



Jesuschrist Followers

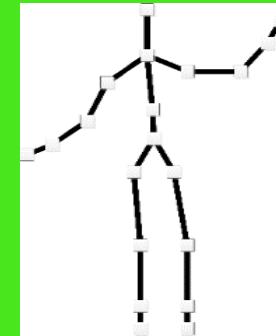
# Natural User Interaction

Reaching Digital Inclusion in Healthcare and Education ICT services

## SEIF 2013

- Experimental Research
- NUI Design

NUI Research



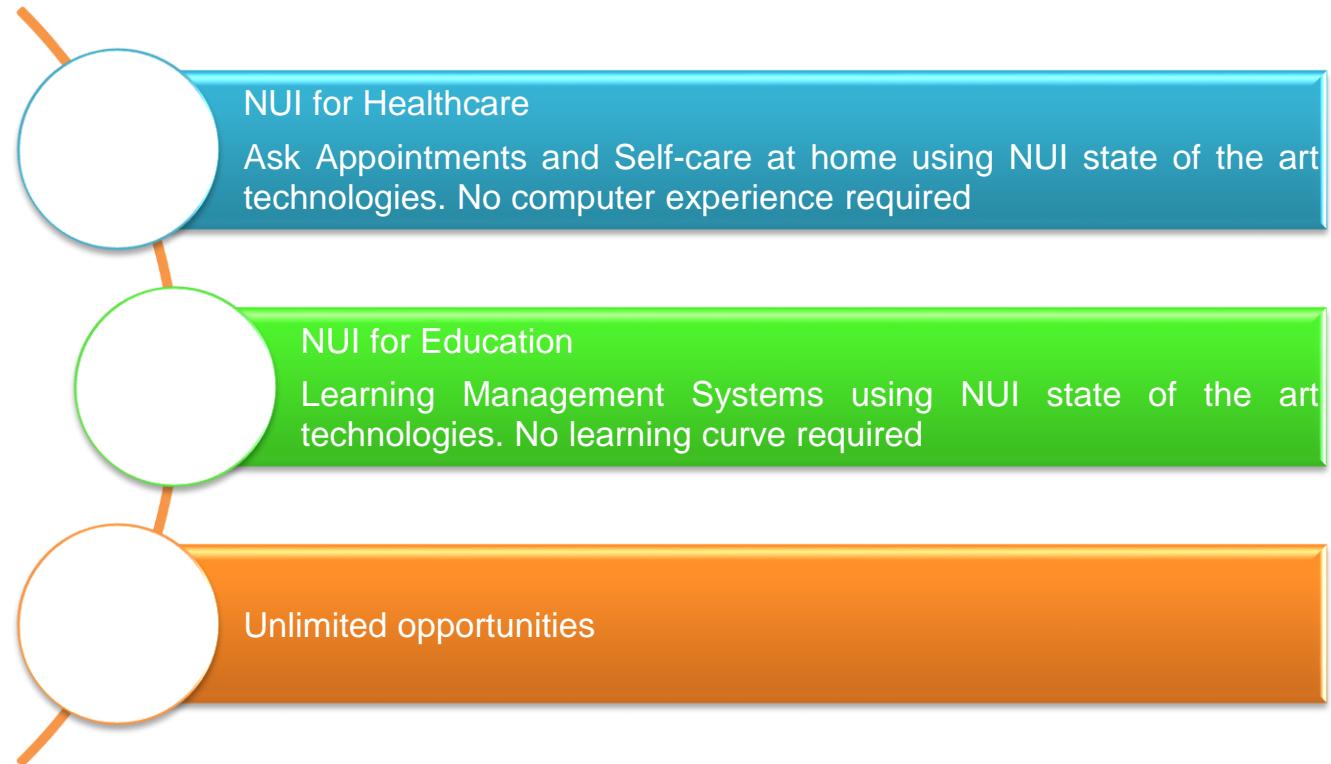
Edwin Duque

Ana Vasquez

Medellín, Colombia

# Motivations

- The spread use of ICT in government, healthcare, education and basic citizen needs.
- Many software consider accessibility for disability users, but no low literacy accessibility.
- Above items, are bringing “technological discrimination”.
- Adult persons (> 40 years old) , often have digital low literacy (developing countries is common), often called digital immigrants.
- Urban vs. Rural areas, literacy.

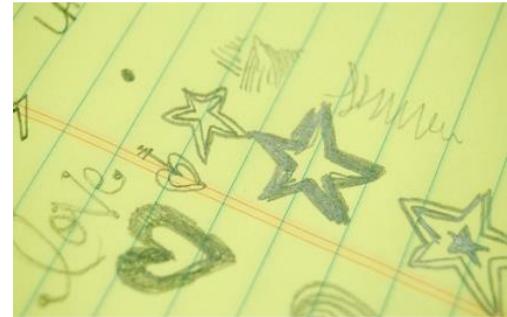
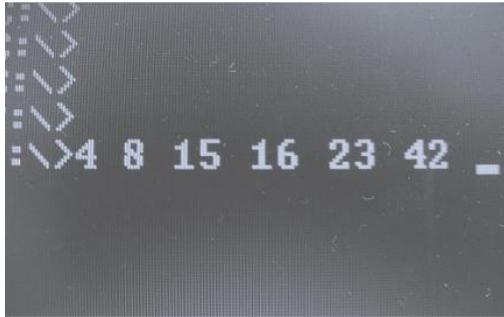


“I don’t want to make the most efficient use of the computer;  
I want to make the most efficient use of the human.  
How do you optimize the human user?”

Bill Buxton



# Input Ecology



## Keyboard

Good for Accuracy

Con Limited



## Mouse

Good for Moving across the screen efficiently

Con Indirect



## Stylus

Good for Freeform input

Con Low accuracy  
Need large controls



## Single point

Good for Direct object selection

Con Not for quick input  
Low accuracy  
Need of large controls  
Mis-hits from fingernails of perceived hit area



## Multi point

Good for Manipulating objects  
Social

Con Not for input  
Low accuracy  
Need large controls  
Support of hands and screen



**Essentially, what is "natural" depends on what is already familiar to the user and what is also appropriate at the moment the user is interacting with the system**

