

Spatial Navigation in the Web

@[Breakout session](#), [TPAC 2017](#)

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LG Electronics

Smart TV has the great screen, but..

Modern TVs are so full of gimmicks, at the expense of being **great screens**. I know they won't, but I wish Apple would make a TV.

🌐 영어 번역하기

<https://twitter.com/jaffathecake/status/907522184222048256>

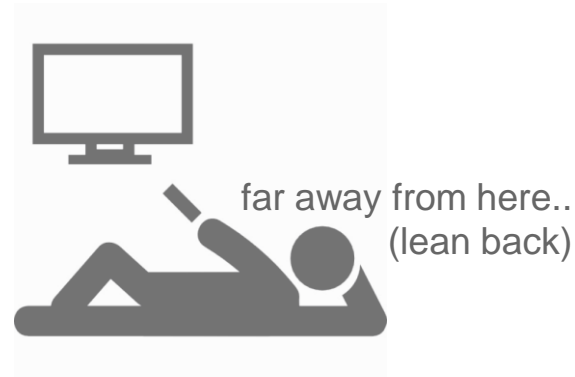
오후 5:32 - 2017년 9월 12일



LG webOS TV want to use the full potential of the web
in terms of user experience

Problem on Input Device

- **Mobile** has touch interface..
- **Desktop** has keyboard+mouse interface..
- **TV** has remote controller interface, but..



How LG webOS TV remote controller works

Intuitive Control is at Hand

With LG Magic Remotes, you can control your entertainment by simply clicking, scrolling or by using the unique LG Voice Mate™ speech recognition technology.*



How to Use LG Smart TV Magic Remote (1m 20s)

<https://www.youtube.com/watch?v=uoxYO9DslkA>

Problem on Input Device

- Difficult to use the TV remote controller for web applications
- One of the issues: unintended pointer moving while pressing buttons



Pointing



Wheel

✓ Remote control by mobile



Universal Control



Gesture



Voice

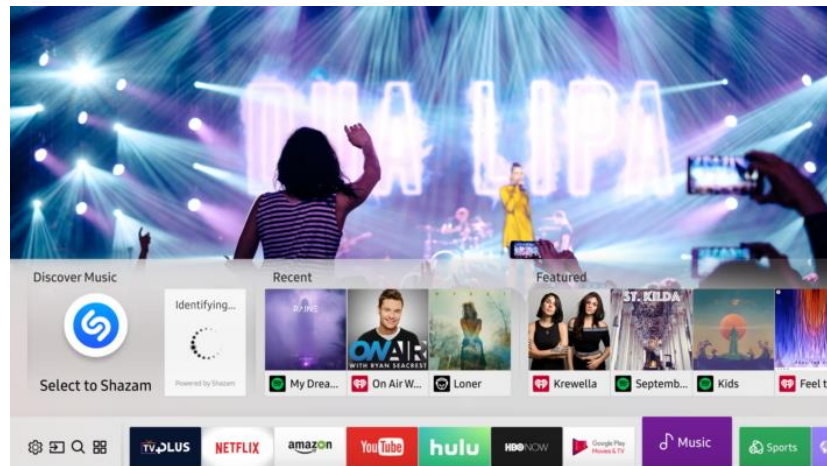
* 5-way keys (arrow keys + OK key)

Consideration of TV Platforms (1/3)

Vewd (Opera TV)



Tizen TV



Tweaking Spatial Navigation for TV Browsing

<https://developer.vewd.com/display/OTV/Tweaking+Spatial+Navigation+for+TV+Browsing>

Consideration of TV Platforms (2/3)

LG webOS TV



Spotlight library for Snav

<https://github.com/enyojs/spotlight>

Firefox OS TV



Interacting with TV remote controls

https://developer.mozilla.org/en-US/docs/Mozilla/Firefox_OS_for_TV/Interacting_with_TV_remote_controls

Consideration of TV Platforms (3/3)

