

Smart Homes: Assistive Technology for Aging in Place

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What is a Smart Home?

- Designed for access, security, comfort & livability
 - Ease of use features
 - Supports functional independence
 - Individualized to your needs and interests
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- Smart home features are becoming increasingly available and affordable

Who Needs a Smart Home?

- People with:
 - Mobility limitations
 - Sensory loss
 - Attention/memory/other cognitive problems
 - Medical care needs
 - Transition from supported to independent living
 - Emerging risk of nursing home placement
 - Motivation to increase independence thru AT

Smart Homes can...

- Improve safety and security
- Assist with mobility, transfers, access
- Automate routine appliance functions
- Allow remote control of home features using a variety of access tools and supports
- Provide communication tools, including passive occupant monitoring
- Assist with task support, shopping, bill-paying, social interaction

The Right Fit:

☐ **Assess:**

- ☐ Functional abilities and interests
- ☐ Human support resources
- ☐ Environmental supports in place
- ☐ Safety concerns
- ☐ Medication management
- ☐ ADL/IADL (food, hygiene, money management)
- ☐ Financial resources/insurance
- ☐ Work collaboratively to problem-solve solutions
- ☐ *Important: What is best access tool for remote control?*

Access & Safety

- Are exterior walkways and entrances well-lit and free of tripping hazards?
- Is there at least one entrance into the home without steps?
- Do the exterior doors have good lighting?
- If it's a multi-story home, does the ground floor have a bedroom, full bathroom, and kitchen?
- Are staircases well-lit, guarded by handrails on both sides, and equipped with light switches at both the top and bottom?
- Are cabinets and shelves throughout the home within easy reach from your height and easily accessible for you?
- Does the kitchen have a work surface you can use while sitting?
- Is there a fire extinguisher within reach of the stove and/or oven?
- Are area rugs secured to the floor or lined with non-slip grips?
- Are there smoke and carbon monoxide detectors on each floor of the home that are able to be heard in all bedrooms?
- Can you hear the phone and doorbell ring?
- Can you read label on a pillbox?

