Robots for Disabilities

Assistive Technology for Elderly

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Problem Statement

• Boxes in top shelf of a cupboard and on the floor
• Develop an assistive technology (also easy to use!)
• Modular
• Smart-connected
V1.0

- Modular design
- Wi-Fi connectivity with Wifly shield
- Connects to iPhone app (item selection)
- Auto sensing with RGB sensor
Initialize app parameters

Attempt Wi-Fi connection

Successful connection Made

Check Mode

Auto

Initialize Auto Mode
1. Hide Grip command
2. Show Selection Pane

User selection sent to device
1. Red
2. Green
3. Blue
4. yellow

Manual

Initialize Manual Mode
1. Hide connect
2. Hide Selection Pane
3. Display connection status

User input sent to device
1. Grasp
2. Release

iOS App Layout

- iPad/iPhone
- Reliable auto-sensing
- Intuitive GUI
Connection

Manual Mode

Auto Mode

On Selection
Data Flow

Start

Initialize

Data-in

yes

no

Data

yes

no

Auto-mode

Stand-by

In T

Not in T

Sensor RGB value

RGB

Sensor

Task

Grasp

Release

Sensor RGB value

Sugar

Salt

Coffee

Tea

Item

Task

’d’

‘e’

‘f’

‘g’

‘h’

‘a’

‘b’

Grasp

Release

3/10/2017
Effectiveness

- Very responsive iOS app
- Robust RGB sensor and grasping mechanism
- Fully modular assembly (no tools required)
- Connects to local network/ad-hoc/access point
Drawbacks and Improvements

- Heavier than expected
- It’s still Arduino and RGB sensor
- Form factor reduction
- Not so attractive GUI
- Cost –
- BLE 3V conversion

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>Cane</td>
<td>$17</td>
</tr>
<tr>
<td>Arduino</td>
<td>$15</td>
</tr>
<tr>
<td>Wifly shield</td>
<td>$40</td>
</tr>
<tr>
<td>RGB sensor</td>
<td>$6 + $6</td>
</tr>
<tr>
<td>Assembly</td>
<td>Approx. $5</td>
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<tr>
<td><strong>Total</strong></td>
<td>~$90</td>
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</tbody>
</table>
Thank you all!

Some people, no matter how old they get, never lose their beauty – they move it from their faces into their hearts.