



Jesuschrist Followers

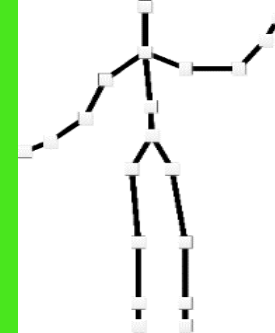
Natural User Interaction

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.



NUI for Healthcare

Ask Appointments and Self-care at home using NUI state of the art technologies. No computer experience required

NUI for Education

Learning Management Systems using NUI state of the art technologies. No learning curve required

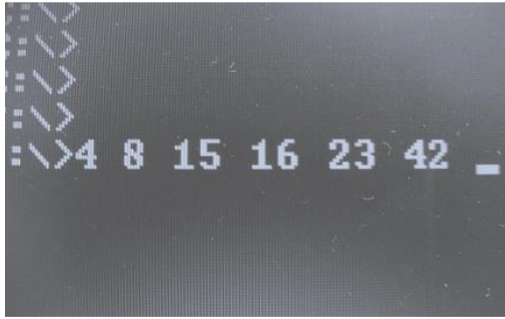
Unlimited opportunities

“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





Add feeds ▾

Feeds

- Featured
- Business
- Design
- Entertainment
- Fashion
- Food
 - The Pioneer Woman
 - Closet Cooking
 - Just Bento
 - The Daily Meal
 - Summer Tomato
 - Turntable Kitchen
- Humor
- Interesting
- Lifestyles
- Music
- News
- Photography
- Techology
- Travel

Feeds

Refresh

Details View

List View

Headline	Date
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: Espresso con nanna	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?



Feeds

- ▶ Featured
- ▶ Business
- ▶ Design
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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

