

Gizmo PoS using BLE and Raspberry Pi

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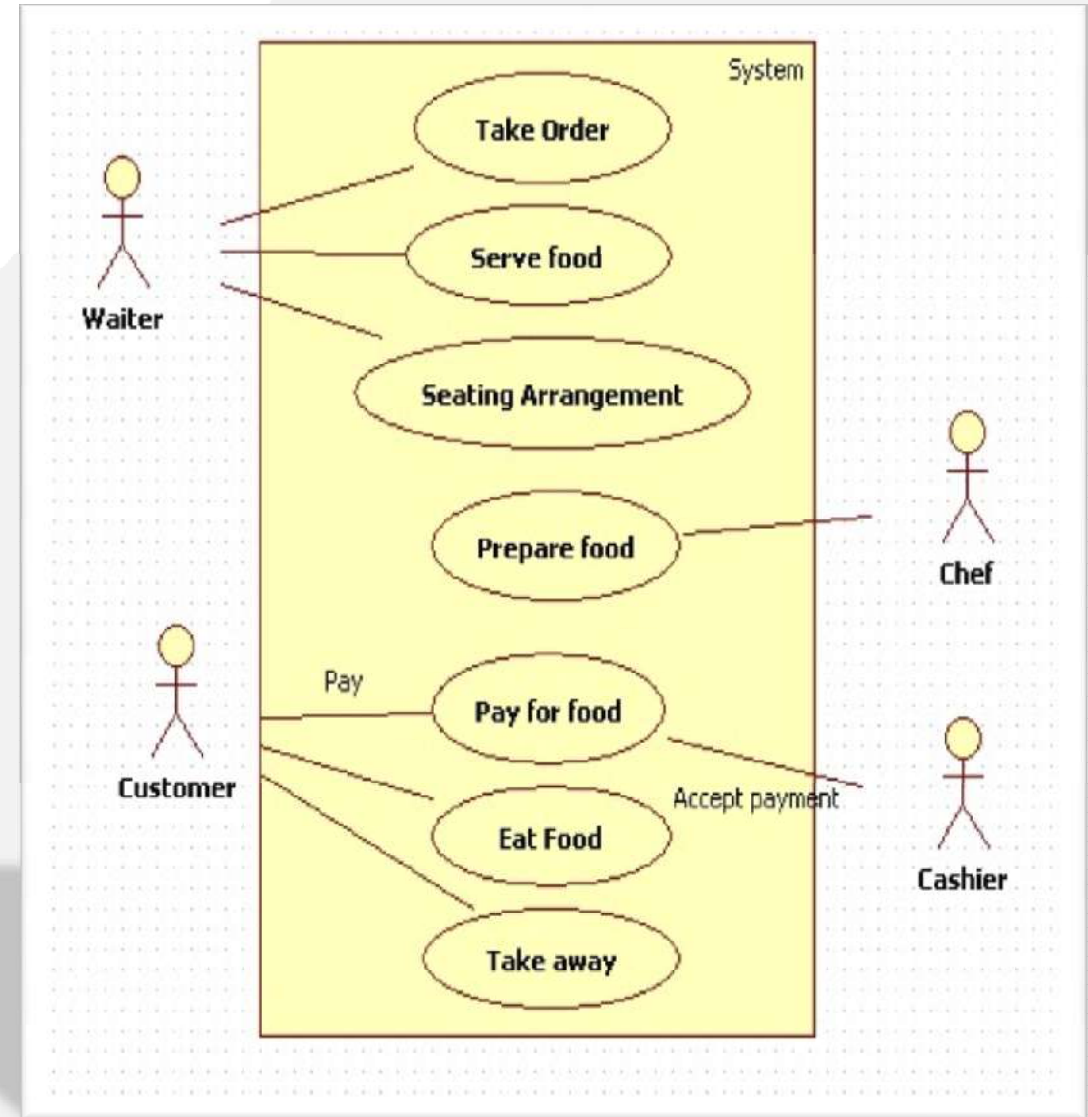
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Prof. Dr. Robert Manzke