**Appropriate User Interface**

**Bill Buxton**

# Interface Iterations



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  - ▷ **Summer Tomato**
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-  [Cook the Book: Vegetable Terrine](#) Thursday, Sept. 15, 2011
-  [Would you hire this man?](#) Thursday, Sept. 15, 2011
-  [Washington D.C.: 10 Favorite Bites at Eastern Market](#) Wednesday, Sept. 14, 2011
-  **Poll: Thick or Thin, what's your crust choice?** Wednesday, Sept. 14, 2011
-  [How to brew your own Munich Helles for Oktoberfest](#) Wednesday, Sept. 14, 2011
-  [A sandwich a day: egg and chorizo torta from Tortas](#) Wednesday, Sept. 14, 2011
-  [I spent the summer of my 17th year scooping gelato](#) Monday, Sept. 12, 2011
-  [Cereal eats: Are mini box variety packs a blessing or a curse?](#) Monday, Sept. 12, 2011
-  [Cook the book: 'Home Made'](#) Monday, Sept. 12, 2011
-  [Served: Leaving restaurants for groceries](#) Monday, Sept. 12, 2011
-  [Snapshots from Ecuador: Making chicha at the edge of the Amazon](#) Monday, Sept. 12, 2011
-  [Drink this now: Fernet](#) Monday, Sept. 12, 2011

**Poll: Thick or Thin, what's your crust choice?**<http://slice.thedailymeal.com/feeds/iBag?m=926>

Thick and doughy like the grandma slice on the left or thin like this NY-style on the right?

[Photograph: Aaron Mattis]

It's been natural disaster week on the East Coast, and nothing makes you ask yourself the big questions like the threat of destruction. This week's question is, if you were limited to one kind of crust for the rest of your life, would you opt for only thick and doughy crusts like [Sicilians](#), grandma, pan, deep dish, and Greek, or would life be unbearable without thin and crispy pies like NY-style, New Haven, bar pies and Neapolitan?

If you could only eat thick or thin crust for all of eternity, which would you choose?



Add feeds ▾

## Feeds

Refresh

Details View

List View

## Feeds

- ▷ Featured
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## Headline

		Date
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# Headlines

## The Pioneer Woman



A Sandwich a Day: Egg and Chorizo Torta from Tortas



Snapshot from Ecuador: Making Chicha at the Edge of the Amazon



Would You Hire This Man?



