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<th><strong>Title</strong></th>
<th>CAREFREE HEART: a wearable ECG system for real-time heart monitoring</th>
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<td><strong>Author(s)</strong></td>
<td>Zheng, Kaixi</td>
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Electrocardiograph (ECG) is the most popular non-invasive diagnosis test that reveals key information on the heart’s electrical activity. Doctors make inaccurate diagnosis because they only see patients during their short hospital visits.

CAREFREE HEART
A Wearable ECG System for Real-Time Heart Monitoring

Cardiovascular diseases are the No. 1 health killer, accounting for 1 out of 3 deaths in Singapore. Current healthcare system cannot accommodate the rising need of our aging population. Doctors make inaccurate diagnosis because they only see patients during their short hospital visits.

To avoid frequent and expensive hospital visits, and to service patients with rapidly changing health states, we introduce CAREFREE HEART, a wearable ECG system that helps a non-medically trained individual monitor his or her heart condition instantaneously with clinical precision. This leads to early detection that dramatically reduces the incidence of fatal heart attacks.

1. Sensing Unit
Low-noise electrode in close contact with skin surface collects electrical data.

2. Processing Unit
Embedded in the wearable fabric is Arduino Uno microcontroller, an open-source architecture similar to the chips in conventional 12-lead ECG devices. It processes data and identifies various health states real time.

3. Communication Unit
Bluetooth communicates remotely between microcontroller & smartphone.

4. Application Unit
Smartphone displays information in an intuitive user interface.

Highlights
- Embedded system light and comfortable
- Easy access anytime anywhere
- Highly accurate and reliable information
- Quick to learn and simple to operate user interface
- Instantaneous data transmission
- Real-time data collection and feedback

Future Development

Stage 1: Customers create personalized health profiles online over time

Stage 2: Doctors diagnose and give suggestions based on health profiles

Stage 3: Doctors predict impending illnesses using intelligent information systems