Introduction

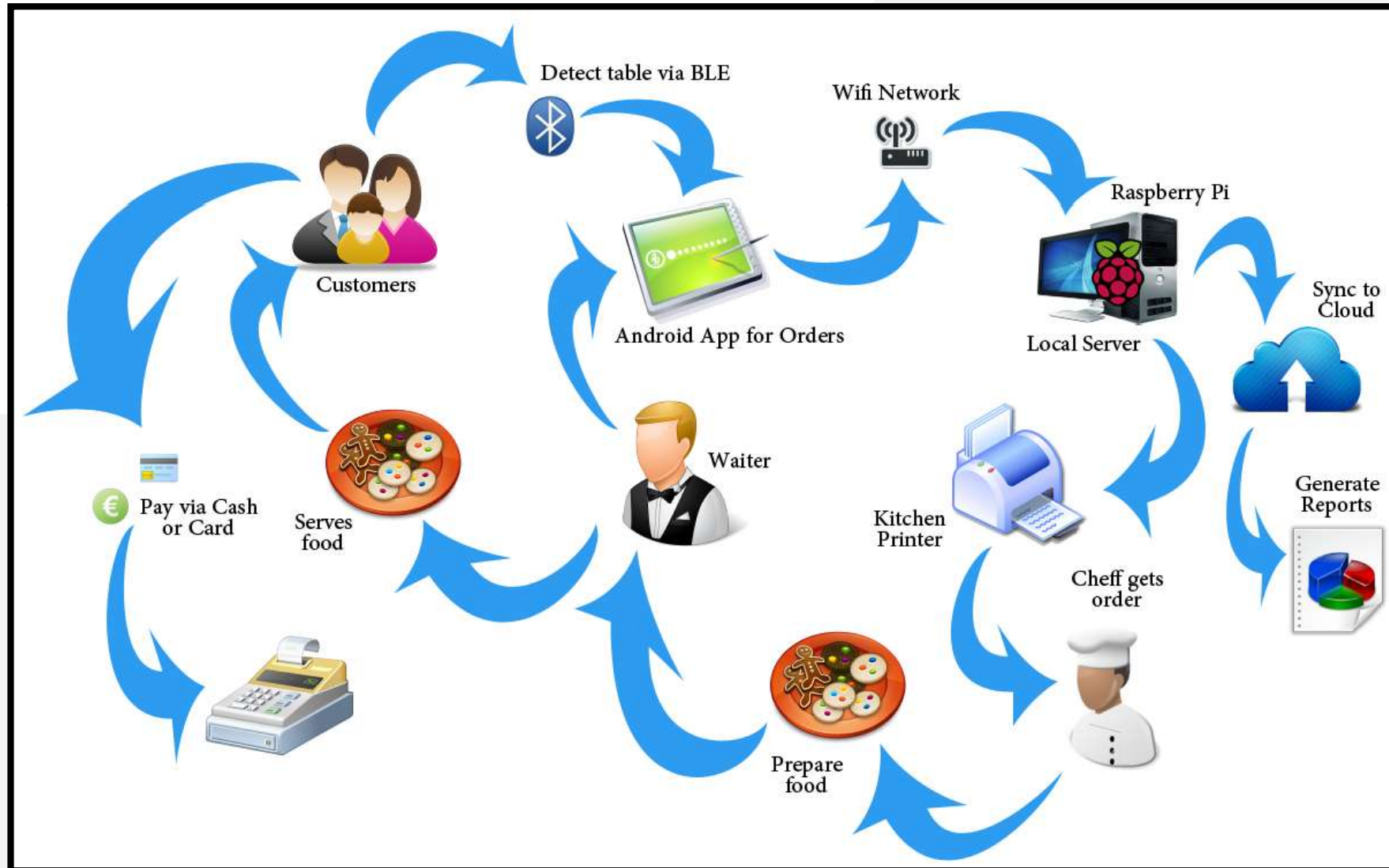
Gizmo Point of Sale is a management system designed for restaurants.