How to brew your own Munich Helles for Oktoberfest

## Closet Cooking



Pasta with Whiskey, Wine, and Mushrooms



Chipotle Steak Salad



Spicy Beans



In the meantime

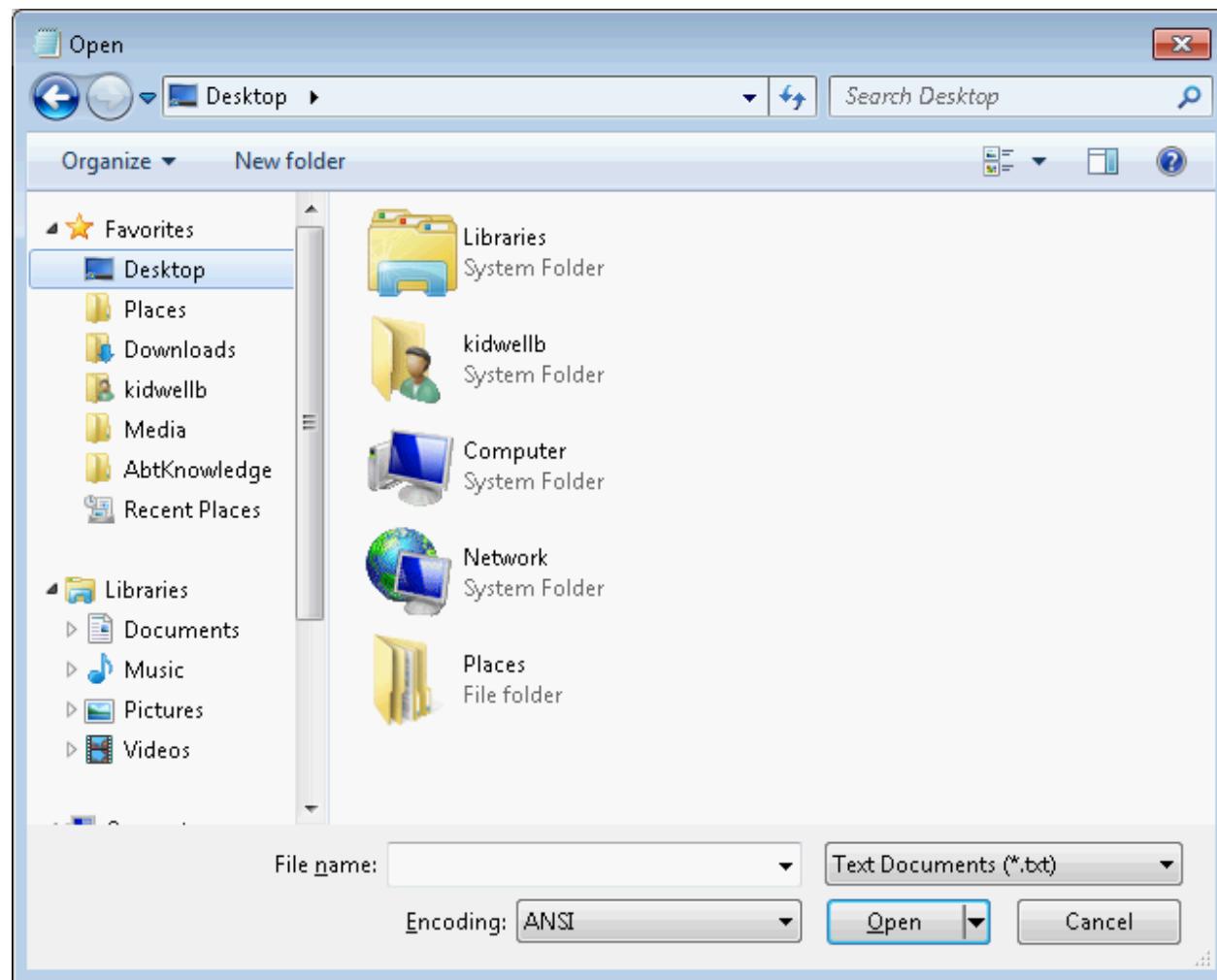
## Just Bent

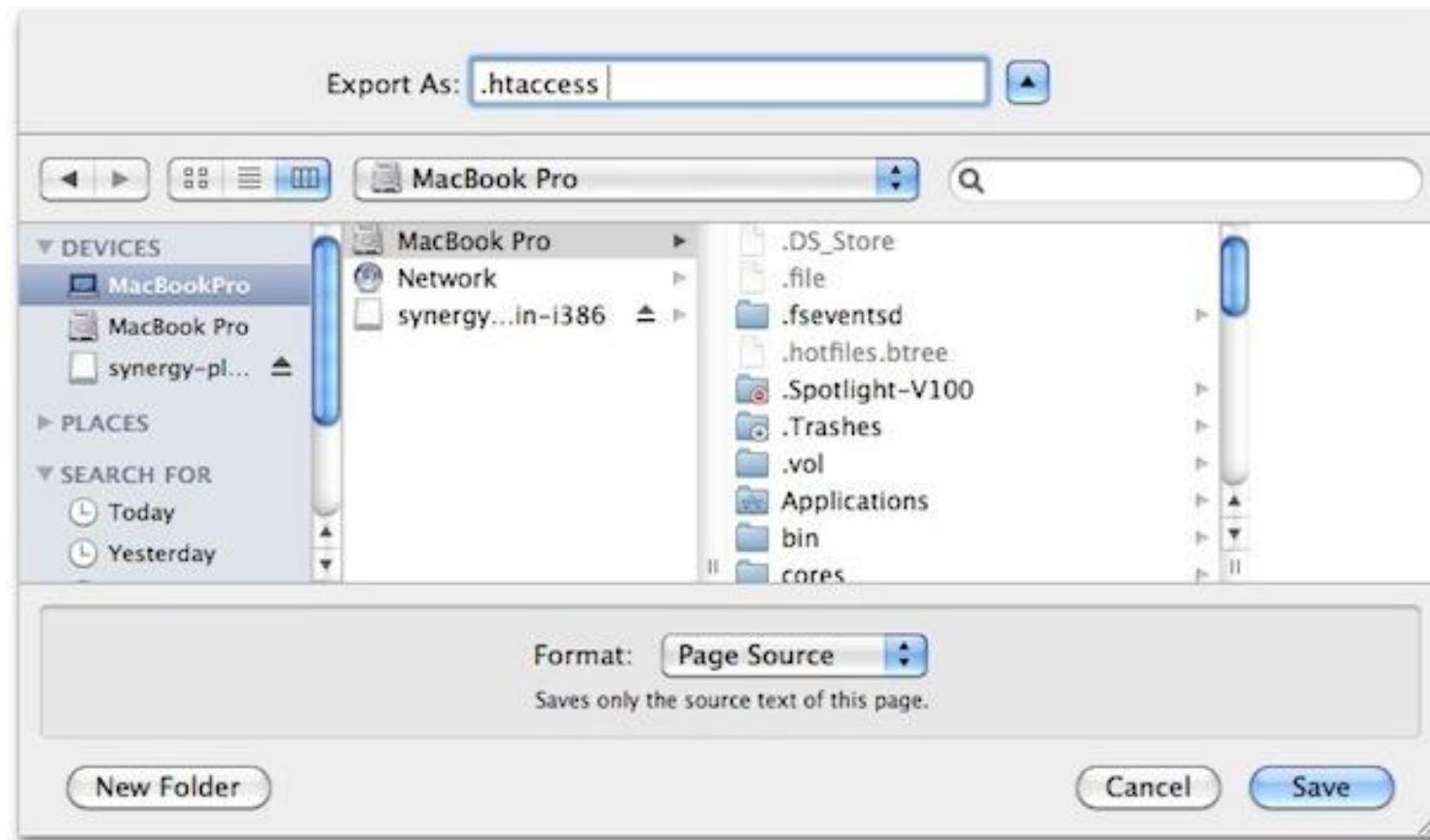


Caffe Press Higher Cust

Gilt City 3,300 America Package

Gilt City deals on reser

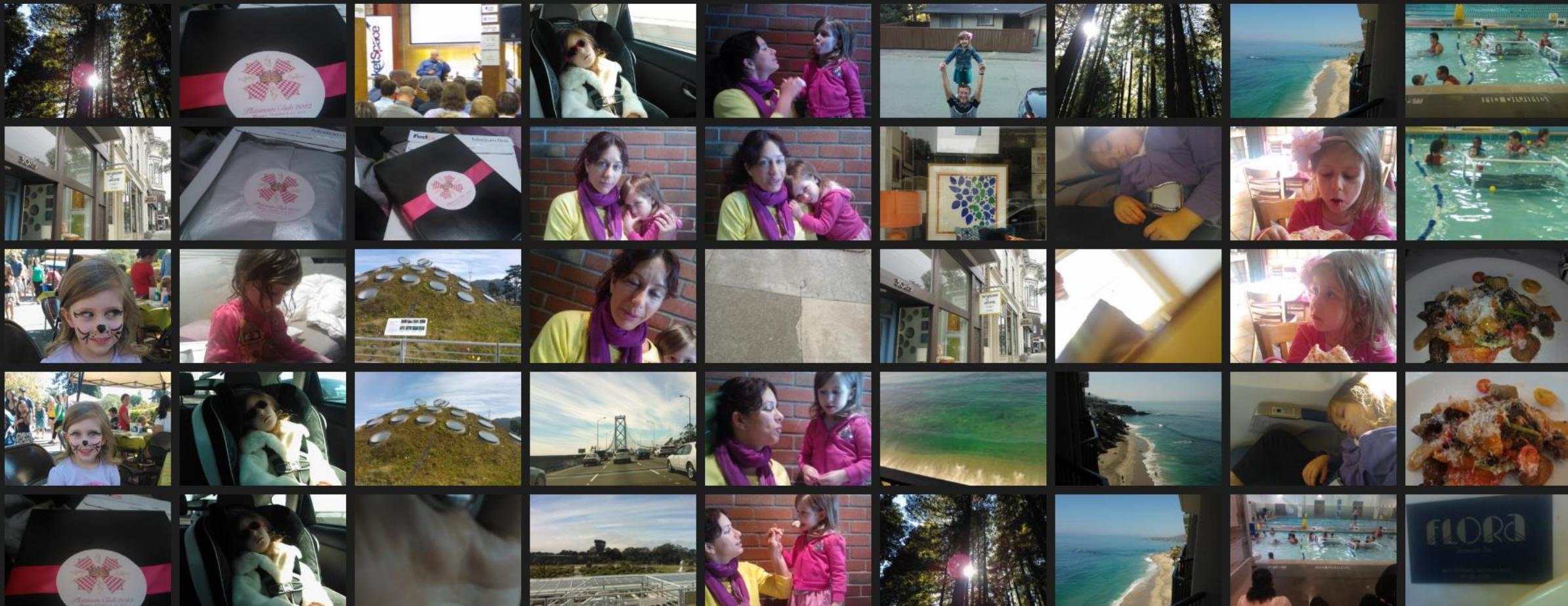




# Files

Camera roll

Go up Sort by date



Choose picture

Cancel

**NUI**-based technologies such as speech, touch, contextual and environmental awareness, immersive 3D experiences, Multi - Channel and anticipatory computing -- all with the goal of a computer that can see, listen, learn, talk and act smartly on our behalf.

