Sun City Summerlin Computer Club Seminar

Introduction to

Smart Home Technology

Tom Burt

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Where to Find the Materials

- **Sun City Summer Computer Club Website:**
  - https://www.scscc.club/smnr

- **Direct Hyperlink**
  - https://www.scscc.club/smnr/SmartHomeIntro2026.pdf

Agenda

- Introduction to “Smart Home”
  - What is a “Smart Home”
  - Why Do It?
- Interoperation Standards
- Available Smart Equipment
- Examples:
  - Heating and Cooling
  - Lighting
  - Sensing
  - Appliances
  - Cameras
  - Door Locks
- Operational Concerns
- Security Concerns

Introduction

- **What is a Smart Home?**
  - Many of your home's mechanical and electrical systems are set up with remote control and automation
  - Usually includes one or more master control units (smartphone, Alexa, your TV, others)
  - Connections to devices are often a mix of local home WiFi network, internet cloud, other protocols
- **Why Would You Want to Set Up a Smart Home**
  - Convenience – often just speak a command like "lights out" and it happens
  - Automation – can have things turn on or off on schedules or as a result of triggers
  - You and remote caregivers can receive status and send commands remotely when not at home
  - Can compensate for forgetfulness (Did I turn off the oven?, Are the doors locked? Is the garage closed?)
  - Can be a large help for seniors aging at home
- **Articles**
  - https://www.nytimes.com/wirecutter/reviews/smart-home-for-seniors/
  - https://getjubileetv.com/blogs/jubileetv/best-smart-devices-for-elderly
  - https://www.zdnet.com/home-and-office/smart-home/5-home-objects-appliances-to-automate/

Smart Home Interoperation Standards

- https://www.zdnet.com/home-and-office/smart-home/thread-vs-zigbee-vs-matter/
- https://lembergsolutions.com/blog/smart-home-protocols-explained
- **In 2026 the Matter 1.5 Protocol has become widely supported across major vendors**
  - Application-level protocol for communication between “Internet of Things” devices
  - Can be transmitted over Ethernet, WiFi or Thread physical protocols
  - Thread is a low-power, mesh, IP-based, wireless network protocol. It’s ideal for IOT, uses 2.4 MHz band and is claimed to be “self-healing”
  - Every device has an IP address and a name like “Kitchen lights”, “Oven”, “Front Door”, “Fridge”
  - Remote control devices and apps can discover each other
  - Apple, Google, Amazon, Samsung and others now support it
- **Zigbee – Widely-used standard for past 10 years**
  - Low-power mesh network – uses 2.4 MHz band
  - Billions of devices in use
  - Phillps, Hue, IKEA, Home Smart support it
  - Requires a dedicated Zigbee hub to bridge its signals to your smartphone or the internet
  - Some concerns about compatibility between vendors
- **Z-Wave – Older protocol, still around**
  - Largely replaced by Zigbee and Matter

Smart Home Common Devices

Many of these allow you to remotely turn a device on or off

- **LED light bulbs**
- **Wall plugs**
- **Light switches**
- **Sensors:**
  - **Smoke, CO2, water, electrical**
- **Motion detectors**
- **Thermostats**
- **Door Locks**
- **Televisions**
- **Doorbells & cameras – indoor / outdoor**
- **Speakers**

Smart Home Controllers / Hubs

- https://www.tomsguide.com/us/best-smart-home-hubs,review-3200.html
- **Aeotec V4**

  Wide compatibility with devices, protocols
- ***Amazon Echo (Alexa)***
  - *Various models with/without screens; also available as a smartphone app (requires Android 12)*
  - *Supports Matter, Zigbee*
  - *Voice Control for many devices*
- ***Apple HomePod (Siri)***
  - *Supports Matter, Zigbee*
  - *Voice Control for many devices*
- ***Google Nest Hub***
  - *Supports Matter, Zigbee*
  - *Voice Control for many devices*
- ***Several Other Brand-X devices***

Smart Lighting

- **Example: Linkind Matter smart, dimmable LED light bulbs**
  - Compatible with Alexa, Google Home, Apple Home, others
  - Fairly expensive (non-Matter versions cheaper)
  - Require a Matter - compatible home controller to act as a bridge to your WiFi router
- **For some lights (e.g. kitchen overhead lights) you will need a “smart” switch**
  - Install in place of regular manual switch
  - Once configured, you can turn those lights on/off remotely with a voice or phone command
- **May want to use a motion sensor to automatically turn the lights off or on when someone enters / leaves a room.**
  - This can be nice in bathrooms, closets, laundry room
  - Wiring can be tricky if the original switches are double or triple pole
  - Lots of helpful YouTube videos, but may be best to hire a pro
  - Can combine a motion sensor and a smart switch, both connected to a home controller