Gizmo Solution

- Gizmo PoS
 - Trivial functionalities
- GizmoTix
 - Analysis
 - Report
- BLE PoC
 - Weight as context

Process Flow



Gizmo PoS

- Local Server
 - Deployed on Raspberry Pi
 - Dashboard to manage user, menu and item management
- Android App
 - For collecting order
 - Table Identification with RSSI

Gizmo PoS

GIZMO POS

Mubasharkk

MAIN

Dashboard

MANAGE

Counters

Menus

Items

Users

Shops

CONFIGURATION

Variables

Home /

Total Members

0

Pro Members

0

Sales

\$5308.25

Notifications

0

Order List

Order Id	Counter	Amount (\$)	Items Count	Printed	Served	Cashed Out	Pending Since	Actions
518436b1b40e5	Table 3	1588	6	Pending	Pending	Pending	2 Months, 2 Weeks, 5 Days, 6 Hours, 4 Minutes	View
5182dd66eaaca	Table 5	123	2	Pending	Pending	Pending	2 Months, 2 Weeks, 3 Days, 6 Hours, 49 Minutes	View
5182dcf11bfb0	Table 2	78	1	Pending	Pending	Pending	2 Months, 2 Weeks, 5 Days, 6 Hours, 4 Minutes	View
5182dcb84fc06	Table 4	1103	5	Pending	Pending	Pending	2 Months, 2 Weeks, 5 Days, 6 Hours, 3 Minutes	View
5181706721ec6	Table 3	1358	4	Pending	Pending	Pending	2 Months, 2 Weeks, 5 Days, 6 Hours, 4 Minutes	View
51817011f0851	Table 3	450	1	Pending	Pending	Pending	2 Months, 2 Weeks, 5 Days, 6 Hours, 4 Minutes	View

Gizmo PoS

GIZMO POS Mubasharkk







MAIN
Dashboard

MANAGE
Counters
Menus
Items
Users
Shops

CONFIGURATION
Variables

Items / + Create

Menus

ID	Logo	Title	Actions
31		Chicken Soup 1	Remove
32		Chinese Soup 2	Remove
33		French Soup 1	Remove
34		French Soup 2	Remove
35		Chicken Biryani	Remove
36		Chicken Biryani (Half)	Remove

Create Item

Name

Menu - Root -


Unit Price \$
Unit price example value : 99.99

Caption

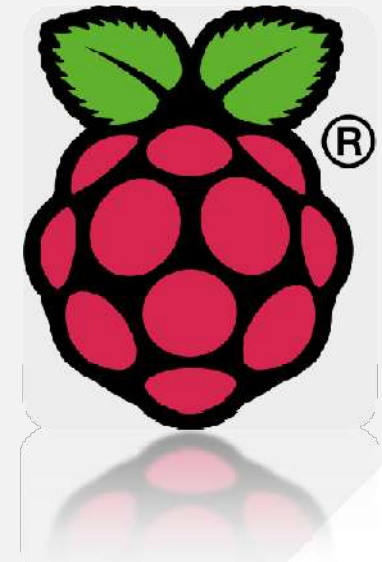
Image SELECT FILES

Description

Create Cancel

ID	Logo	Title	Price	Description	Status	Created At	Actions
36		Chicken Biryani (Half)	80.25	this is my caption	Active	Fri, 26 Apr 2013 20:55:28 +0000	Remove

Raspberry Pi












- Local server (350-500 W)
- Pi 3.5 W (model B) price: ~40\$
- 700 MHz
- VideoCore IV GPU OpenGL ES 2.0
- 2 Usb ports & 10/100 Ethernet
- SD card storage


<http://www.adafruit.com/products/998>

Gizmo PoS

Select Menu





- **Rice Cuisine**
Neque porro quisquam est qui dolorem ipsum quia dolor sit amet, consectetur. 
- **Pasta**
Neque porro quisquam est qui dolorem ipsum quia dolor sit amet, consectetur. 
- **Beef & Lamb**
Neque porro quisquam est qui dolorem ipsum quia dolor sit amet, consectetur. 
- **Soups**
Neque porro quisquam est qui dolorem ipsum quia dolor sit amet, consectetur. 