Steve Ballmer.



# Inside a Kinect Sensor



- The Kinect contains two cameras, an infra-red projector and four microphones.
- Software can use video, sound and gesture recognition driven interactions.

1 <b>H</b> Hydrogen 1.01
3 <b>Li</b> Lithium 6.94
4 <b>Be</b> Beryllium 9.01

11 <b>Na</b> Sodium 22.99
12 <b>Mg</b> Magnesium 24.31

19 <b>K</b> Potassium 39.10
20 <b>Ca</b> Calcium 40.08

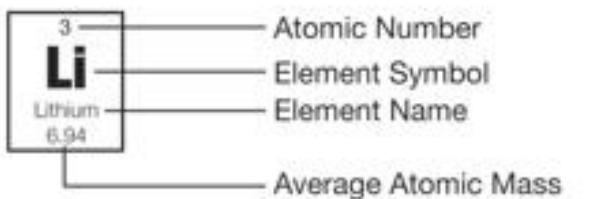
37 <b>Rb</b> Rubidium 85.47
38 <b>Sr</b> Strontium 87.62

55 <b>Cs</b> Cesium 132.91
56 <b>Ba</b> Barium 137.33

87 <b>Fr</b> Francium (223)
88 <b>Ra</b> Radium (226)

89 <b>Ac</b> Actinium (227)
104 <b>Rf</b> Rutherfordium 178.49

# The Periodic Table of the Elements



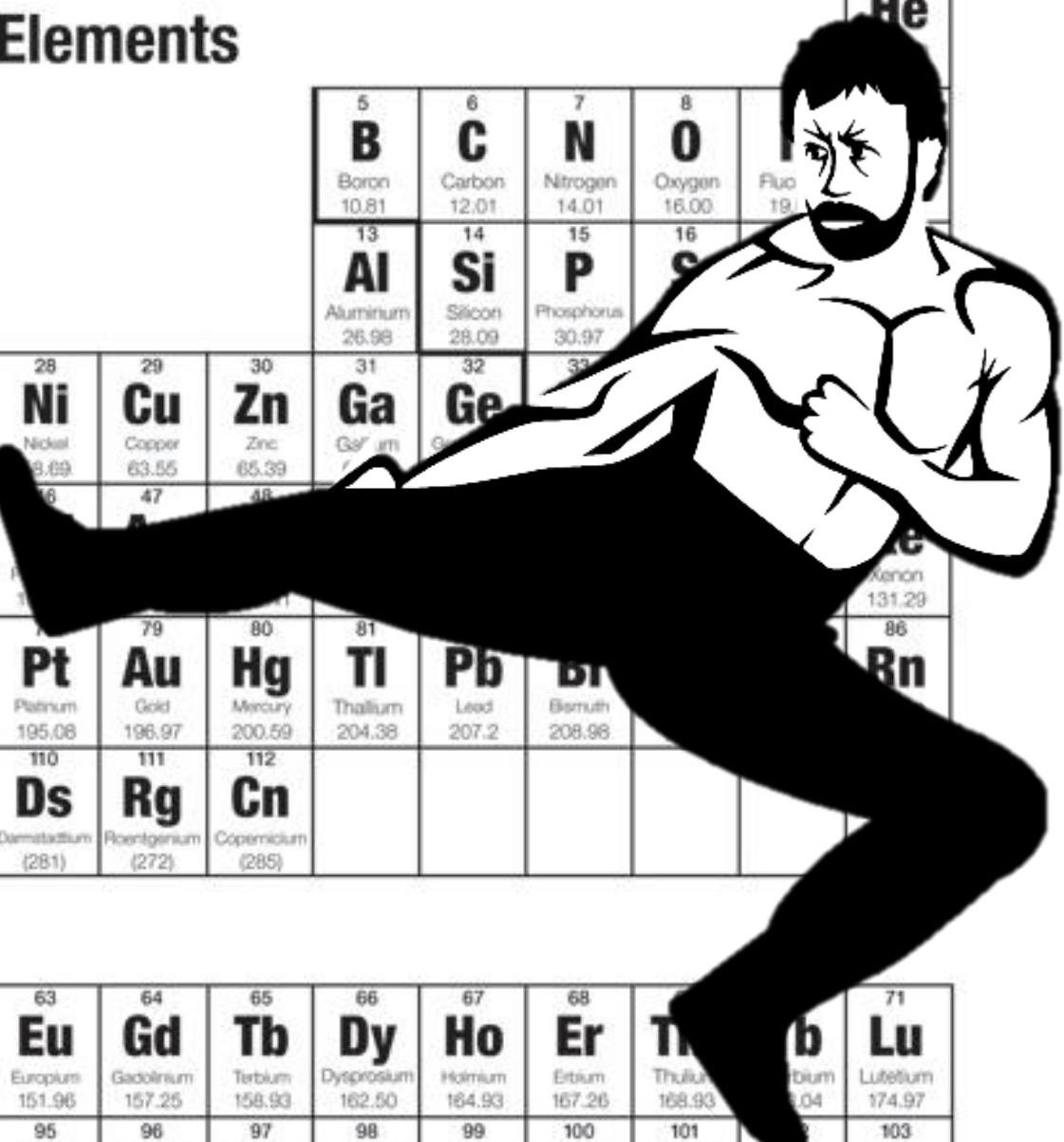
5 <b>B</b> Boron 10.81
6 <b>C</b> Carbon 12.01
7 <b>N</b> Nitrogen 14.01
8 <b>O</b> Oxygen 16.00
13 <b>Al</b> Aluminium 26.98
14 <b>Si</b> Silicon 28.09
15 <b>P</b> Phosphorus 30.97
31 <b>Ga</b> Gallium 69.72
32 <b>Ge</b> Germanium 72.63
33 <b>As</b> Arsenic 74.94
34 <b>Se</b> Selenium 78.96
35 <b>Br</b> Bromine 80.00
36 <b>Kr</b> Krypton 83.80
37 <b>Xe</b> Xenon 131.29

56 <b>Ba</b> Barium 137.33
57 <b>La</b> Lanthanum 138.91
72 <b>Hf</b> Hafnium 178.49
73 <b>Ta</b> Tantalum 180.95
74 <b>W</b> Tungsten 183.84
75 <b>Re</b> Rhenium 186.21
76 <b>Os</b> Osmium 190.23
77 <b>Ir</b> Iridium 192.22
78 <b>Pt</b> Platinum 195.08
79 <b>Au</b> Gold 196.97
80 <b>Hg</b> Mercury 200.59
81 <b>Tl</b> Thallium 204.38
82 <b>Pb</b> Lead 207.2
83 <b>Bi</b> Bismuth 208.98
86 <b>Rn</b> Rn