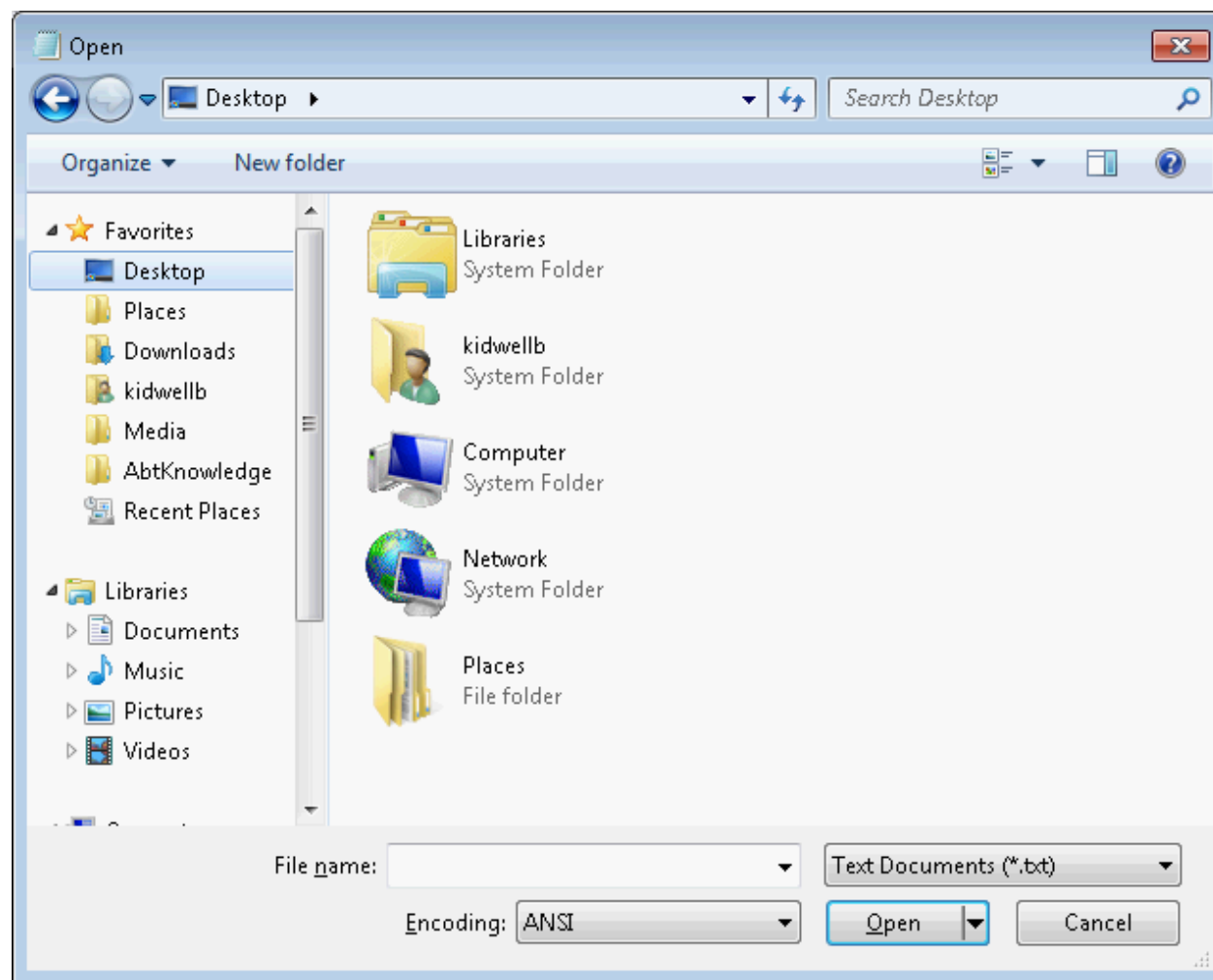
Just Bento

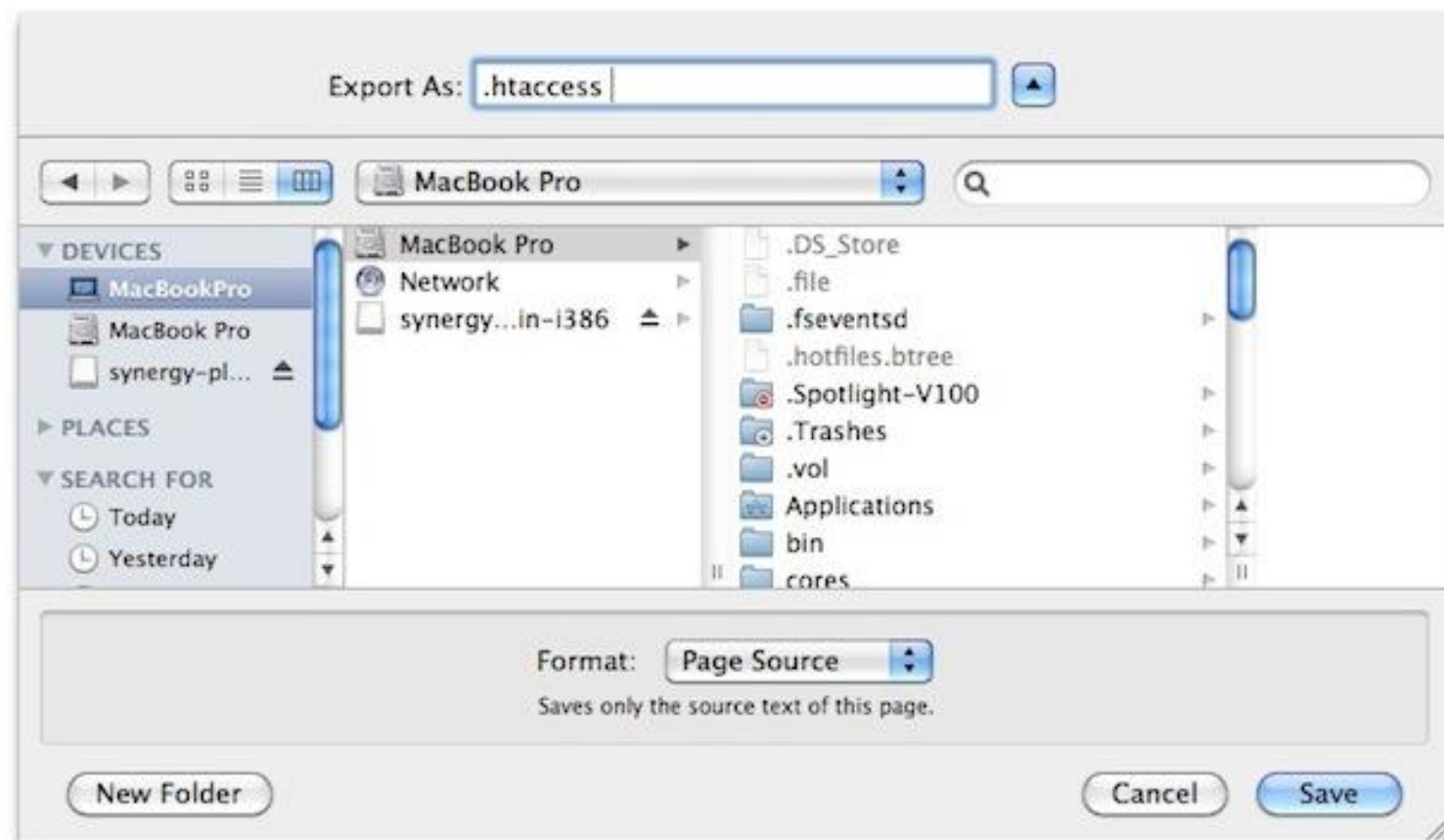


Caffe Press
Higher Customer

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 H Hydrogen 1.01	The Periodic Table of the Elements																2 He																								
3 Li Lithium 6.94	4 Be Beryllium 9.01																	5 B Boron 10.81	6 C Carbon 12.01	7 N Nitrogen 14.01	8 O Oxygen 16.00	9 F Fluorine 18.99																			
11 Na Sodium 22.99	12 Mg Magnesium 24.31																	13 Al Aluminum 26.98	14 Si Silicon 28.09	15 P Phosphorus 30.97	16 S Sulfur 32.06	17 Cl Chlorine 35.45	18 Ar Argon 39.94																		
19 K Potassium 39.10	20 Ca Calcium 40.08	21 Sc Scandium 44.96	22 Ti Titanium 47.87	23 V Vanadium 50.94	24 Cr Chromium 52.00	25 Mn Manganese 54.94	26 Fe Iron 55.85	27 Co Cobalt 58.93	28 Ni Nickel 58.69	29 Cu Copper 63.55	30 Zn Zinc 65.39	31 Ga Gallium 69.72	32 Ge Germanium 72.64	33 As Arsenic 74.92	34 Se Selenium 78.96	35 Br Bromine 79.90	36 Kr Krypton 83.80	37 Rb Rubidium 85.47	38 Sr Strontium 87.62	39 Y Yttrium 88.91	40 Zr Zirconium 91.22	41 Nb Niobium 92.91	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.91	46 Pd Palladium 106.42	47 Ag Silver 107.87	48 Cd Cadmium 112.41	49 In Indium 114.82	50 Sn Tin 118.71	51 Sb Antimony 121.76	52 Te Tellurium 127.60	53 I Iodine 126.91	54 Xe Xenon 131.29						
