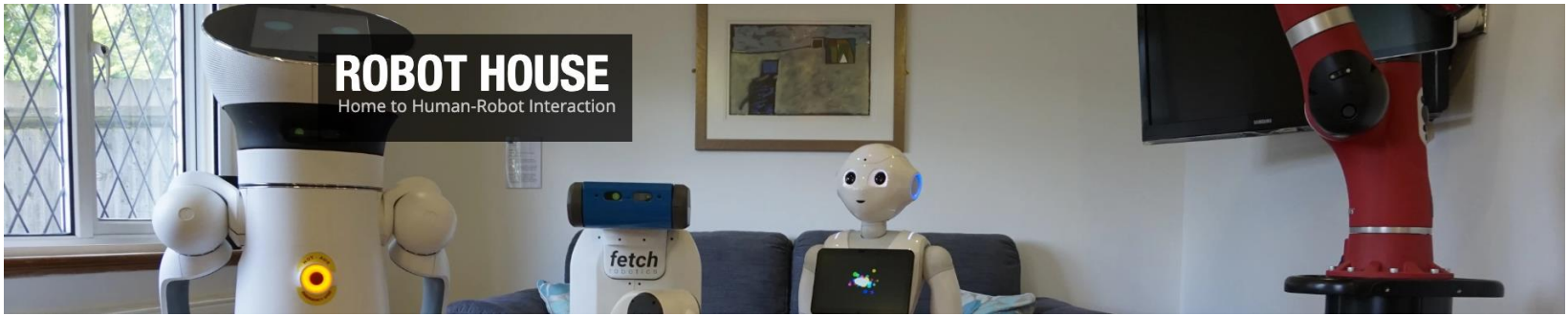
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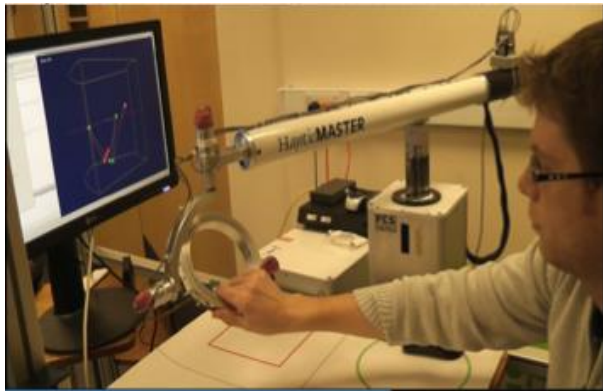
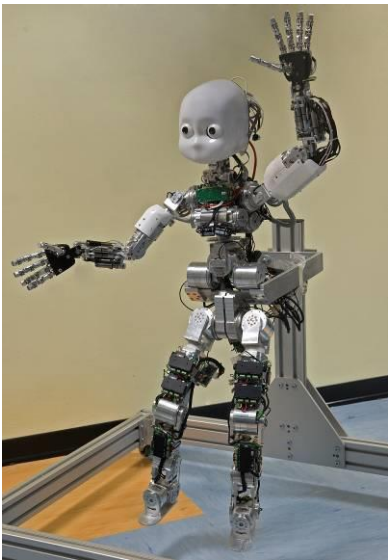


Sehrish Rafique

- Sehrish is a PhD researcher at the **Robotics Research Group, University of Hertfordshire**, specializing in human-robot interaction.
- Her research focuses on detecting people and activities in ambient assisted living scenarios to support independent living.
- In a home-based hospital setting, her work combines robotics and AI to identify people, objects, and their interactions.



Robots in UH Robot House and Robotics Research Group



Motivation and Background



British Heart
Foundation

**FIGHT
FOR EVERY
HEARTBEAT**

bhf.org.uk

Healthcare Challenges in the UK

- Staff shortages and economic pressures
- Increasing heart diseases

Heart Disease Impact

- 49,000 deaths annually under 75
- Over 10% of people 70+ have heart failure
- 7.6 million affected (4M men, 3.6M women)
- 17% die within a year; 44% rehospitalised