87 <b>Fr</b> Francium (223)
88 <b>Ra</b> Radium (226)
89 <b>Ac</b> Actinium (227)
104 <b>Rf</b> Rutherfordium 178.49
105 <b>Db</b> Dubnium (262)
106 <b>Sg</b> Seaborgium (266)
107 <b>Bh</b> Bohrium (264)
108 <b>Hs</b> Hassium (269)
109 <b>Mt</b> Meitnerium (268)
110 <b>Ds</b> Darmstadtium (281)
111 <b>Rg</b> Roentgenium (272)
112 <b>Cn</b> Copernicium (285)

58 <b>Ce</b> Cerium 140.12
59 <b>Pr</b> Praseodymium 140.91
60 <b>Nd</b> Neodymium 144.24
61 <b>Pm</b> Promethium (145)
62 <b>Sm</b> Samarium 150.36
63 <b>Eu</b> Europium 151.96
64 <b>Gd</b> Gadolinium 157.25
65 <b>Tb</b> Terbium 158.93
66 <b>Dy</b> Dysprosium 162.50
67 <b>Ho</b> Holmium 164.93
68 <b>Er</b> Erbium 167.26
69 <b>Tm</b> Thulium 168.93
70 <b>Yb</b> Ytterbium 170.04
71 <b>Lu</b> Lutetium 174.97

90 <b>Th</b> Thorium 232.04
91 <b>Pa</b> Protactinium 231.04
92 <b>U</b> Uranium 238.03
93 <b>Np</b> Neptunium (237)
94 <b>Pu</b> Plutonium (244)
95 <b>Am</b> Americium (243)
96 <b>Cm</b> Curium (247)
97 <b>Bk</b> Berkelium (247)
98 <b>Cf</b> Californium (251)
99 <b>Es</b> Einsteinium (252)
100 <b>Fm</b> Fermium (257)
101 <b>Md</b> Mendelevium (258)
102 <b>No</b> Nobelium (259)
103 <b>Lr</b> Lawrencium (262)



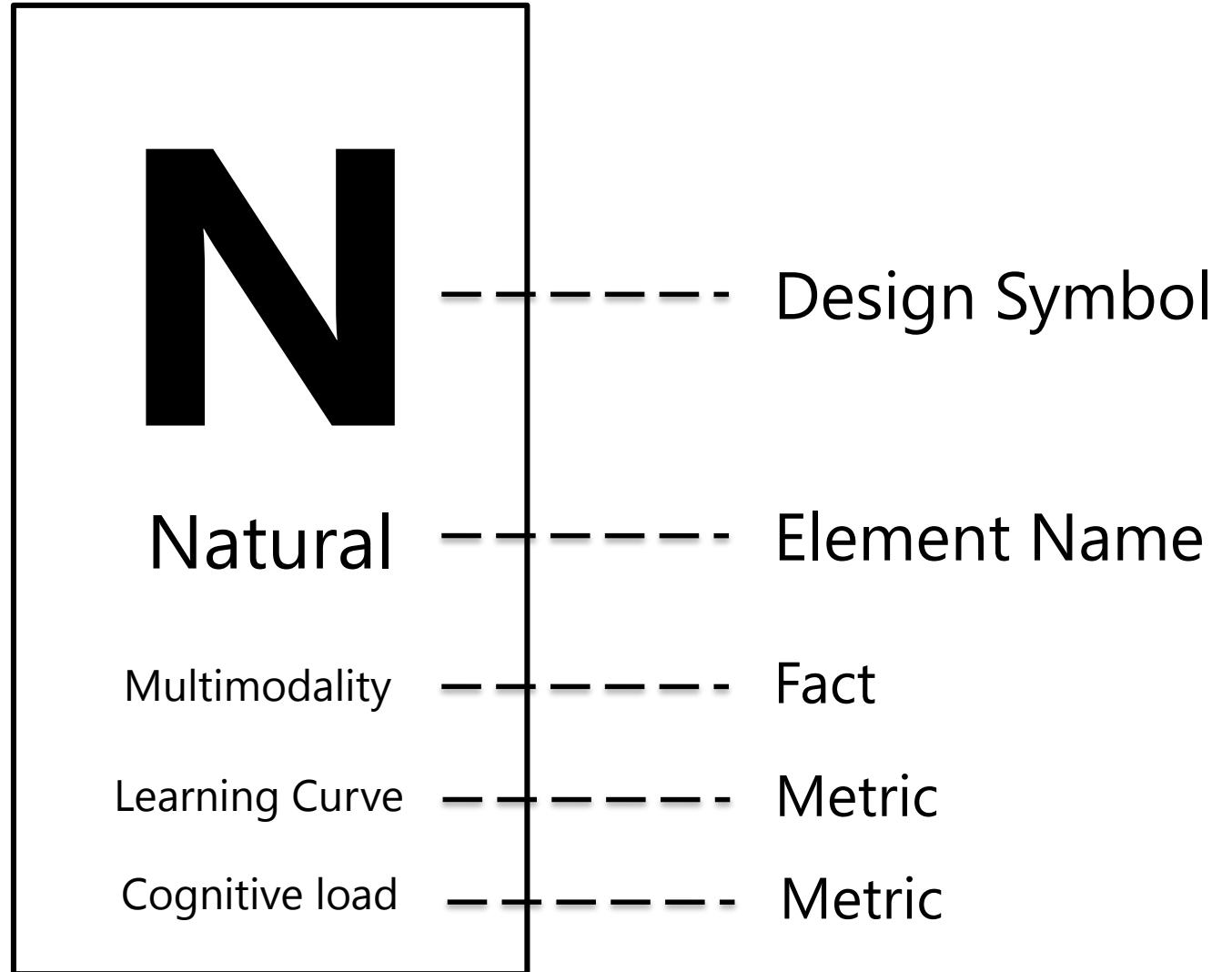
We should  
ignore  
THE PERIODIC TABLE...

