

## RELEVANT EMBEDDED /IOT/M2M BACKGROUND

### Custom Hardware Development

(US client-Touch screen Parking Kiosk)

### custom kiosk Development

Custom Hardware based on

ARM, FPGA and SoC



Custom  
Parking  
Kiosk

Salient Features



End-to-End Product development lifecycle

- Concept
- Architecture
- Design
- App development

- Prototype
- Commissioning and Remote Service Support

Live Development in SFO

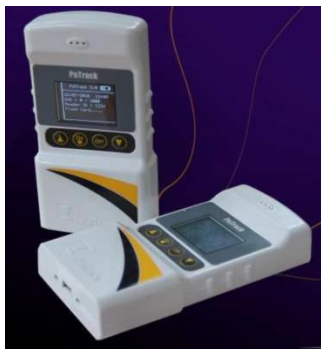
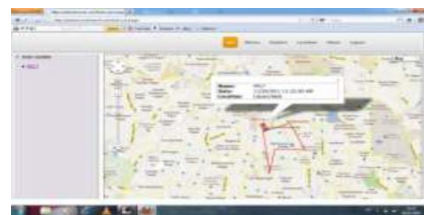


COMPREHENSIVE Child safety on school buses as per Enforcement Authorities Guidelines



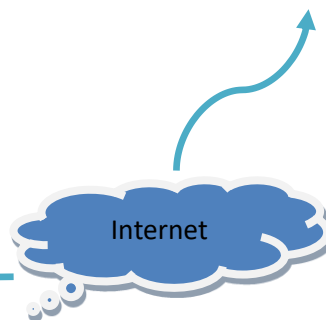
Guard Patrol Monitoring (IOT Ready)

For Police Beat Patrolling, Railway Track Patrolling, Industrial and Apartment security



Salient Features

- Passive RFID
- GSM/GPRS
- Bluetooth
- USB



## Active Tags and Solutions



A complete suite of Active RFID using Nordic chips were Developed in 2010

- 2.4 GHz ISM band with 15-20mts range
- Coin sized tags powered by coin batteries
- Optional wake-up functionality for special applications

### Special use cases where it was deployed

- Car access/ car parking solutions
- School/Employee attendance and tracking solutions
- Asset tracking solutions

## Keyless Smart Locks

A complete IoT based system to manage keyless locks on the field

BLE based products and solutions



## Data acquisition system for medical devices



- End to end development of data acquisition system for medical electronics application
  - ✓ Used **ARM7** to collect and store the data on MMC?SD card
  - ✓ Display of 4 channel data on LCD for quick diagnosis
  - ✓ Implemented the vendor class driver to transfer the data (over USB)
  - ✓ Developed Windows side application (VB) as well as driver (WDM driver with vendor class)

## Multi channel ECG – Data acquisition System

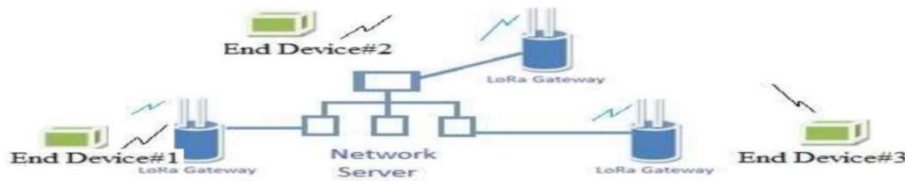
- End to end development of Data Acquisition System for medical electronics application
  - ✓ Used ARM cortex to collect the data
  - ✓ Store the data on MMC/SD card
  - ✓ Targeted for remote/Village health care
  - ✓ Data collected at village health centers and analyzed by expert/ specialized doctors using data from cloud



## “Wearable” Watch – IoT



- **Wearable watch** – Measures the Heart rate, Body temperature, and sudden fall
- Data is sent over IoT for cloud analysis
- Built on cortex MO controller – integrates with HRM , temperature sensors with accelerometer
- Runs on tiny lithium ion battery
- Collects the data regularly and sends the data over LoRa (Long Range) WAN
- Collected data on the backend and analyses. Provides the general health of the person and if any emergency assistance to be provided.
- Participated in complete design, proof of concept
- LoRa-based Long Range comm. ( sub Gig RF Frequency:868 MhAZ)
  - Touted as one of the best protocol for IoT
  - LoRa devices consume very little power making it deal for battery-powered devices with built in security features



## Hybrid Mobile Applications



## Summary of Skills

Embedded skills	Software Platforms
<ul style="list-style-type: none"> <li>• Circuit/PCB Design</li> <li>• Languages: Embedded C, LabView</li> <li>• Device driver – USB/MMC/SD, Camera, serial, SOI, I2C etc</li> <li>• RTOS – VxWorks, Nucleus, Threadx, FreeRTOS</li> <li>• Platforms: PCI, Atmel, ST, Renesas, pSoc, ARM (ARM7, CortexM3, M4, M7)</li> <li>• Open Platforms: Intel UDOO, Raspberry Pi, Beagle Bone,</li> <li>• Operating System: WinCE, Linux, RTOS, YACTO</li> <li>• Domains: Medical electronics, Industrial automation, IoT, and Robotics</li> </ul>	<ul style="list-style-type: none"> <li>• Languages: VC++, C#.Net, VB.Net</li> <li>• Scripting/Web tools: VB, JavaScript, JQuery</li> <li>• RDBMS: MS SQL &lt; MySQL</li> <li>• Operating System: Windows, WinCE, Linux, Android</li> <li>• Other tools: OpenCV on Ubuntu Linux</li> <li>• Frameworks &amp; Platforms: NodeJS, AngularJS, Bootstrap, EXT JS</li> <li>• Mobile application on Android, IOS, and WinCE</li> </ul>