55 Cs Cesium 132.91	56 Ba Barium 137.33	57 La Lanthanum 138.91	72 Hf Hafnium 178.49	73 Ta Tantalum 180.95	74 W Tungsten 183.84	75 Re Rhenium 186.21	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.97	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)	87 Fr Francium (223)	88 Ra Radium (226)	89 Ac Actinium (227)	104 Rf Rutherfordium 178.49	105 Db Dubnium (262)	106 Sg Seaborgium (266)	107 Bh Bohrium (264)	108 Hs Hassium (269)	109 Mt Meitnerium (268)	110 Ds Darmstadtium (281)	111 Rg Roentgenium (272)	112 Cn Copernicium (285)	113 Nh Nihonium (286)	114 Fl Flerovium (289)	115 Mc Moscovium (288)	116 Lv Livermorium (293)	117 Ts Tennessine (294)	118 Og Oganesson (294)						
		58 Ce Cerium 140.12	59 Pr Praseodymium 140.91	60 Nd Neodymium 144.24	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.96	64 Gd Gadolinium 157.25	65 Tb Terbium 158.93	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93	68 Er Erbium 167.26	69 Tm Thulium 168.93	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.97													90 Th Thorium 232.04	91 Pa Protactinium 231.04	92 U Uranium 238.03	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium 168.93	102 No Nobelium (259)	103 Lr Lawrencium (262)