for a moment

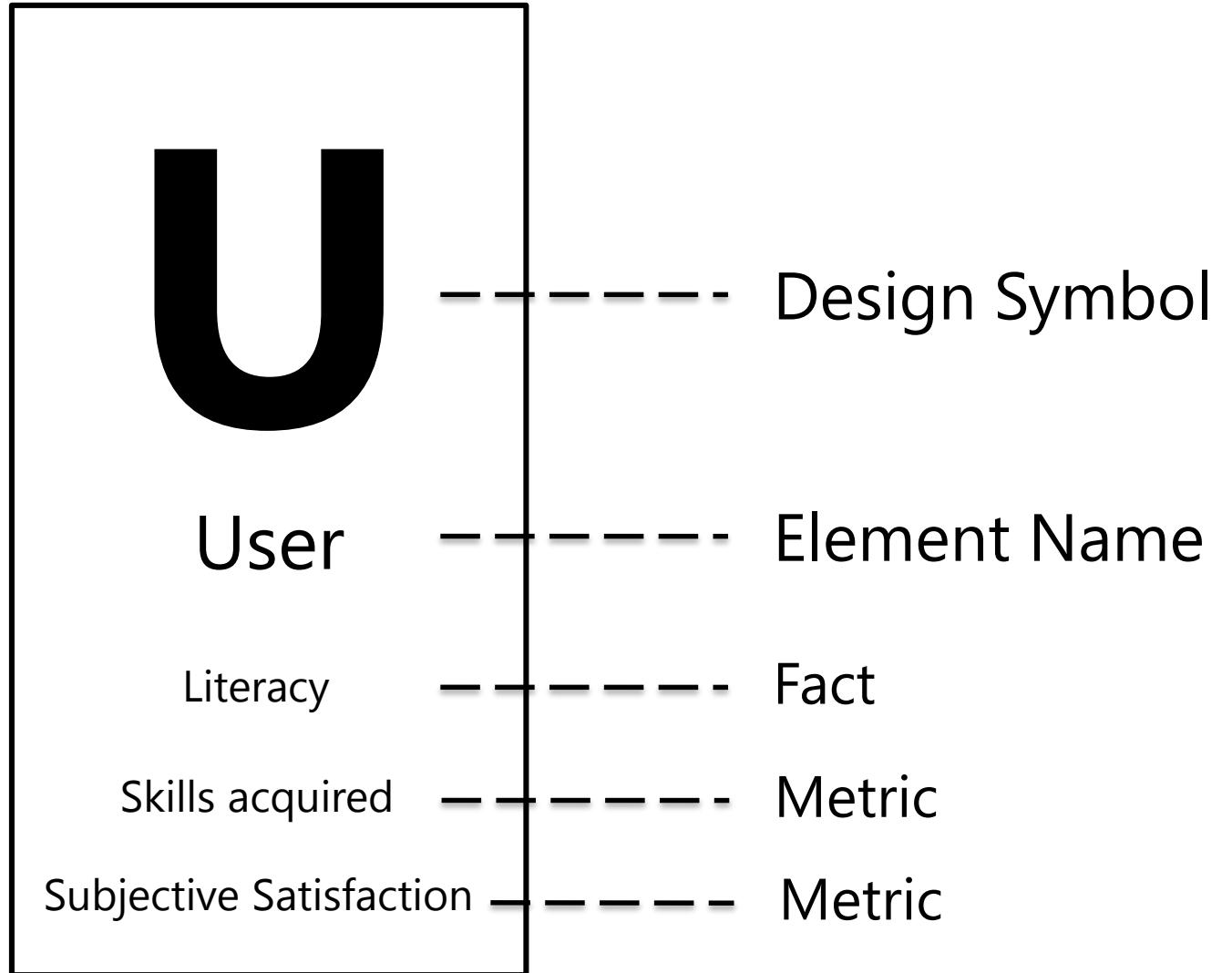
And focus ON human being!



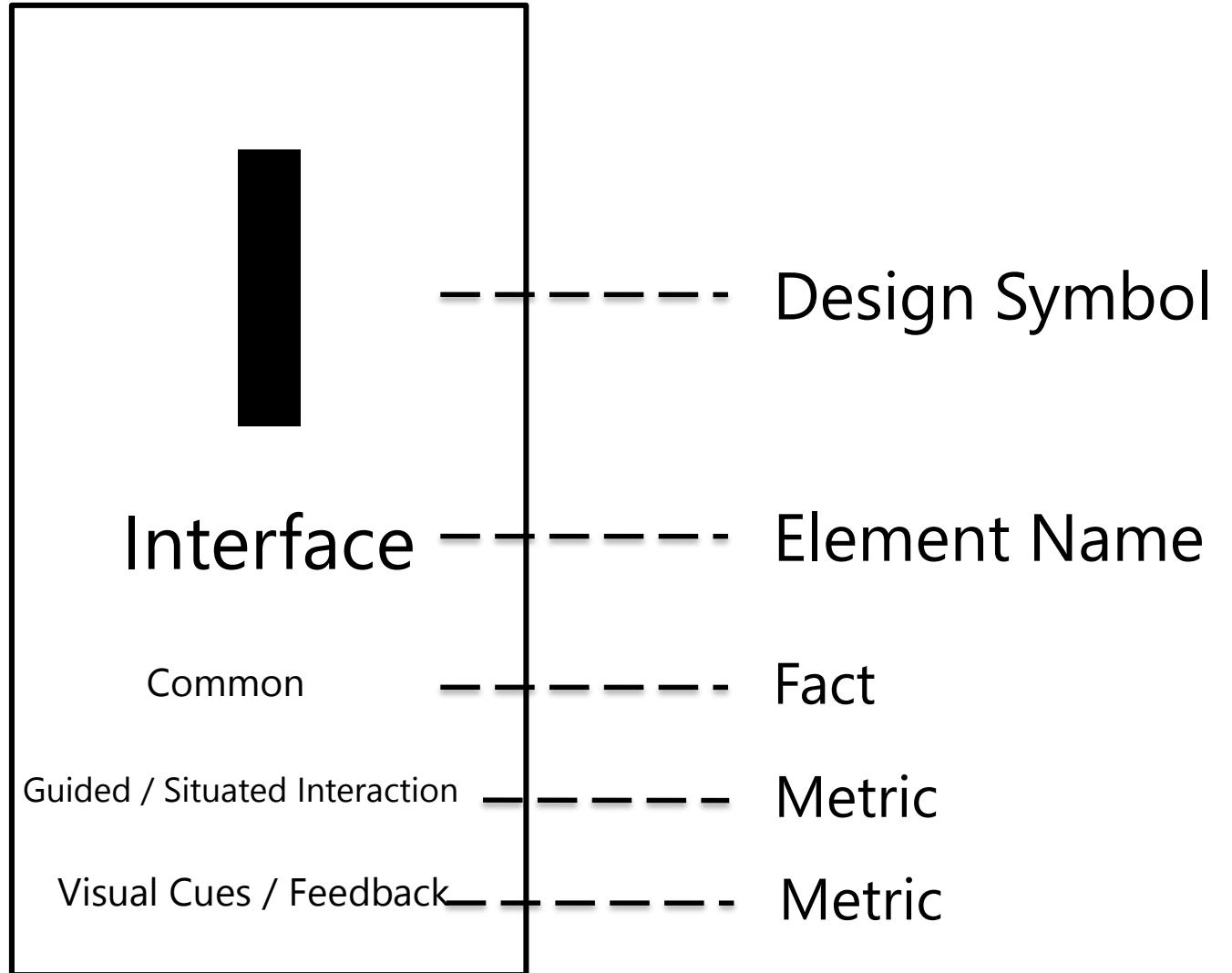
# The Periodic Table of NUI Design



# The Periodic Table of NUI Design



# The Periodic Table of NUI Design



# Data Streams (Eyes & Ears)

**D**

Depth

DepthImagePixel[]