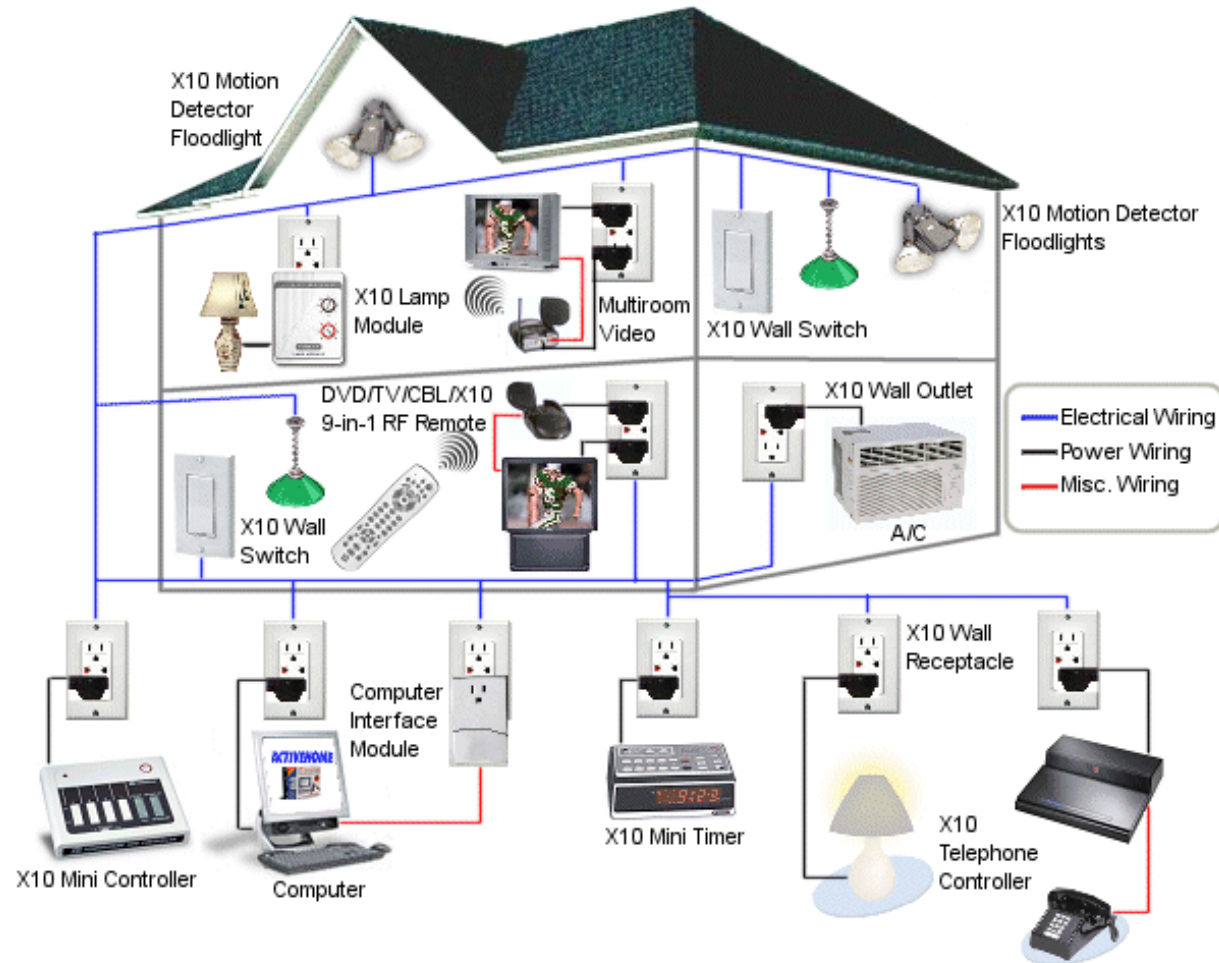




Safety



Appliance Controls



What can be automated or controlled remotely?

- Lights and lamps
- Media equipment (tv, radio, camera, stereo, etc.)
- Appliances with on/off switches (fans, motorized doors & window shades)
- Door locks
- Thermostat
- Phone, Computer
- Occupant monitors

Switches

- Tap or proximity switch
- Sip-n-Puff
- Head control
- Eye Gaze
- Voice control



Voice Considerations

*(Apple Siri/Amazon Echo/Google Home/
Microsoft Cortana)*

- Clear, concise commands
- Quiet environment
- Proximity to microphone
- Proper labeling of appliance modules
- Triggering of chained commands



Competing Technologies



Monitoring Options:

Quiet-Care by Care Innovations

- ☐ Wireless motion sensors/changes in routine noted

Grandcare

- ☐ set-top box on tv acts as communicator and control center for remote sensors

Vendor comes to your home to set these up and teach how to use them;
monthly fee – Medicaid may support fee.