Smart Heating and Cooling

- Recent thermostats (e.g. Ecobee) connect to your WiFi network
  - Can be “programmed” from a web app or from a smart phone app
  - Automatically switch between heating and cooling based on temperatures ranges, time of day
  - Support “vacation” settings
- The Ecobee smartphone app can be used to remotely control any Ecobee device in your home, including your thermostat
- You can also connect your Ecobee thermostat to Alexa, Apple Home or Google Home for voice control
  - Can get status: (“Alexa, what’s the temperature?”)
  - Can give verbal commands: (“Alexa, raise the thermostat temperature by 2 degrees”)
  - Caution … Your Android version must be at least 12 to use the Alexa phone app
  - Not sure about iPhone requirements

Smart Sensing Devices

- https://www.nytimes.com/wirecutter/reviews/best-smart-home-sensors-for-alexa/
- **Most Sensors send alerts to your smart phone and / or home controller or hub**
  - These alerts can act as triggers that the home controller will respond to by taking some action
  - Example: Humidity in bedroom is low; turn on the humidifier via a smart plug.
- **Temperature & Humidity Sensors**
  - Measure temperature and humidity in area/room and report it
- **Motion (infra-red) or Presence (radar) Sensors**
  - Detect presence or absence of motion in a room
  - Often combined with a smart light switch or bulb
- **Electrical System Sensors**
  - Plug in to a wall outlet and can detect and report various kinds of wiring issues on that circuit
- **Door and Window Sensors**
  - Detect and report when a door or window is open
- **Water Sensors**
  - Detect and report presence of water – might use on garage or kitchen floor

Smart Cameras & Doorbells

- **Video doorbells and external cameras can increase security and convenience**
  - Many brands and quality levels
  - Generally, have a high-res camera, microphone and motion sensor that starts the camera recording
  - Most connect to a phone app, and many connect to a cloud server to save recorded video clips
  - You can usually use the phone app to view and talk to whomever is outside your front door
- **Indoor cameras are often used by remote caregivers to monitor activity in the home**
  - Some of the apps may support video conferencing between the person being monitored and the remote caregiver.
  - This is common when the family or friends are providing remote caregiving
  - Can be a sensitive issue because of privacy considerations
- **Indoor cameras also allow the residents to monitor what's going on in the house when they're away**
  - Useful for snowbirds or when on vacation
  - Can detect and record intruders

Smart Door Locks

- https://www.pcmag.com/lists/best-smart-locks
- **Smart door locks allow you to remotely control the deadbolt lock on an entry door.**
  - Most are battery powered
  - Many have a keypad to provide backup to an app on your phone or home controller
  - Some offer facial or fingerprint recognition option
  - Some include a video doorbell w camera
  - Most mount in existing door cutouts
  - Still important to have 3” screws holding face plate
- **Nice to have one on garage entry and one on front door – maybe also on security door.**

ULTRALOQ - $170 at Amazon

Smart Appliances

- **Vacuum Cleaners**
  - Controlled with a smart phone app
  - Have to “learn” the layout of the house
  - Need a recharging station and need to be emptied out
- **Coffee Makers**
  - Pretty self-contained; just set on/off timers
  - Still have to load the grounds or pucks
- **Robotic Housekeepers – Very Early Stages**
  - https://www.1x.tech/neo
  - Combines a humanoid robot with AI
  - Can converse with owner & understand commands
  - Similar robots already in use in factory automation
  - Potential to handle many housekeeping tasks, but need training
  - Have to “learn” the layout of the house
  - Price points around $20,000
  - China is farther along with deploying robotic workers

iRobot Roomba J7 - $155

Neo Home Robot - $20,000

Operational Concerns

- **Smart home configurations can be challenging to set up**
  - Need to configure each device and connect it to your home controller
  - Can be difficult to troubleshoot
  - If using WiFi for connections, can overload your router and, each device has to be set up with your WiFi password; better to have one or more hubs (Zigbee or Matter/Thread) that connect to your WiFi network.
  - Every device maker tends to have their own smartphone app – hard to manage without a home controller
  - Many devices – especially sensors and locks – are battery-powered; changing these batteries can get tedious
- **Smart home devices are often expensive**
  - Pays to shop around and look for major sales (Black Friday, Spring sale)
  - Zigbee devices from different vendors more likely to have compatibility issues.
  - If starting out, may want to favor matter/Thread devices – designed to be compatible (but they tend to be more expensive).
- **Some smart devices – especially switches – have to be wired into your home's electrical system.**
  - Call an electrician or capable handyman unless you're experienced with wiring

Security Concerns

- **Smart home devices very often need to connect to the cloud to function properly**
  - Potential for lots of information about the user to be acquired by the device's producer
  - What happens if your internet connection is down?
  - What happens to information captured by cameras and microphones – especially indoor?
- **Home controllers like Alexa have many powerful skills to allow them to act on the user's behalf**
  - Users need to be cautious about trusting AI agents to carry out actions involving financial accounts or shopping
  - (Hypothetical example) "Alexa, order me a half-gallon of 2% milk". Alexa may prompt for which store and what to do if it's out of stock. But Alexa may choose an expensive premium brand, rather than the house brand. Also, an order for just a half gallon of milk won't qualify for free delivery, so there's likely to be a $10 delivery charge added to the bill.

Final Q and A

Final Questions and Answers