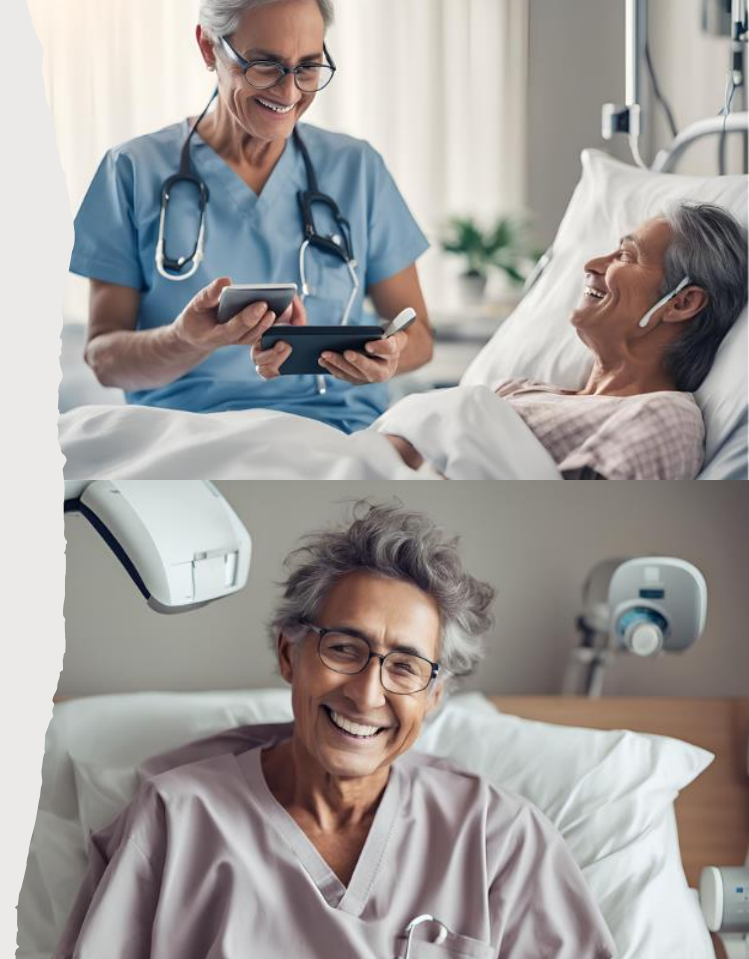
Economic Burden

- £10 billion annually on heart disease care

The NHS initiative of Virtual Ward Care for Heart Failure Management

A virtual ward model includes:

- Alternative to hospital admission at patients' homes including:
 - personalised care
 - Smart monitoring
 - medication recommendations
 - personalised therapy
 - individualised dietary prescriptions
- Data input and alerts system in case of emergencies.
- Medical professionals overseeing and supporting patients at home.



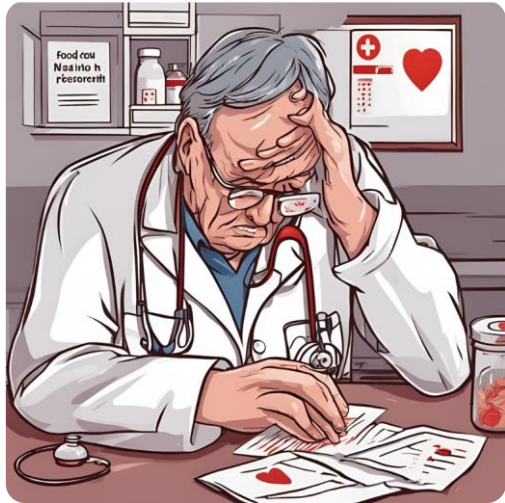
NHS



Aims and Contributions

- Aims
 - Explore needs and **challenges** faced by **patients with heart failure (HF)**
 - Support transition from hospital to **home settings** through virtual ward care.
 - Highlight **limitations of current solutions in the context of virtual ward**
- Contributions
 - Assessment of current fitness of the **virtual ward** concept
 - Open discussion about the **future potential** in delivering hospital-level care for HF at home.

Needs and Challenges managing Heart Failure



- Medication Management

- Prescription (dosage, timing)
- Administration, admission, and discharge.
- 237 million medication errors annually in NHS England (across all departments).

- Diet Management

- Food delivery (orders or food types)
- Malnutrition (esp. With chronic or severe illnesses)

- Monitoring

- Limited time and staff
- Technical issues (e.g. remote monitoring)
- Patient discomfort and usability

- Rehabilitation

- Access (cost, geography)
- Lack of personalisation
- Staffing

- Emotional needs

- Social isolation, stress, fears and uncertainties
- Exhaustion
- Financial problems

- Post-heart surgery delirium

- Confusion
- Training requirements



CURRENT SOLUTIONS AND THEIR SHORTCOMINGS



- Medication Management

- Automatic dispensing machines and error reporting tools
- Challenges: Accuracy, usability, effectiveness

- Diet Management

- AI apps for dietary intake and weight
- Issues: User adherence, data errors, limited food databases, personalized advice

- Monitoring

- Cost-effective staffing and monitoring
- Wearable devices for remote monitoring
- Limitations: No EEG, chronic disease focus, clinical validation

- Rehabilitation

- AI-based personalized prescriptions, assistive robots
- Issues: Sensor data recognition, clinical evaluation, implementation, precision

