Home Automation... ...Not as simple as you think

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by Steven Goodwin

@marquis de geek

www.MarquisdeGeek.com

www.MinervaHome.net



ADress





What is Home Automation?

• Home Automation is anything that your home does for you automatically to make living there more enjoyable or productive. It covers many areas, including remote and timed control of lights and electrical home appliances, distributed media services, and communication.

Appliance Control

• One of the most impressive features of an automated smart home is the ability of a computer to control your lights or to operate the power socket attached to the kettle. Naturally, this requires the addition of hardware such as X10, LightwaveRF, or wemo.



Emailing your light switch

• Write a procmail recipe:

:0 * ^From: steev.* * ^Subject: light |~steev/lightcontrol \$SUBJECT

• Write the control script:

homedevice default on bedroom2

But...

- How is the email authenticated?
- Is the user allowed to issue this command?
- How do we support devices from difference manufacturers?

More importantly...

- What if the message is 'off?
- When does local control override?
- Consider the time line:
 - 1. Human turns light on
 - 2. Machine turns light on
 - 3. Machine turns light off
 - 4. Should the light be on or off?

Then consider...

• ...which human?

Appliance Control – See also...

- Hue
- Lifx
- Insteon
- Etc...



Media Playback

- Play music (in any given room)
- Changing the volume
 - When the doorbell rings
 - When there's incoming VoIP calls
 - When the computer needs to make announcements
 - When requested by a user

Volume Change

\$volume = get_volume()
change \$volume in some way
set volume(\$volume)

Implementation

- Taken from /dev/mixer it caps at 0 to 100
 - Volume + up + down != volume
 - 95 => 100 => 90
- Taken from /var/log/mymixer we can have
 Volume + up + up + up = turned_up_to_11



• Is volume+1 identical when volume==80 and volume==10?



sub get_delta { my (\$volume) = (@_);

return 1 if \$volume > 95; return 2 if \$volume > 90; return 4 if \$volume > 80; return 8 if \$volume > 85; # etc



• Does volume up == volume down?

No!

- What's the context for turning it *down*?
 - The track is too loud, compared to the last
 - The track has a loud bit in the middle
 - There's an advert in the middle
 - Trying to hear if the door bell went
- What's the context for turning it *up*?
 - You like this song more
 - Trying to hide the noise from the washing machine
 - The reverse of one of the previous 'turn it down'?

Picking a random song

• Plan A

- Pick a random directory
- If there are more sub-directories, repeat
- Else, pick a random song

• Plan B

- If there are both songs and sub-directories. Choose 1
- Continue as A

• Plan C

- Enumerate all songs, in all directories
- Pick one

- A : Bias towards sub-directories, usually album tracks in 'Z'
- B : Bias for minor tracks amongst albums
- C : Bias towards artists with lots of songs

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 - Consider the distribution of artists-vs-letters

Ignore song

- Based on...
 - The user?
 - The location?
 - The time of day?
 - The time of year?
 - The situation?

The other half...

- Motion sensors don't distinguish between users
- Using bluetooth to detect users
- Handling the ignore list (AND or OR the results)

Conclusions

- There are no rules
- Context-sensitive is only the first step
- The 'configuration calibration'

Any Questions?

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FOSDEM Scorecard:

Attended: 17 Diaries written:15 Talks given: 11 (on 9 different topics)

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