**Main Menu**

**View Order**

Gizmo PoS

Back Order for Table 4

	Chinese Rice 1 this is my caption	\$ 150.25
	Chinese Rice 2 this is my caption	\$ 150.25
	Italian Pasta 1 this is my caption	\$ 15.25
	Italian Past 2 this is my caption	\$ 78.25

Total : \$ 394

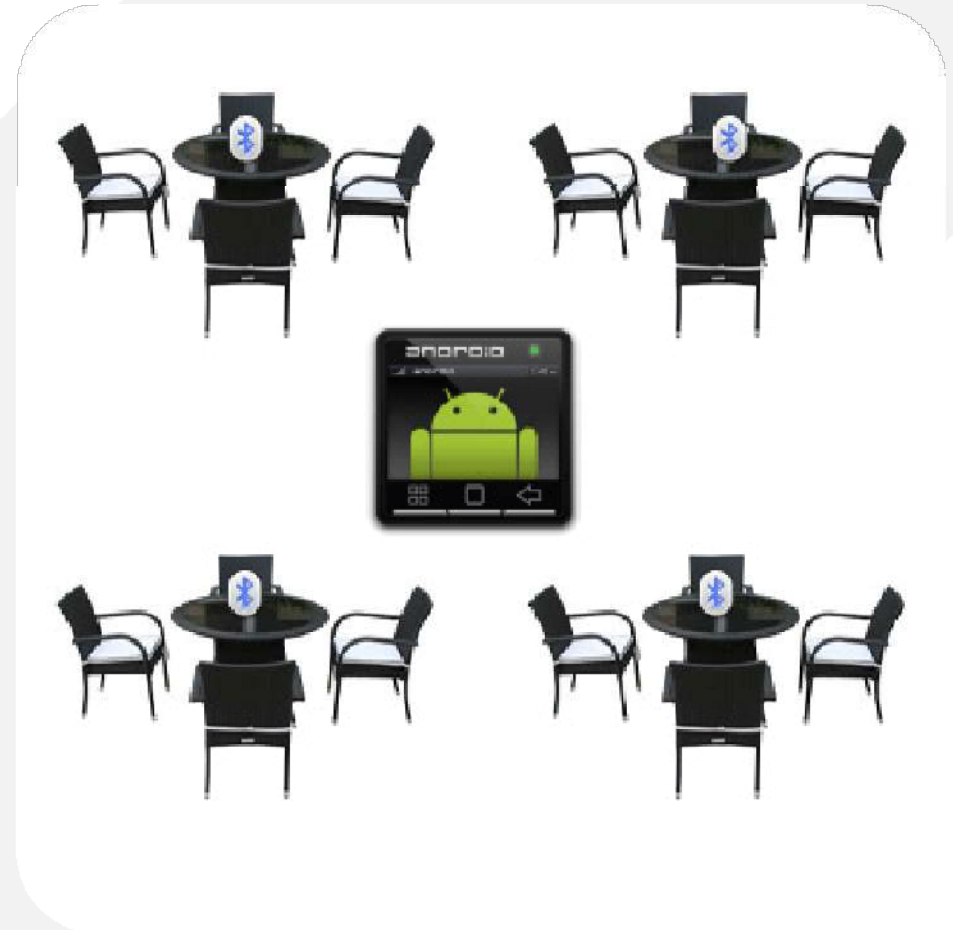
Are you sure place this order?