Motion Sensors



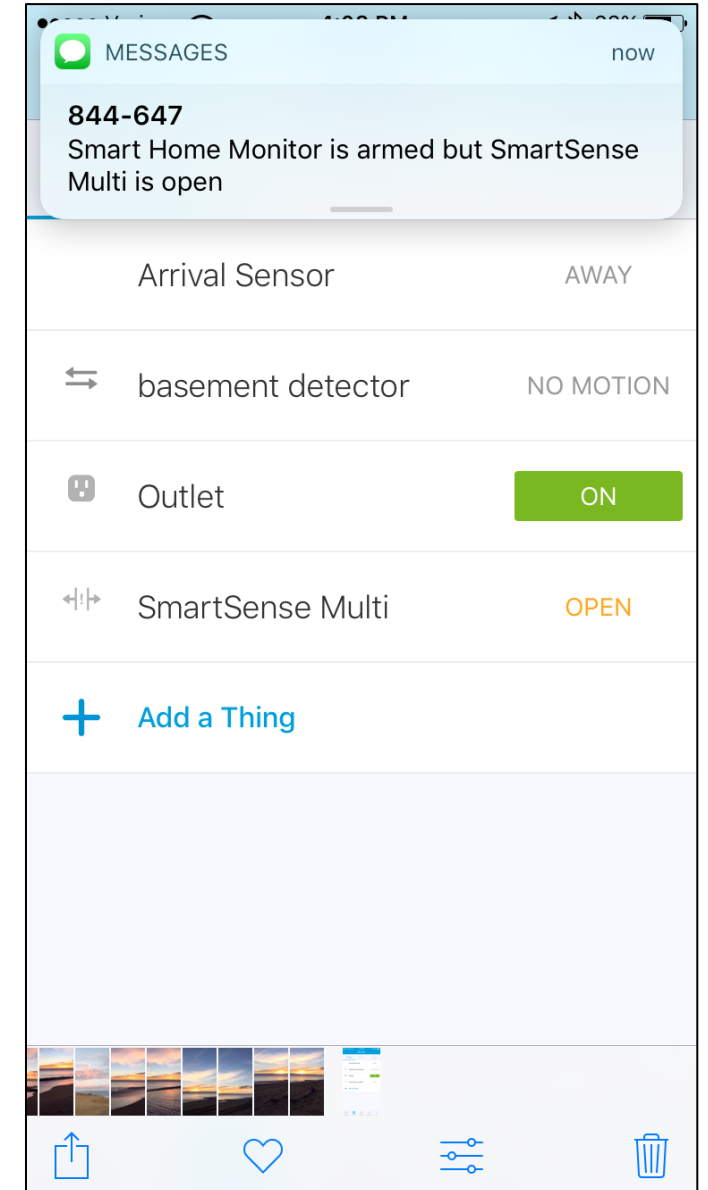
Phillips Hue
Motion Sensor -
\$35



SmartThings Arrival Sensor -
\$16

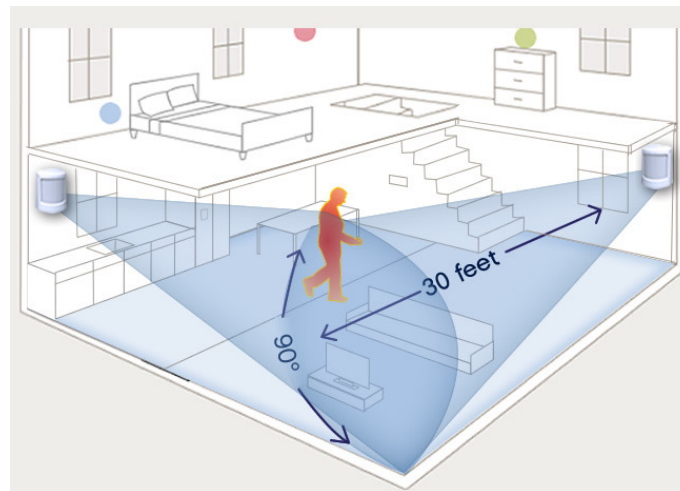


Homekit Door Sensor - \$29



Sensors Go Where?

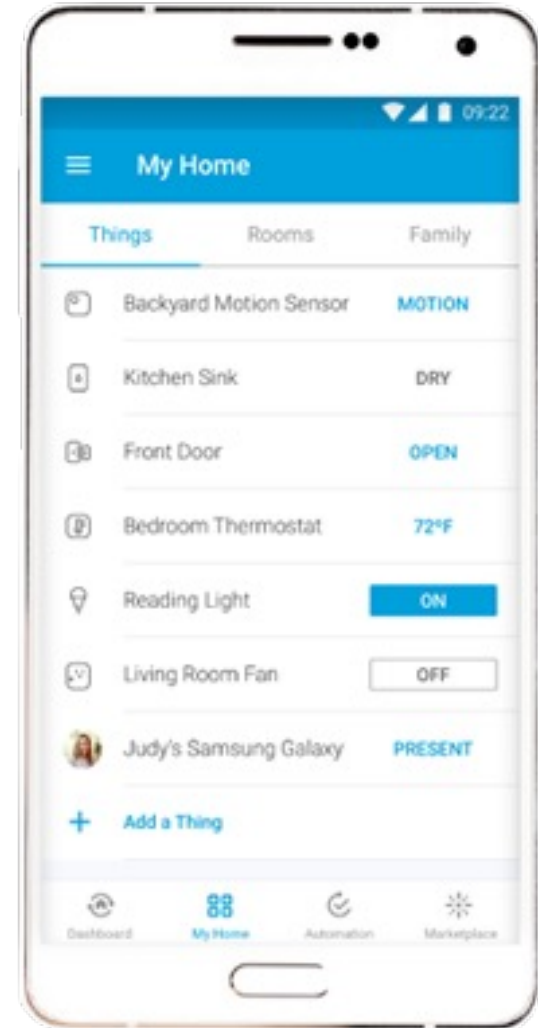
Motion Sensors	Arrival Sensors	Doorway Sensors
Living spaces	On key ring	Front & Back Doors
Garage door	On vehicle or bicycle	Bathroom door
	In backpack	Medicine Cabinet
		Refrigerator