3

Li

Lithium

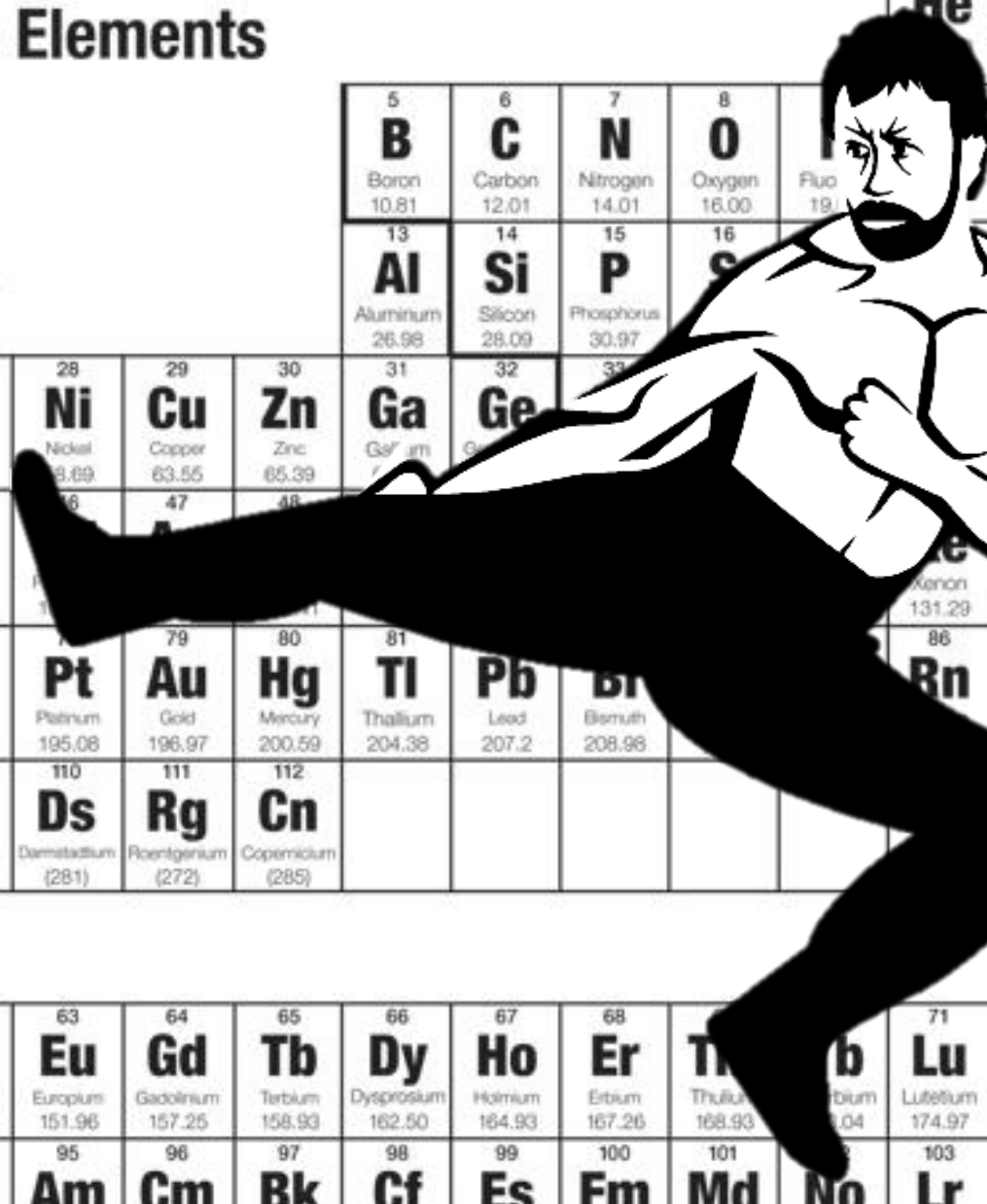
6.94

Atomic Number

Element Symbol

Element Name

Average Atomic Mass



We should
ignore
THE PERIODIC TABLE...

for a moment



And focus ON human being!

The Periodic Table of NUI Design

N	-----	Design Symbol
Natural	-----	Element Name
Multimodality	-----	Fact
Learning Curve	-----	Metric
Cognitive load	-----	Metric

The Periodic Table of NUI Design

U	-----	Design Symbol
User	-----	Element Name
Literacy	-----	Fact
Skills acquired	-----	Metric
Subjective Satisfaction	-----	Metric

The Periodic Table of NUI Design

<div><div></div><div>Interface</div><div>Common</div><div>Guided / Situated Interaction</div><div>Visual Cues / Feedback</div></div>		Design Symbol
		Element Name
		Fact
		Metric
		Metric

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[]

D

S

Speech

Recognition Events

A

FT

Face Tracking

FaceTrackFrame

D

C

ST

MK

Traditional
Input

Mouse/Keyboard

T

IF

Interactions

InteractionFrame
(UserInfo[])

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

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

The background is a solid green color with several thin, white-outlined circles of varying sizes scattered across it. Some circles are partially cut off by the edges of the frame.