Yes Cancel

Place Order Cancel

Gizmo PoS

- BLE112 Module
- Android 4.3+
- Table number = uuid
- RSSI



Bluetooth Low Energy

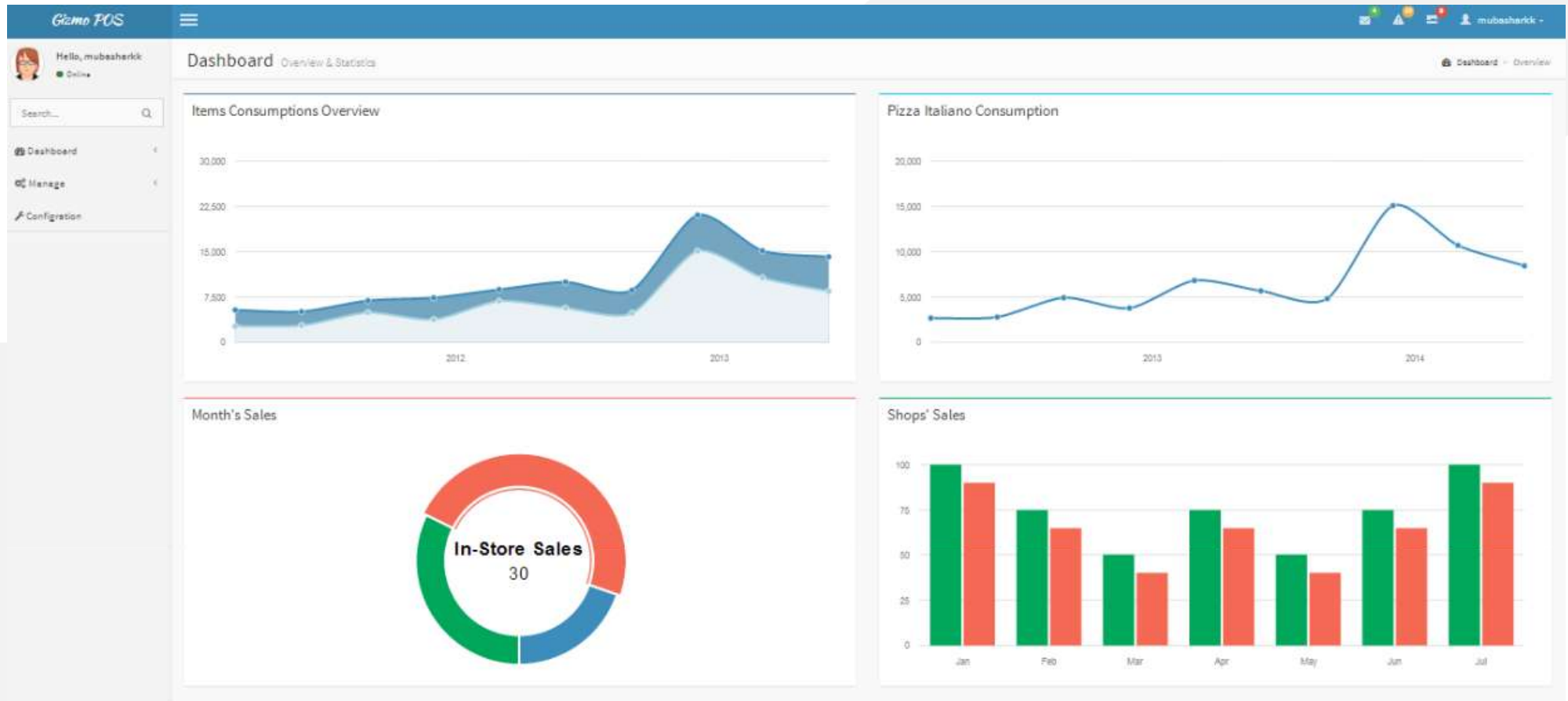
- BlueGiga BLE 112 module
- Integrated *Bluetooth* Radio, micro controller and software stack
- Lower cost and smaller size
- Power supply : 2.0 - 3.6V
- 8051 microcontroller, 8kB RAM, 128kB Flash
- lowest power sleep mode: 500 nA

<https://www.bluegiga.com/en-US/products/bluetooth-4.0-modules/ble112-bluetooth--smart-module/>

GizmoTix

- Currently
 - Collects data daily from local server
 - Analysis on sales
- ToDo
 - To make it more intelligent for suggestions and prediction using some contexts (weight, temperature, weather conditions)

GizmoTix



So Far

- Deployment ready PoS
- Android App to Collect orders
- GizmoTix (summary of sales)

Dependencies

- Hardware

- Raspberry Pi, Wi-Fi Router, Android Device, Tag Printers, BLE 112 Module, CC Debugger Texas Instruments

