MedBot-Home: Automatic Medication Dispensing System
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Motivation

- Medication organization and administration has become a growing issue in the United States for older adults (65 and older)
  - ~30% of hospital admission of older adults are drug related
  - >11% due to medication noncompliance
  - >17% related to adverse drug reactions
- Noncompliance includes forgetting to take medications or improper administration of the drug – both behaviors that may be present in either healthy or ill elderly individual

Current devices:
- Have a limited web interface that prevents elderly adults from documenting their given medication
- Require presorting medication
- Frequent monitoring of device

Market Analysis

Of the 46.2 million older adults in the United States...

- 40% - 75% do not comply with their medications.
- 18% feel comfortable using a new device on their own.
- 77% feel comfortable using a new device with guidance.

Target Market
- 4 - 15 million older adults

How the device works

Goal: Increase patient independence, increase compliance, and better follow-through on taking prescribed medications

Solution:
- A device that sorts and administers medications to the patient at the appropriate time in an easily accessible location, such as the kitchen
- MedBot-Home achieves this through a web application and home device

1. Schedule medications in website and track symptoms/reactions to medication

2. Load up to 6 medications into device by pouring into specified pill container

3. At scheduled time, system alerts the patient, specified servo motor is activated, and auger is rotated

4. A pill falls into auger pill slot and falls down pill chute

5. An IR break beam reads that pill has dispensed and servo motor turns off

Description of Design

Software design:
- Raspberry Pi 3 used to connect website backend to on-board scheduler
- Scheduler selects motor to turn on at predetermined time, allowing the pill to be dispensed
- Requires external power source

Website design:
- Offers patients or caretakers ability to edit or add new medications and track symptoms or reactions to medications
- Information stored in a database that can be accessed by the Raspberry Pi 3

Hardware design:
- User inputs up to six medication types and dispensing system works to dispense the desired number of pills and the desired pill types at treatment time

Reimbursement

<table>
<thead>
<tr>
<th>Unit Name</th>
<th>Unit Price ($)</th>
<th>Required Quantity</th>
<th>Total Cost ($)</th>
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</thead>
<tbody>
<tr>
<td>Raspberry Pi 3</td>
<td>35</td>
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<tr>
<td>Adapts 16-Channel 12-bit PWM/Servo Driver + 24 Interface PCB Assembly</td>
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<td>Continuous Rotation Servo – ProTech FCS1000</td>
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<td>IR Break Beam – Tross LEDS</td>
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<td>3D Printing Costs</td>
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Cost per unit is $177.16

References


Acknowledgments

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