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 Nombre ANA MARIA VASQUEZ VELASQUEZ
IPS Basica CIS COMFAMA SAN IGNACIO

Información de Contacto

Telefono Celular
Departamento Ciudad
Correo Electronico

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
Servicio

CONSULTAR DISPONIBILIDAD DE CITAS

Asignación de Citas

[Nueva cita para otro servicio](#)

Asignación Citas

[Consulta y Cancelación](#)

Informacion 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

Informacion de Profesional

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

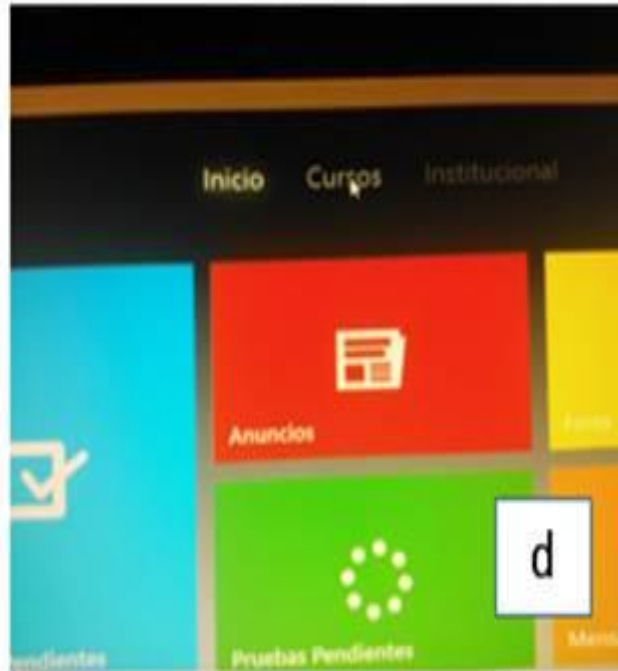
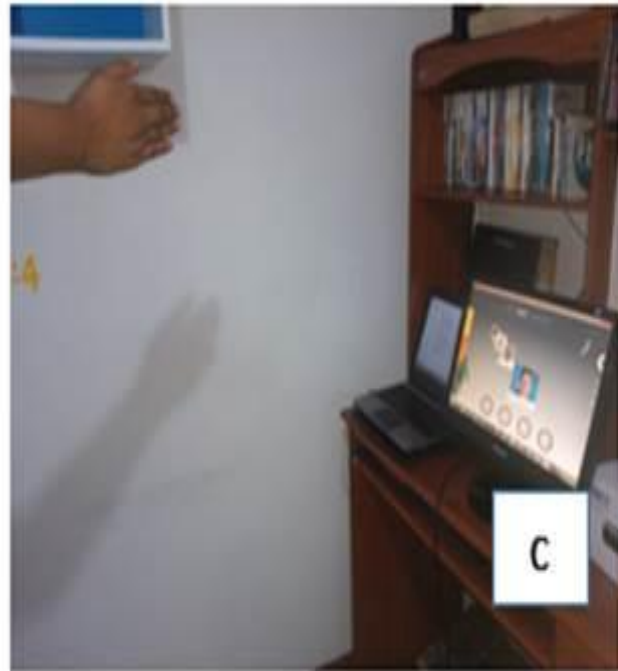
Citas

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 atencion	Martes
		2013/11/26
19:40	CIS COMFAMA SAN IGNACIO	ASIGNAR CITA
20:00	CIS COMFAMA SAN IGNACIO	ASIGNAR CITA
20:20	CIS COMFAMA SAN IGNACIO	ASIGNAR CITA
20:40	CIS COMFAMA SAN IGNACIO	ASIGNAR CITA

The background is a solid green color with several white circles of varying sizes scattered across it. Some circles are complete, while others are partially cut off by the edges of the frame. The circles are distributed in the top-left, top-right, and bottom-right areas, leaving the bottom-left area relatively clear for the text.