Set up Notifications on Phone

On app

- Receive text when a sensor is activated
- Set routines so you are only notified if a variance occurs
- Check any time to see status of sensors
- App stores all sensor activity in database



Alexa Together

\$19.99/month

Monitor interactions with Voice Assistant

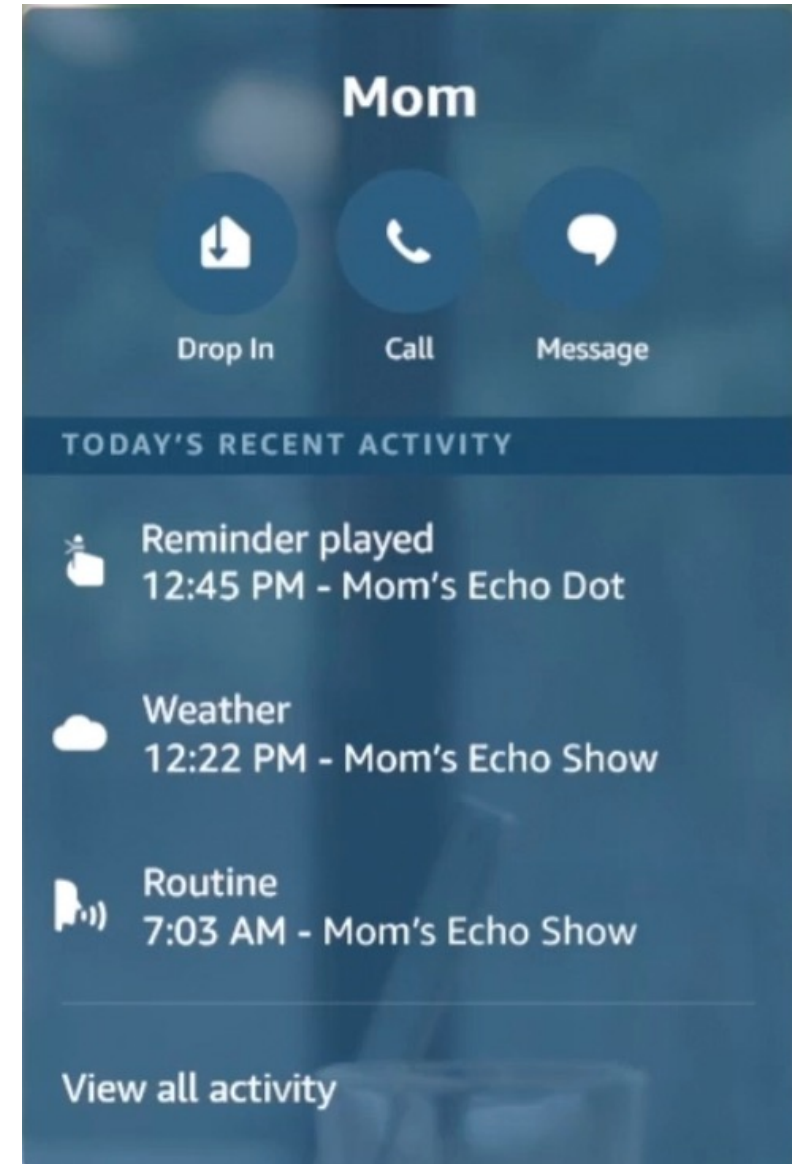
Get alert if “Alexa, call for help” is said.

Send alert (for instance, time to take meds)

Falls notification with some linked devices

Sign up online – free one month trial

<https://www.amazon.com/Alexa-Together/b?ie=UTF8&node=21390531011>



Ceiling Fan with
Lutron Wall Switch (\$200)



Nold Garage Door Opener
(\$120)



ConnectSense Smart
Outlet (2 lamps)
\$59



Apple TV (\$150)



First Alert Smoke & MO Alarm
(Homekit Enabled) (\$150)



Honeywell Lyric Thermostat
(\$158)



Phillips Hue Motion
Sensor (3)
\$120



iPhone or iPad
with Home app



Total: \$898

For under \$900, you can...