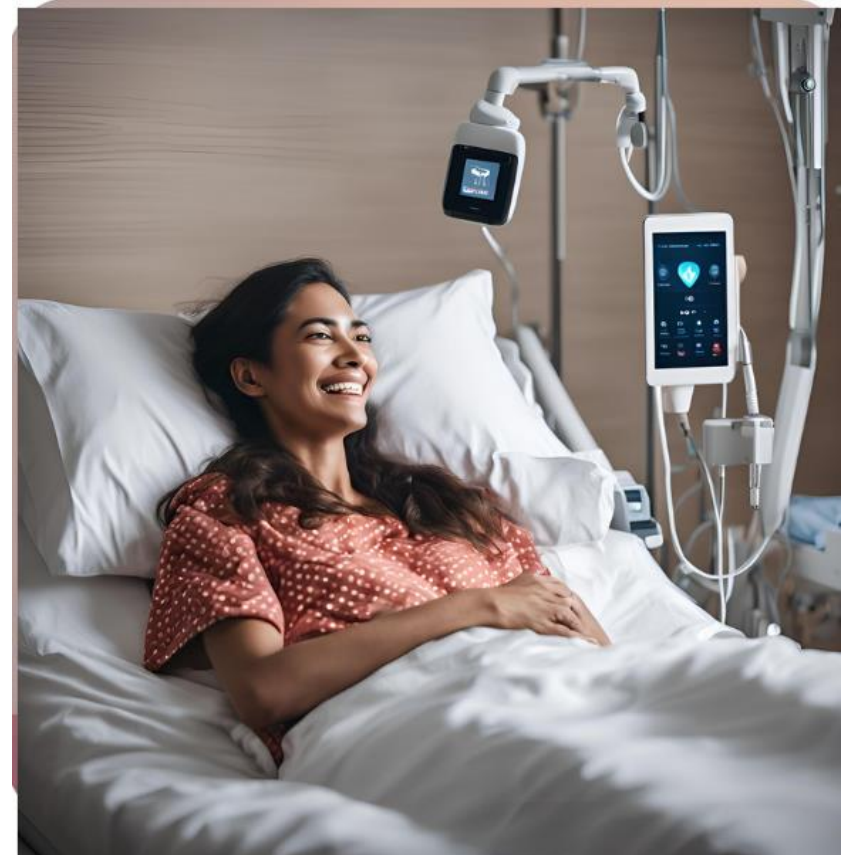
- Emotional needs

- Chatbots and virtual therapists
- Limitation: lack of deep empathetic interaction

CONCLUSION AND FUTURE WORK

Conclusion:

- Explored challenges for UK heart failure (HF) patients.
- Reviewed existing home care solutions.
- Acknowledged complexities and challenges.
- Identified shortcomings, highlighting room for improvement.



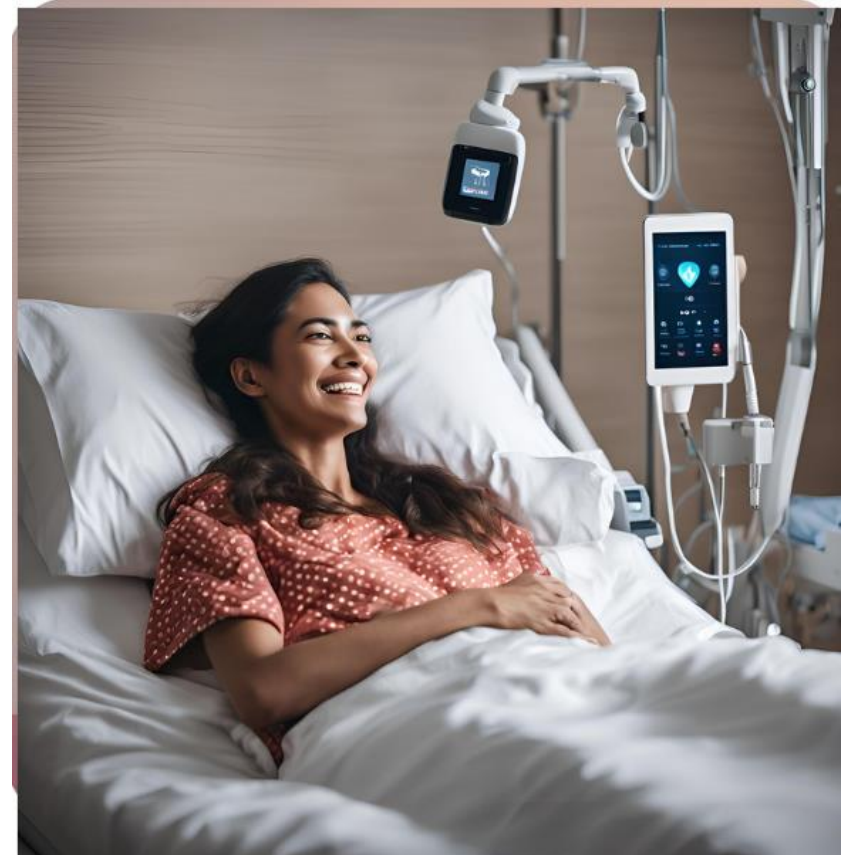
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Future Work:

- Call for advanced systems to overcome technology shortcomings.
- Highlight NHS Virtual Ward Care initiative's potential.
- Suggest focus on evolving HF patient care pathways.
- Emphasize assessing tech innovations for improved outcomes.



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