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

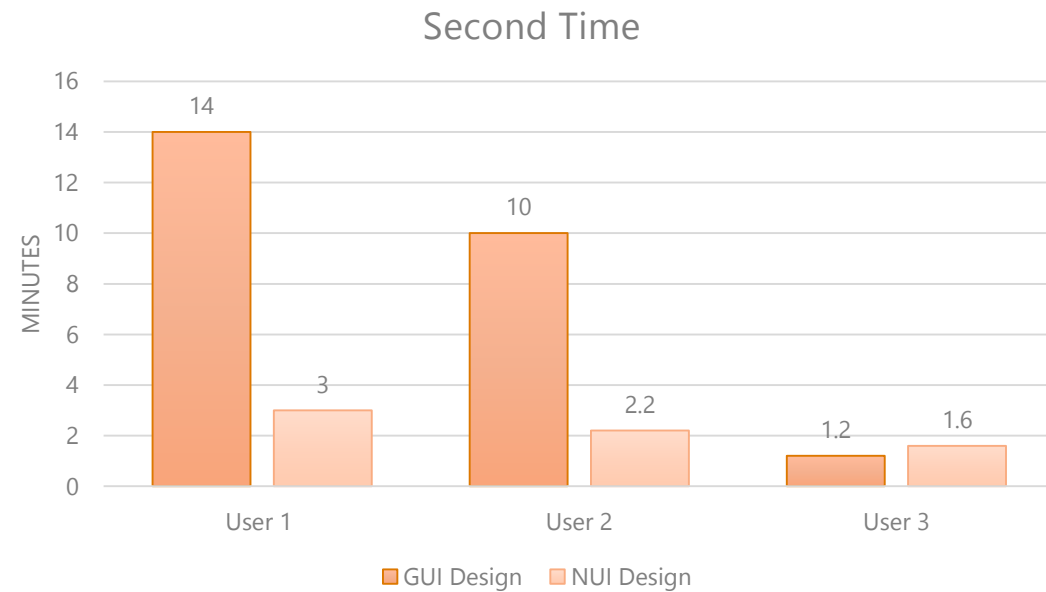
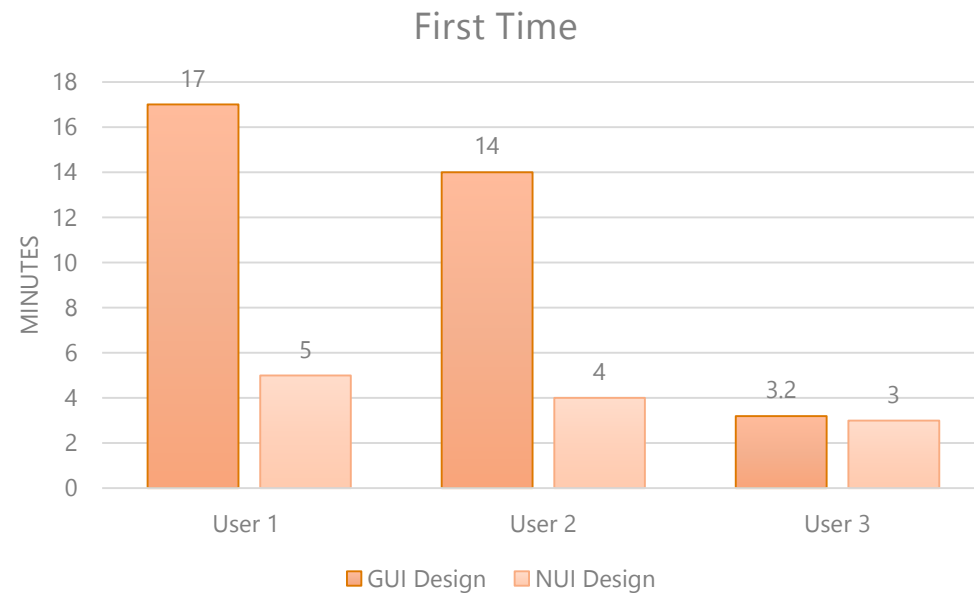


Application created for help patients to ask appointments in a natural way. **(a)** The login can be done using multimodal interaction as well as **(b)** review the bio signals graph, **(c)** and assign an appointment on a selected day considering **(d)** the care professional agenda.

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

