Fraunhofer ISIT

FLEXIBLE ELECTRONICS IN HEALTH –INTEGRATION OF OLED AND OPTICAL SENSING FOR HEALTH MONITORING

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INTRODUCTION

Flexible electronics combined with optical sensing electronics allow for the manufacturing of wearable smart devices for measuring various bio-signals. Together with organic LED (OLED) through the partnership with Mads Clausen Institute (MCI) at Southern Denmark University, health monitoring for private use becomes possible.

ORGANIC LED

- A small-molecule OLED structure was optimized by varying the thickness of the three organic layers.
- A display was designed and fabricated via physical vapour deposition to graphically depict the user's heartbeat and skin temperature.

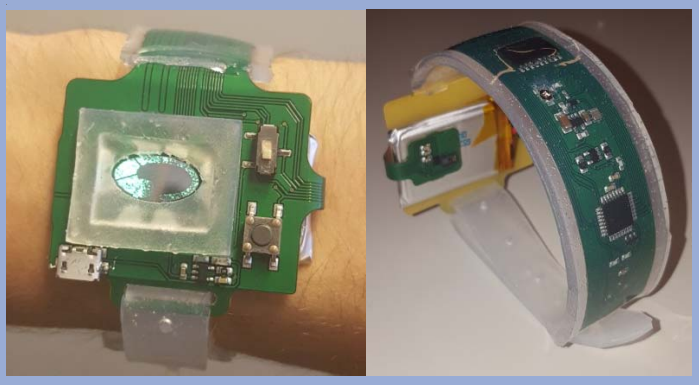
OPTICAL SENSING

- Non-invasive optical measurement of the change in blood flow in the wrist is used for heartbeat detection and heart rate calculation.
- Infrared radiation is measured to determine skin temperature.

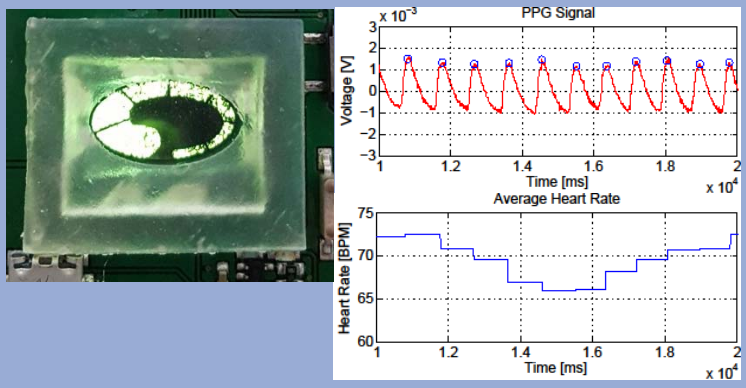
PROTOTYPE DEVELOPMENT

- The flexible PCB was designed and assembled at Fraunhofer ISIT integrating the OLED display fabricated at MCI.
- A wearable wristband was realized by moulding the flexible device in silicone.
- Successful real-time display of heartbeat and skin temperature from the wrist has been shown.

FIRST RESULTS



Wearable health monitoring device with integrated organic LED display and optical sensors



Design of optimized OLED display (left) and heart rate data extracted from the user's wrist via optical sensing (right)

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