Android TV



Modifying directional navigation

<https://developer.android.com/training/tv/start/navigation.html>

Apple TV

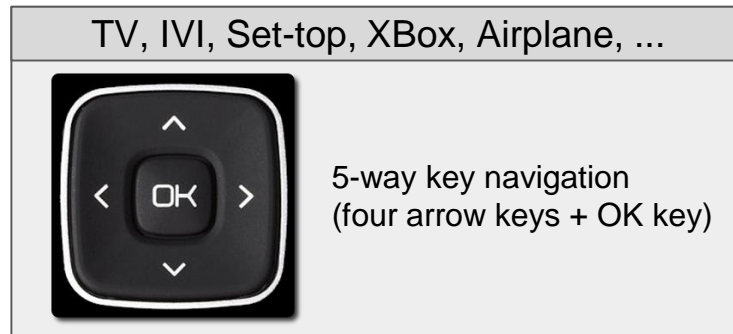
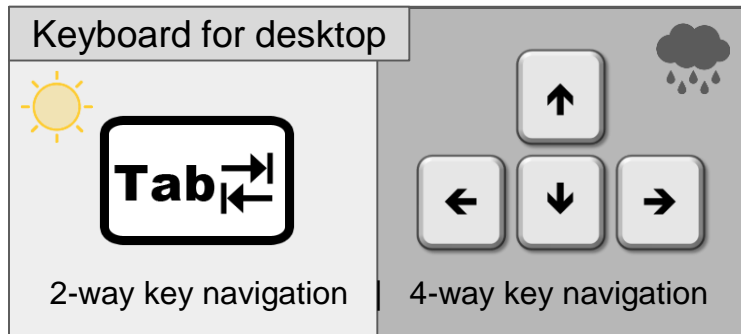


Deciding Where to Move Focus

https://developer.apple.com/library/content/documentation/General/Conceptual/AppleTV_PG/WorkingwiththeAppleTVRemote.html

Not only for TV, but also other target devices






- Target devices
 - **Desktop** using keyboard for Accessibility ★
 - **TV/Set-top** using a remote controller
 - **IVI** using jog shuttle with 4-way directional key
 - **Game console** using game pad (XBox/PS4)



Hope to see that Web will embrace the spatial navigation!

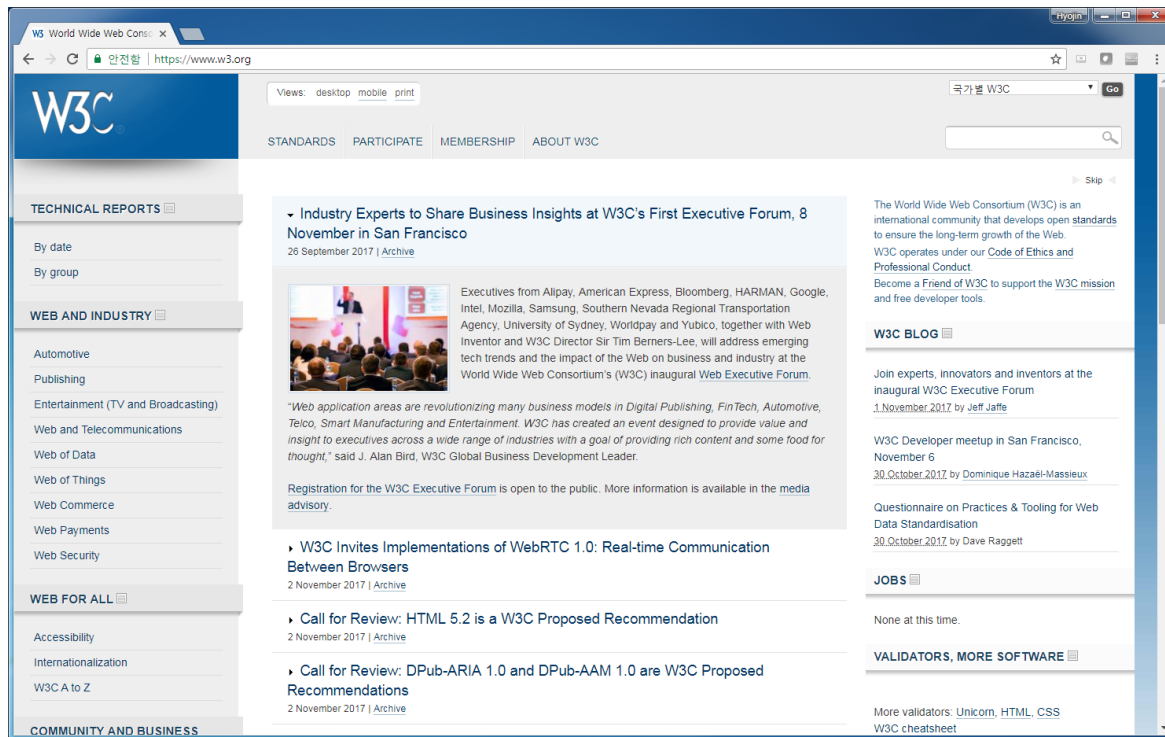
Default behaviors of arrow keys in the Web (1/3)