- Access home through garage
 - Control 2 lights and/or appliances
 - Auto-Manage thermostat
 - Auto-Manage overhead fan
 - Voice control television
 - Broadcast smoke/MO alert to loved one
 - Passively monitor activity in home
-
- Automate these actions based on triggers or scenes
and while away from home via Apple TV

Front Door Considerations



Ring Video Doorbell - \$179



Open Sesame Door Opener
\$2200



August Smart-Lock - \$229

Transactions & Housekeeping

- Automated Bill Paying
- Automated Grocery Order and Delivery
- Auto Plant Watering
- Robot Vacuum Cleaner
- Automated pet feeder



Rhoomba Vacuum Cleaner - \$375

The Internet of Things

- Phone sensor
- Fitness tracker
- Baby monitor
- Window blinds
- Food consumption tracking refrigerator
- Smart shopping carts



EggMinder Smart Tray - \$15

Vision

- Removing trip hazards
- Adequate lighting
- Automated lighting (motion activated, timed)
- Large print and talking devices
- Use of high contrast tape on stairs
- Removing rugs with busy patterns
- Removing obstacles for field cuts or neglect
- Referral to the Department for Blind and Visually Impaired

Hearing

- Referral to Virginia Dept. for the Deaf and Hard of Hearing
- Many devices are available to provide visual feedback for sounds (phones, doorbells, baby monitors, etc.)
- Telecommunication devices and services are often available at no cost



Concerns

- Remembering to Do Things (Wake up!)
- Medication adherence – hospitalization risk
- Home safety – especially fire risk when cooking
- Overly long showers (water bill fears)
- Can get lost while driving
- Forgetting keys – locked out of house

Demonstration Video

Emerging AI

- Smartphones track & share location and suggest activities
- Refrigerator generates order from grocery store
- Smart watch encourages more exercise and better sleep
- Home Assistant observes your behavior and nags about taking medications and getting exercise
- Your doctor's office receives notifications about diet, exercise, medication adherences, and physiological condition and generates health guidance

Ethical Issues re smart homes:

- The intrusiveness of monitoring devices and remote control offsite.
- The question of privacy re information collecting voice assistants.
- The advanced level of electronic wizardry required to understand and install and operate these things.
- The rapid obsolescence and expense of smart home tech.
- The question of robots substituting for human intervention/relationship.
- When does convenience become necessity? When does advertising overcome need?
- Are smart home technologies designed with the needs of people with disability in mind or are they more about selling things and collecting saleable information for the tech companies?

Funding Search Strategy

- Define the need – assess what you need and why you need it
- Document the need – rehab professionals (OT/PT) can do this
- Identify the device needed – vendor/item/alternative options
- Determine if a low or no-cost alternative is available
- Identify appropriate funding sources
- Submit a request to your most likely funding source
- Appeal if denied for all or part of request
- Go to your next funding option

Funding Options

- **Medicare** – Restricted list of available DME, as prescribed by health professional
 - <https://www.medicare.gov/coverage/durable-medical-equipment-dme-coverage>
- **Virginia Medicaid Waiver** – *Electronic Home-Based Supports* under Home and Community-Based Services Waiver
 - <https://www.dmas.virginia.gov/for-providers/long-term-care/waivers/>
 - <https://www.thearcofva.org/introduction-to-medicaid-waivers>

Funding Options

- **Veterans Administration** – Specially Adapted Housing Program
 - Up to \$101k to build or remodel accessible home
 - <https://www.benefits.va.gov/BENEFITS/factsheets/homeloans/SAHFactsheet.pdf>
- **Virginia Dept. of Aging and Rehabilitative Services (DARS)**
 - Would home adaptation support vocation?
- **Assistive Technology Loan Fund Authority (ATLFA)**
 - Below market interest, longer repayment terms
 - Any AT that will help a person with disability

Funding Options

- **FREE Foundation and CATS Program** (locations around Virginia)
 - Used durable medical equipment and wheelchairs
 - Must demonstrate financial need (forms online)
- **Disability-related & fraternal organization** (grants)
 - <https://www.ncdhhs.gov/divisions/vocational-rehabilitation-services/north-carolina-assistive-technology-program/assistive-technology-funding-resources>
- Virginia's **Livable Homes Tax Credit** (up to \$5k)
 - <https://www.dhcd.virginia.gov/lhtc>