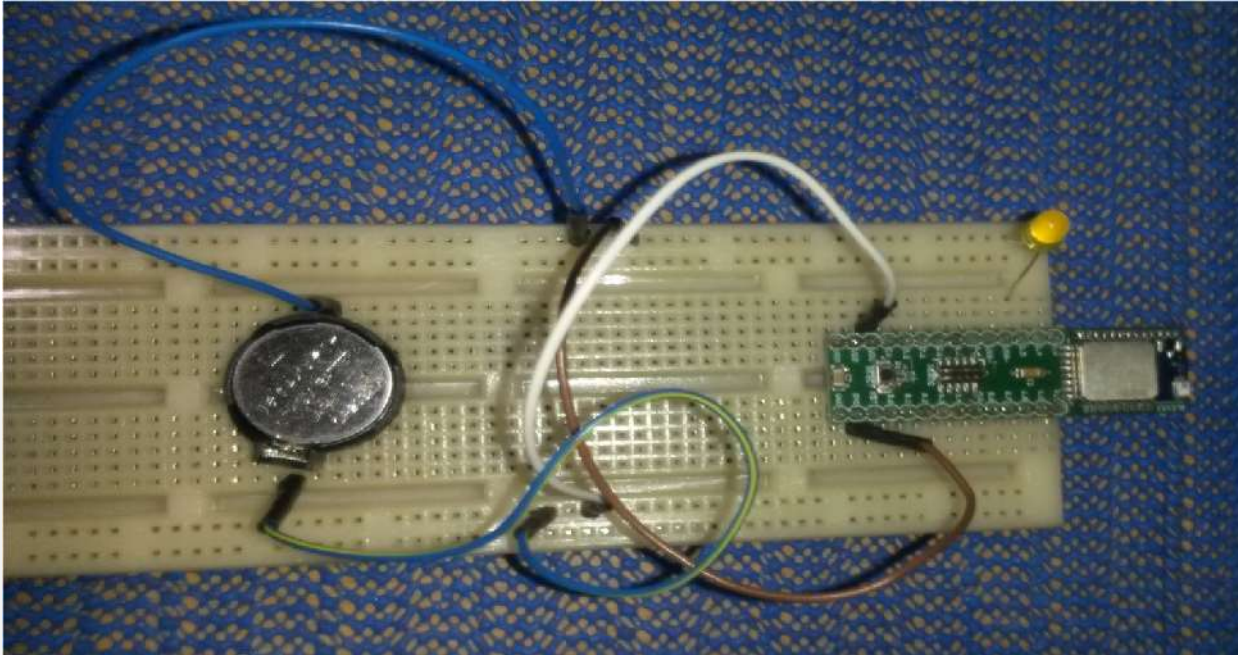
- Software

- Raspbian, Apache Server 2.4.1+, PHP 5+, MySQL, Android 4.3+, BGScript, Bootstrap, d3js

Future Work

- Adding Context to GizmoTix
 - Weather info
 - Either from sensors (humidity, temperature)
 - Or Online forecast
 - Weight
 - Collect Customer Weight Information

Weight as Context: POC



< Gizmo Gizmo Demo N... DISCONNECT

Device address: 00:07:80:6A:F2:89

State: Connected

Data:
04

Generic Access
00001800-0000-1000-8000-00805f9b34fb

Device Information Service
0000180a-0000-1000-8000-00805f9b34fb

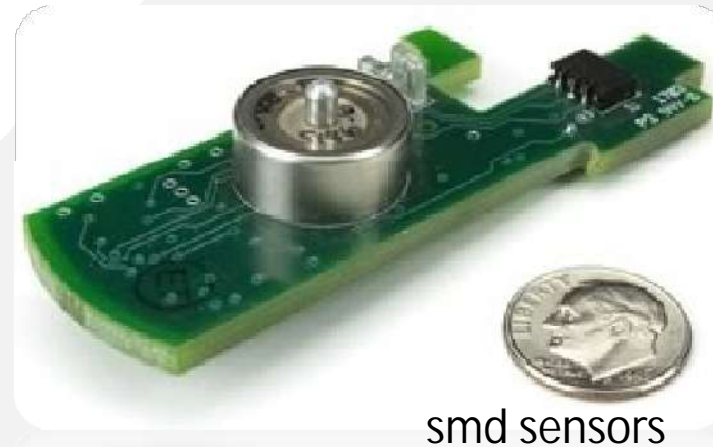
Gizmo Weight service
00431c4a-a7a4-428b-a96d-d92d43c8c7cf