**C**

Color

byte[]

**A**

Audio

Waveform

**IR**

Infrared

byte[]

**T**

Touch and  
Traditional Inputs

Points and Chars

# Recognition Streams (Brains)

**ST**

Skeleton  
Tracking

Skeleton[]

**S**

Speech

Recognition Events

**FT**

Face Tracking

FaceTrackFrame

**MK**

Traditional  
Input

Mouse/Keyboard

**IF**

Interactions

InteractionFrame  
(UserInfo[])

**D**

**A**

**D**

**C**

**ST**

**T**

**D**

**ST**

Experimental Research

Case study - Healthcare

# Hypothesis

NUI interface design helps users among different ages and diverse computer experience to ask a medical consultation reducing the learning curve.

# A first approach

## Users

<b>Aspect</b>	<b>User 1</b>	<b>User 2</b>	<b>User 3</b>
<b>Age</b>	67	58	29
<b>Literacy</b>	Basic	High School	Accounting Professional
<b>Times in front of the pc trough life time.</b>	0	5	All most 7/24
<b>Last time in front of the pc.</b>	Never	Six months ago	Two hours ago
<b>Living Area</b>	Rural	Urban	Urban

# GUI design



## Citas Internet

Afiliado \*

Fecha nacimiento  
(dd/mm/yyyy) \*

CÉDULA DE CIUDADANIA



ACEPTAR

## Asignación de Citas

## Asignación Citas

## Consulta y Cancelación

## Información de Afiliado

Afiliado CC  44002522 Nombre ANA MARIA VASQUEZ VELASQUEZ  
IPS Basica CIS COMFAMA SAN IGNACIO

## Información de Contacto

Telefono 5277914 Celular 3114397448  
Departamento  Ciudad    
Correo Electronico amvasquez240@hotmail.com

AUTORIZO VOLUNTARIAMENTE QUE LA INFORMACIÓN PARA LA RECORDACIÓN DE MIS CITAS, INFORMACIÓN DE MIS PÓLIZAS Y/O INFORMACIÓN GENERAL DE SURAMERICANA ME SEA ENVIADA POR:

Correo electronico  Celular

## Información de la Cita

Plan POS   
Servicio CONSULTA MEDICINA GENERAL

**CONSULTAR DISPONIBILIDAD DE CITAS**



## Asignación de Citas

[Nueva cita para otro servicio](#)

Asignación Citas

[Consulta y Cancelación](#)

### Información de Afiliado

Afiliado CC 44002522 - ANA MARIA VASQUEZ VELASQUEZ  
Lugar de la Cita CIS COMFAMA SAN IGNACIO  
Plan POS  
Servicio CONSULTA MEDICINA GENERAL  
Profesional de Familia CC 43252894 - LIMA SALGADO SUHANY ANDREA

### Información de Profesional

Profesional

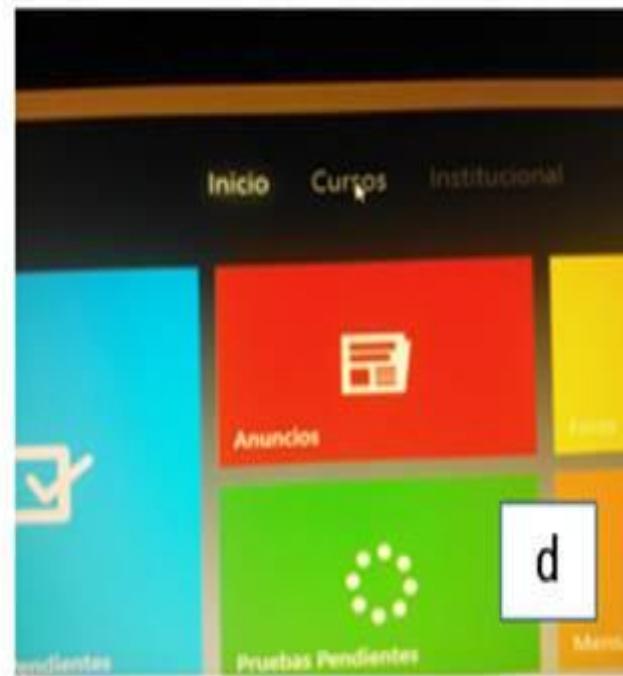
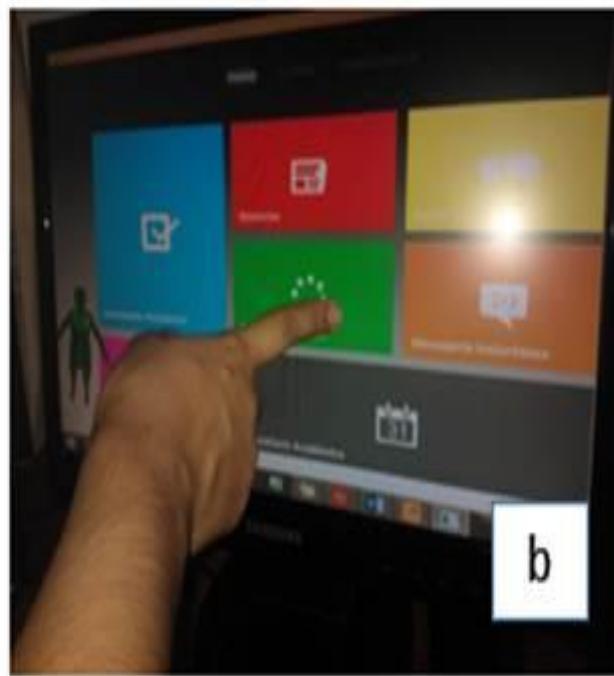
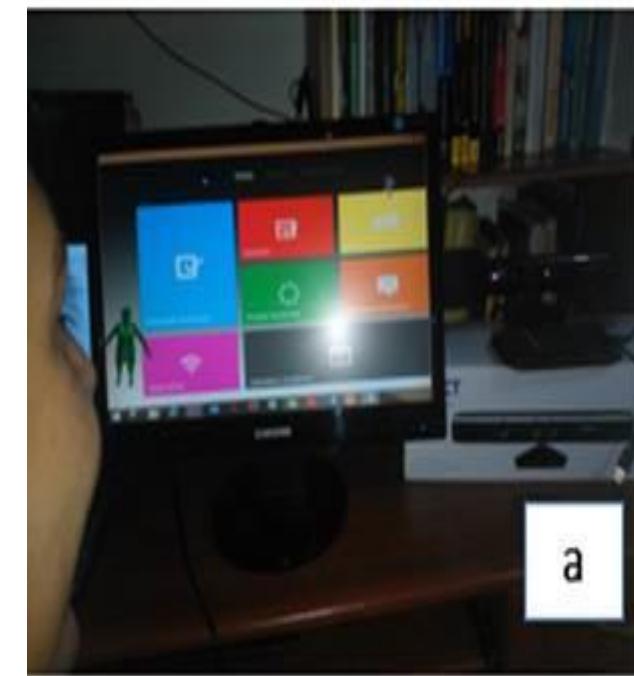
LIMA SALGADO SUHANY ANDREA - 2013/11/26 (F)