- Moving cursor, slider bar and selected item in **Input element**

Product Name *	<input type="text" value="Chang"/>
Supplier Company Name	<input type="text" value="Exotic Liquids"/>  
Category Name	<input type="text" value="Beverages"/>  
Quantity Per Unit	<input type="text" value="24 - 12 oz bottles"/>
Unit Price	<input type="text" value="\$19.00"/>
Units In Stock	<input type="text" value="17"/>
Units On Order	<input type="text" value="40"/>
Reorder Level	<input type="range" value="45"/>
Discontinued *	<input type="text" value="No"/> 

Default behaviors of arrow keys in the Web (2/3)

- Scrolling



Default behaviors of arrow keys in the Web (3/3)

- Moving focus (which should be enable the spatial navigation mode)



Spatial Navigation in Chrome

- Spatial Navigation allows users to move the focus using arrow keys (4-way).
- Spatial Navigation is already embedded in Blink (originated from WebKit).
- You can enable the feature with a flag option: --enable-spatial-navigation

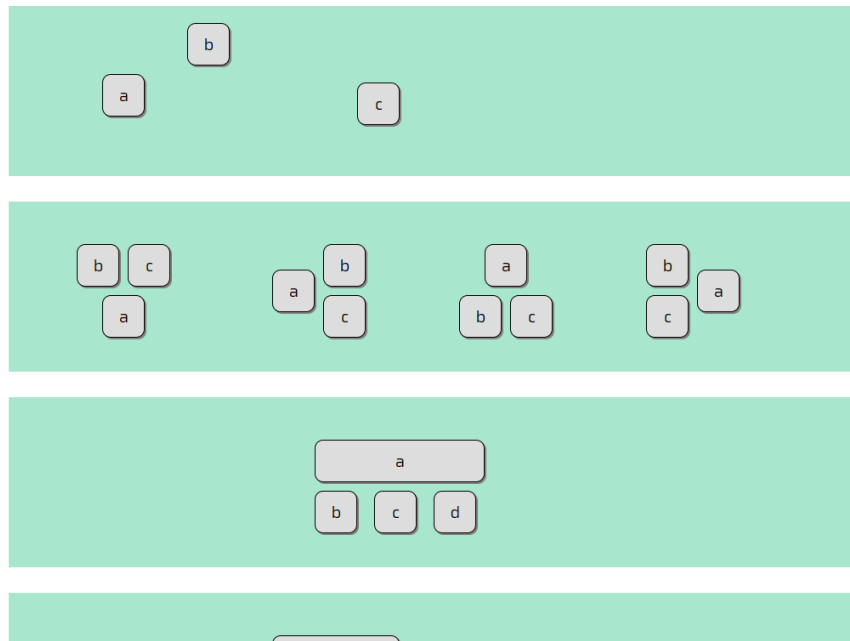
```
chrome --enable-spatial-navigation
```

Demo



Heuristic Spatial Navigation Test Cases

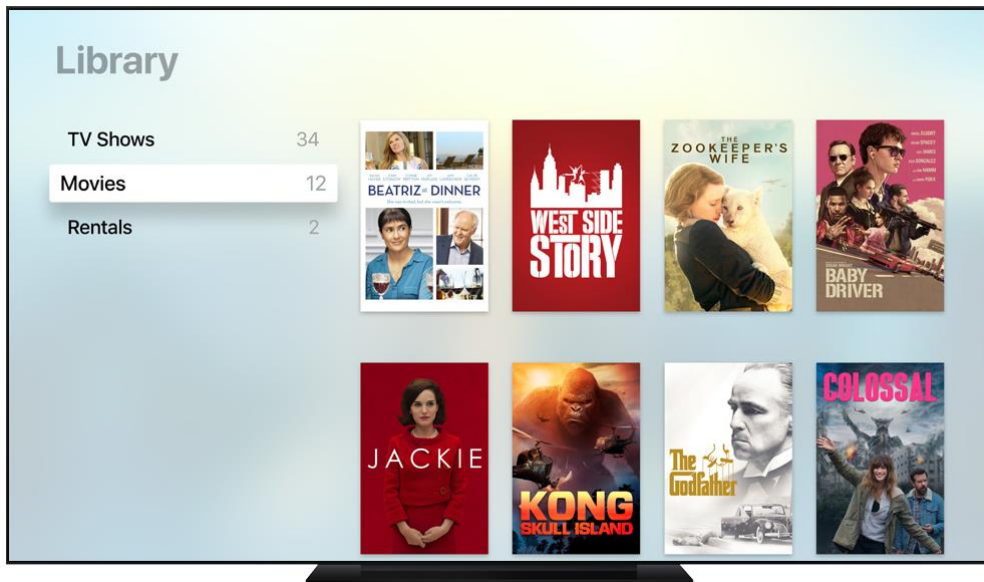
Heuristic Spatial Navigation Test Cases



Demo: https://lgeweb.github.io/spatial-navigation/demo/heuristic/heuristic_testcases.html

What are developers really want?