Weight Data
f1b41cde-dbf5-4acf-8679-ecb8b4dca6fe

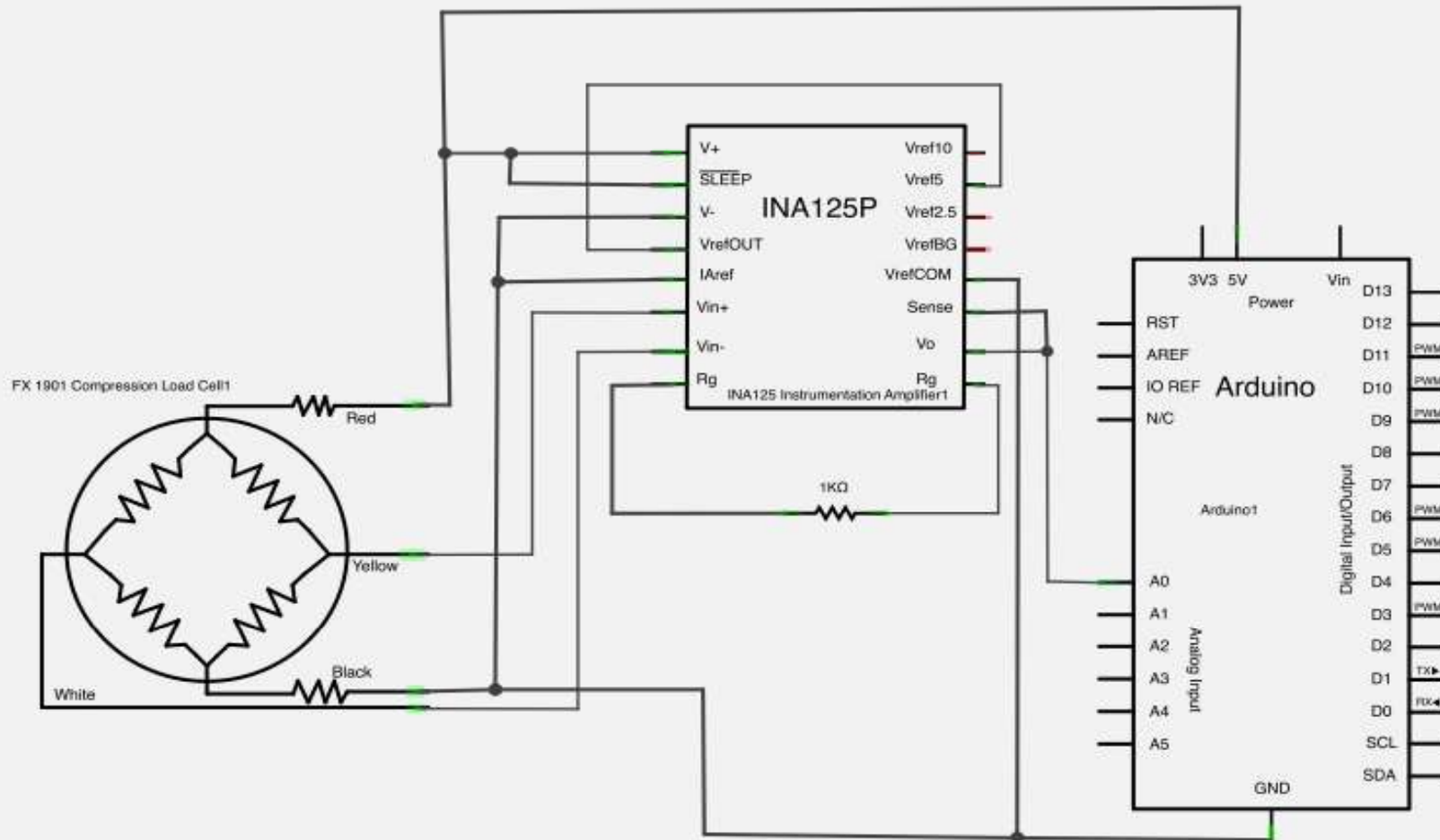
Battery Service
0000180f-0000-1000-8000-00805f9b34fb