### Citas

Noviembre, 2013						
«	<	Hoy	>	»		
Dom	Lun	Mar	Mié	Jue	Vie	Sáb
				1	2	
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
Seleccionar fecha						

Horas	Lugar de atención	Martes
19:40	CIS COMFAMA SAN IGNACIO	<input type="button" value="ASIGNAR CITA"/>
20:00	CIS COMFAMA SAN IGNACIO	<input type="button" value="ASIGNAR CITA"/>
20:20	CIS COMFAMA SAN IGNACIO	<input type="button" value="ASIGNAR CITA"/>
20:40	CIS COMFAMA SAN IGNACIO	<input type="button" value="ASIGNAR CITA"/>

# NUI design



Multimodal interaction through dashboard. (a) User give voice commands to navigate through dashboard, as well as (b) touch the screen, (c) swipe his hands on the air or (d) use traditional mouse to do a task

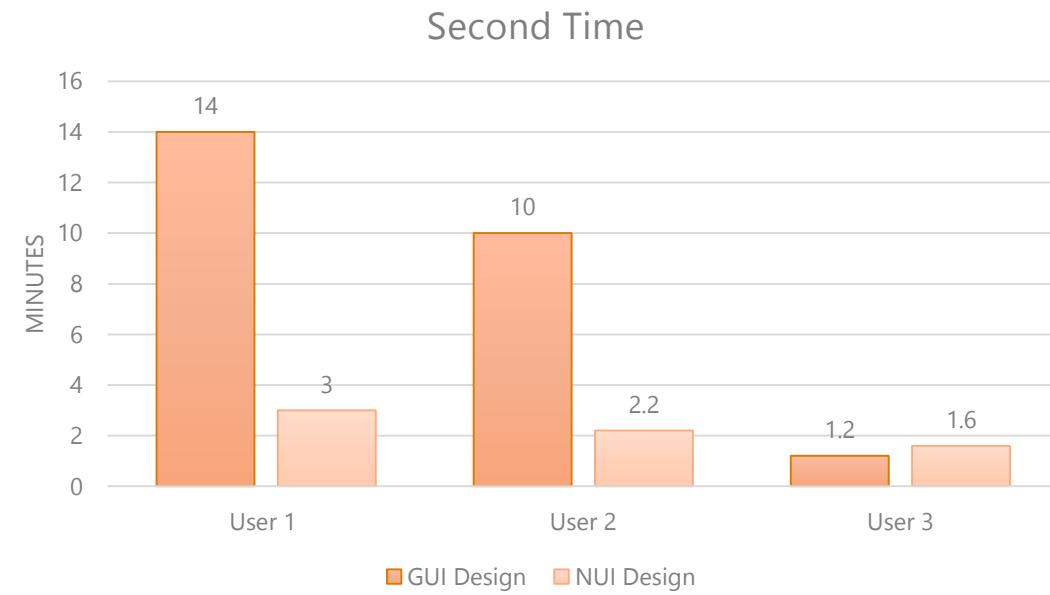
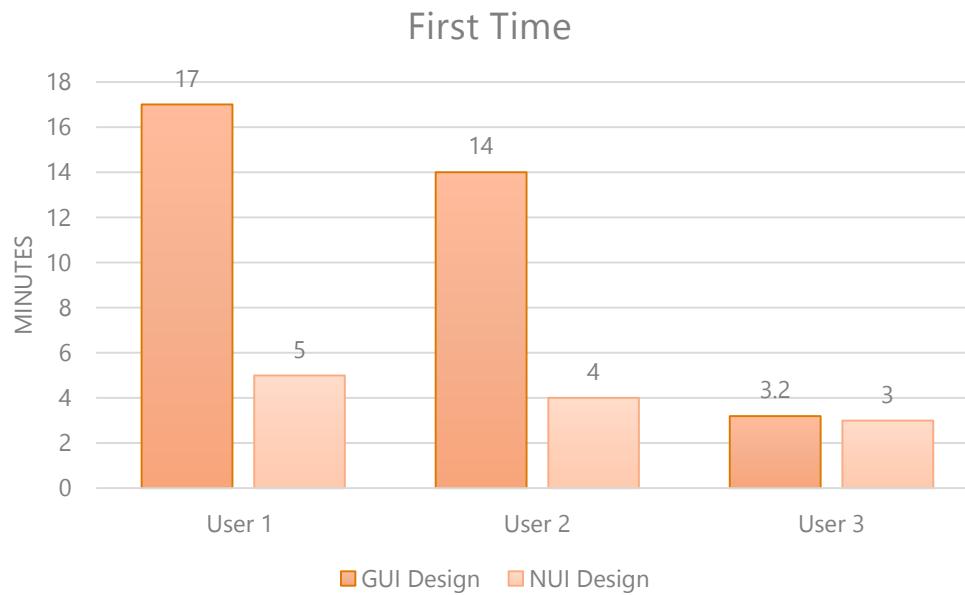


Application created for help patients to ask appointments in a natural way. **(a)** The login can be done using multimodal interaction as well as **(b)** review the bio signals graph, **(c)** and assign an appointment on a selected day considering **(d)** the care professional agenda.

# Demo

# Some findings

Learning how to use the interface.



Debating the future  
of NUI is useless

Creating the future  
is more interesting

**The biggest change of technology is not software or hardware, they are becoming faster and cheaper, but the true change is about who is doing what, where, with whom, for how much and how.**

**Bill Buxton**

What we build is about **People**,  
It is not about **technology**.



# Contact Info



edwin.duque@outlook.com

anamariavasquez@outlook.com

@dea398