- Groups of contents based on their functions or behaviors (e.g., title, menu, list, etc.).
- List with a long scroll



Apple TV

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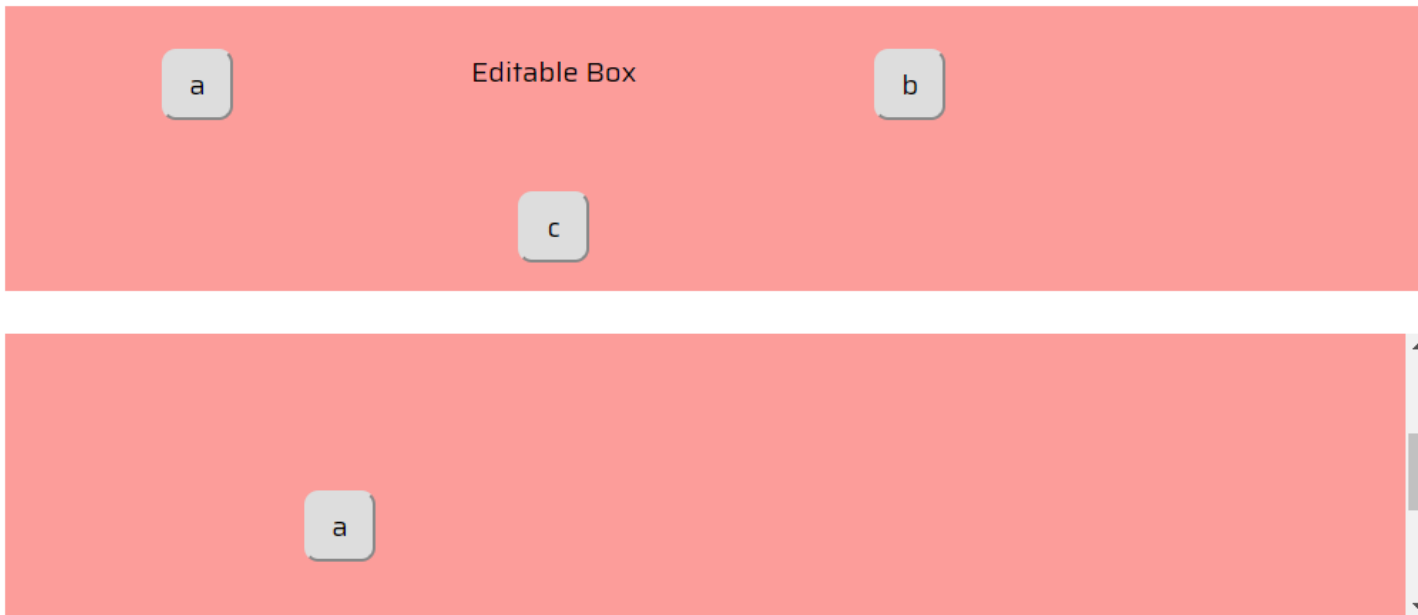
LG webOS TV

How to improve the spatial navigation

- Combine with the original behaviors of the arrow keys (scrolling, moving the cursor on the editable elements)
- Customize the focus navigation algorithm