Weight as Context

- Load Cells
 - Strain Gauge
 - Piezoelectric
 - Hydraulic

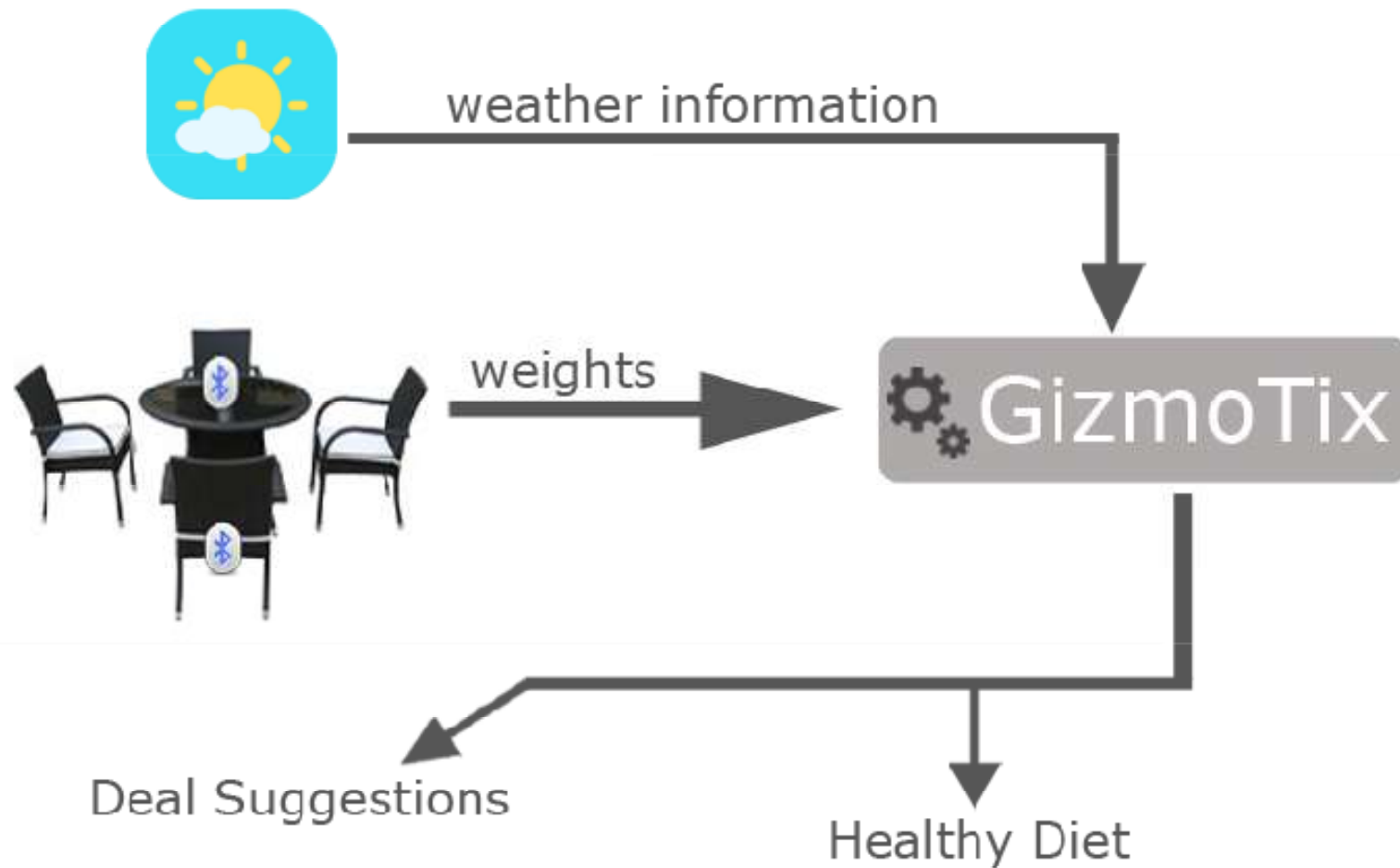


not new but



http://edg.uchicago.edu/tutorials/load_cell/

Weight as Context



Other applications

- Weight Matts
 - Transmits weight to your cellphone or watch
 - Turns off the alarm ensuring you really wakeup
- Smart Chair
 - Transmits sitting time
 - Sitting posture



http://frontgate.scene7.com/is/image/frontgate/76871_main

http://chiropracticdubai.files.wordpress.com/2012/10/woman-with-back_pain-at-desk.jpg

More to look into

- BLE Master Slave approach
 - Where table device(master) collects weight info. from chairs(chairs)
- Making GizmoTix Intelligent
 - By looking into machine learning algorithms for prediction of item sales
 - Training on weight and weather info for deal suggestions
- Privacy

Thanks