Stress Detection and Management System

ECE 445
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Introduction

• Stress is a cause of all kinds of disease

• People do not know what and where they get stressed from

• This device help user to alleviate the stress
Objective

- Monitoring device / management device
- Small, Portable Size
- Convenience
- Practical
System Overview
Module Overview
Power Supply

- 9V Alkaline Battery
- +5V Regulator
Microcontroller

- Arduino Nano 3.0 (ATmega 328)
Stress Detector
Stress Dots

Blue 91° - Relaxed
Green 87° - Calm
Red 84° - Nervous
Black 79° - Tense

Warm your hands to Warm your Mood
Color detection Test

- LED
- Photodiode

<table>
<thead>
<tr>
<th>Trial</th>
<th>Green</th>
<th>Red</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.161V</td>
<td>0.229V</td>
<td>0.068V</td>
</tr>
<tr>
<td>2</td>
<td>0.168V</td>
<td>0.225V</td>
<td>0.057V</td>
</tr>
<tr>
<td>3</td>
<td>0.164V</td>
<td>0.226V</td>
<td>0.062V</td>
</tr>
<tr>
<td>4</td>
<td>0.165V</td>
<td>0.228V</td>
<td>0.063V</td>
</tr>
<tr>
<td>5</td>
<td>0.168V</td>
<td>0.227V</td>
<td>0.059V</td>
</tr>
</tbody>
</table>

Average Difference = 0.0618V
Stress detecting test

• Stressed

• Relaxed
• Infrared LED and Phototransistor package
## Heart Beat Tests

<table>
<thead>
<tr>
<th>Trial#</th>
<th>From Detector</th>
<th>Actual Heartbeat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>65</td>
<td>69</td>
</tr>
<tr>
<td>2</td>
<td>63</td>
<td>64</td>
</tr>
<tr>
<td>3</td>
<td>59</td>
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<td>62</td>
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<tr>
<td>5</td>
<td>72</td>
<td>61</td>
</tr>
<tr>
<td>6</td>
<td>62</td>
<td>69</td>
</tr>
<tr>
<td>7</td>
<td>66</td>
<td>73</td>
</tr>
<tr>
<td>Ave</td>
<td>65.14</td>
<td>65.57</td>
</tr>
</tbody>
</table>

**Tolerance = 0.6%**
Success

- Magnifying changed color
- Storing stress time
- Accurate heart beat rate
- Signal output to vibrator and speaker
Difficulties

- Isolating photodiode
- Software interference
Recommendation

• Complete design before request PCB

• Find better way to isolate photodiode

• Design PCB as small as possible

• Better have wireless communication between device and controller
Thank you