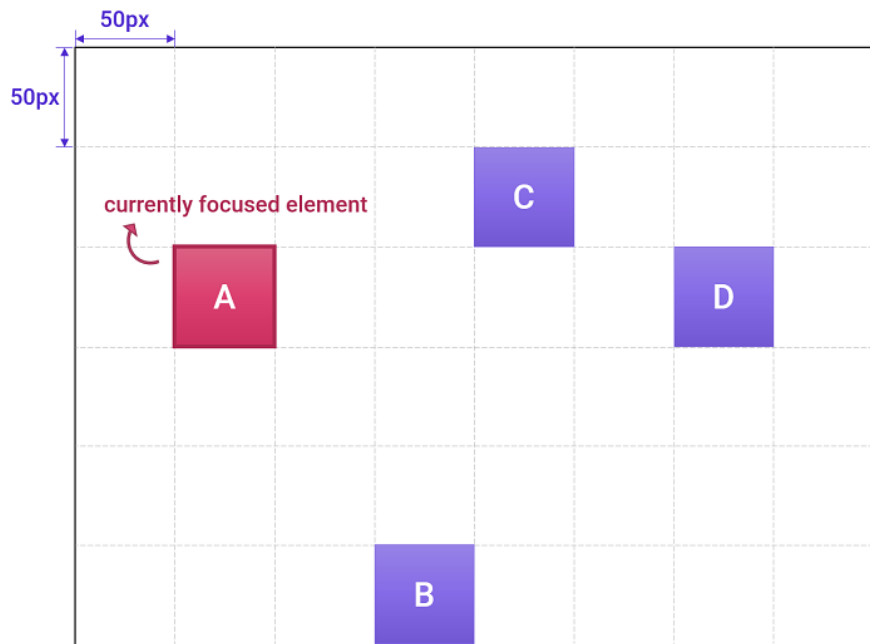
Combine with the original behaviors of the arrow keys

- Define the priority order of the arrow keys' behavior



Customize the focus navigation algorithm

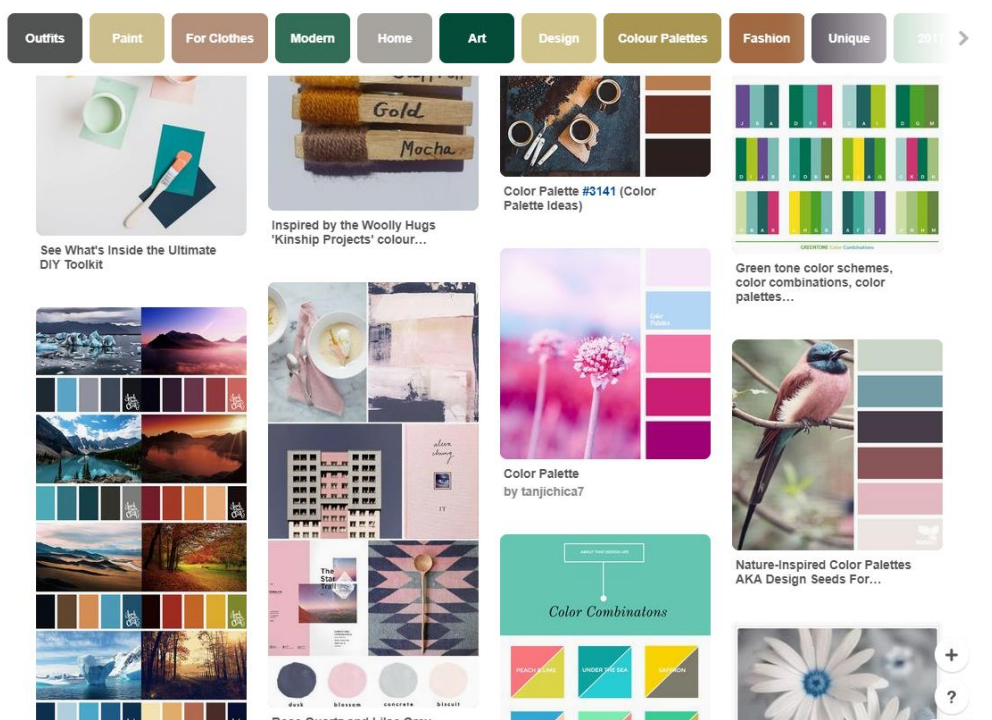
- Navigation Rules



- projection: the focus moves to D.
- direction: the focus moves to B.
- nearest: the focus moves to C.

Customize the focus navigation algorithm

- Focus looping



Remaining Issues

- How to enable the spatial navigation feature?
 - <https://github.com/lgeweb/spatial-navigation/issues/3>
 - <https://github.com/lgeweb/spatial-navigation/issues/5>
- How to trigger the spatial navigation rule?
 - <https://github.com/lgeweb/spatial-navigation/issues/2>
 - <https://github.com/lgeweb/spatial-navigation/issues/6>
 - <https://github.com/lgeweb/spatial-navigation/issues/7>
- One-side axis considered nav-loop
 - <https://github.com/lgeweb/spatial-navigation/issues/1>
 - <https://github.com/lgeweb/spatial-navigation/issues/4>