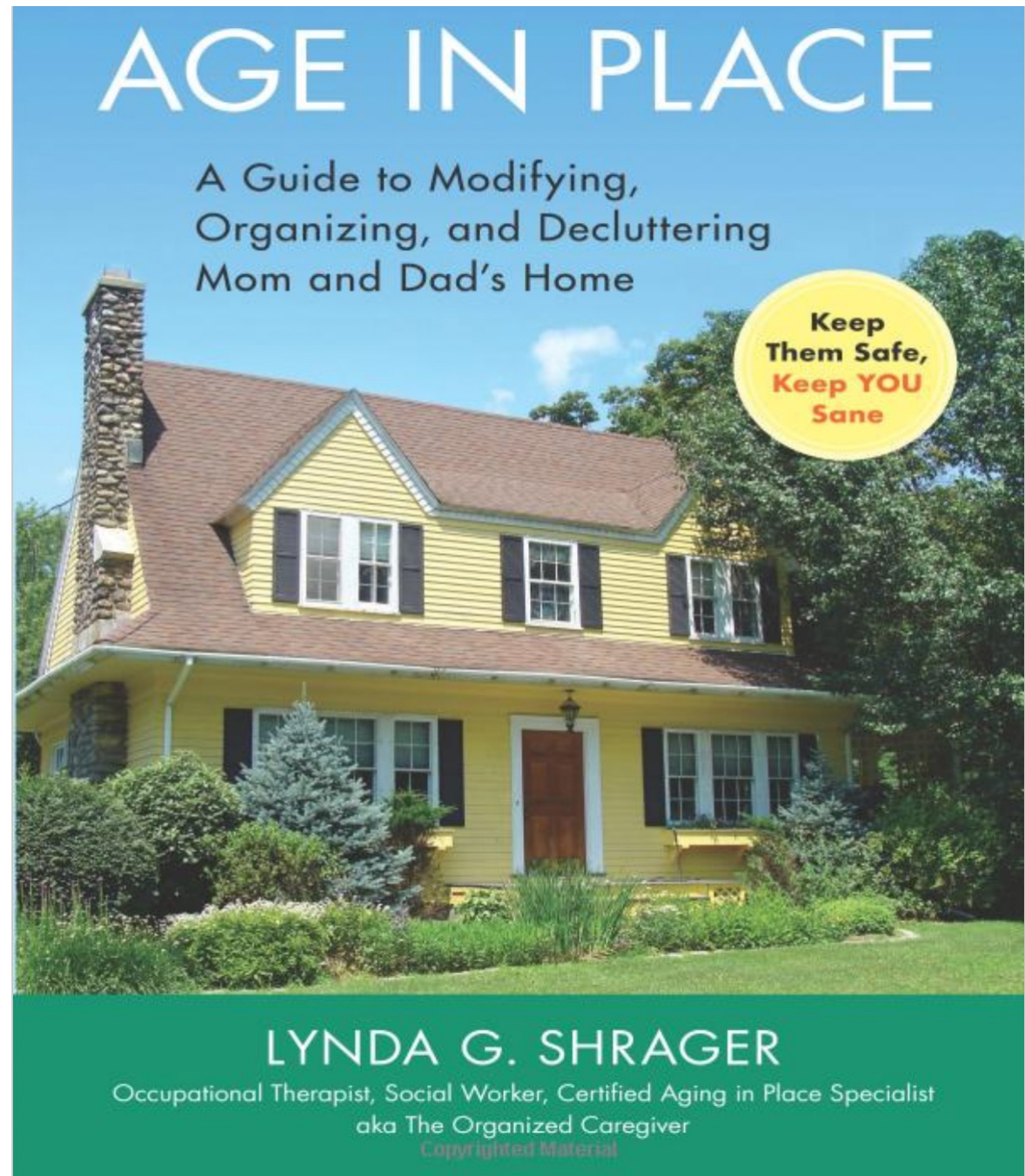
Sensory-Related AT Resources

- **Dept of Blind and Vision-Impaired**
 - <https://www.dbvi.virginia.gov/default.htm>
- **Dept for the Deaf and Hard of Hearing**
 - <https://www.vddhh.virginia.gov/>
- **Virginia Relay** (Communication Services)
 - <https://www.varelay.org/>

Smart Home Links & Resources

- **Virginia Senior Navigator:** <https://seniornavigator.org/>
- Online smart home resource list (Tom's Guide website):
 - <https://www.tomsguide.com/reference/smart-home-guide>
- **Aging in Place Guide** (National Institute on Aging website):
 - <https://www.nia.nih.gov/health/aging-place-growing-older-home>
- **Smart Homes Made Simple Self-Assessment Tool (PATF):**
 - <https://patf.us/smart-homes-made-simple-self-assessment-tool-508-compliant-pdf/>

Good
Book:



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