Low Cost Waist Line Circumference Health Management Belt

Raghav Talreja
Wayne State University, fq3502@wayne.edu

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Low Cost Waist Line Circumference Health Management Belt

Student: Raghav Talreja  
Advisor: Mohammad Avanaki, Ph.D.  
Biomedical Engineering

Opportunity & Significance
- 1/3 of American population is obese or near obese
- $150 billion spent in weight management
- Current devices are expensive and niche products designed for health enthusiasts

Related Work
- Nothing like this at WSU
- Similar belt concept by Welt but over $200

Design User Needs
- Lightweight and compact
- Aesthetically pleasing
- Little to no user input required

Future Development
- Implementing neural network code
- Custom board to miniaturize belt
- Mobile application development

Commercialization Plan
- Implementing it in a Mobile app
- Patent filing: Plan to work with WSU Tech. Commercialization office

References

Methods
Flow Chart of Signal Processing

Results
Change in Waist Circumference vs. Change in Force

Future Results

Sample Data Processing

Equations Derived from Data Collection

Simulated iOS Data Collection Application

Planned Neural Network Implementation

Change in Waist Circumference (%)

<table>
<thead>
<tr>
<th>Force 1</th>
<th>Force 2</th>
<th>Force 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.10</td>
<td>517</td>
<td>50</td>
</tr>
<tr>
<td>1.50</td>
<td>1036</td>
<td>51</td>
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\[
\text{Force 1: } R^2 = 0.8203 \\
y = -0.0003x^3 + 0.0112x^2 - 0.0402x + 0.8539 \\
\text{Force 2: } R^2 = 0.8257 \\
y = 0.0001x^3 - 0.0052x^2 + 0.0833x + 0.2716 \\
\text{Force 3: } R^2 = 0.9196 \\
y = 6E-05x^3 - 0.0031x^2 + 0.1834x - 0.2719
\]