

Mother Goose: Scrum 3

How can I make sure that my (special needs) infant is sleeping well, and how can I better learn about her/his health?

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EK691 Agile Product Development

Prof. J. Rosen, Boston University

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Scrum 3 Goals

Member	Content Aspect	Tasks
Molly	Crib Module/CAD model	Work SolidWorks and iterate through 3D printed models
Gary	Crib Module/CAD model	Research flexible materials for 'grip' on crib slats, fixtures
Bruce	Materials Research	Try to use computer software to analyze the materials; Research of adhesion, coating etc; Determine the quantity of materials.
Don	Breathing Sensor/Manufacturing	refine array data collecting method; research how to use point array data for meaningful interpretations
Jesson	Breathing Sensor/Smart App Capability	refine array data collecting method; switch from Kinect to MATLAB-based raw data collection? Start developing web based app to make the data accessible to parents

Customer Feedback

Would you use a ceiling mobile instead of a crib mount?

- would not want to use a ceiling mobile other than to distract kids or to calm them down/let them sleep
- requires drilling holes; danger of falling on child

More features that would be helpful?

- connectivity with the TV/watch monitor feed while watching TV?

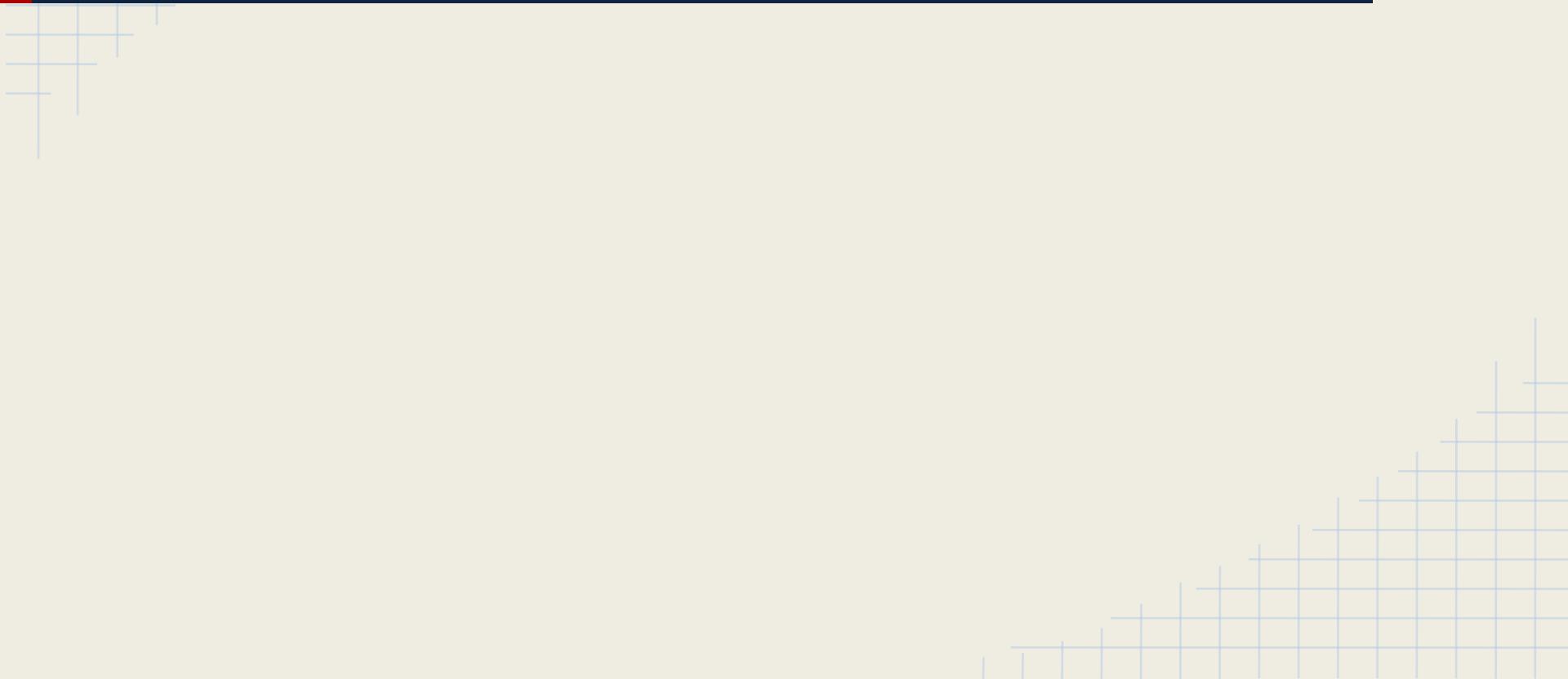
Miscellaneous

- how about making monitors for the elderly?

New customers from BU Child Development Lab?



CAD Model



Materials Research



Famous products of ABS and PC: LEGO bricks; Brita pitcher ---- Seems very untoxic.

But: For PC

Bisphenol A (BPA) causes heart problems, prostate-cancer cells,liver tumors.

And BPA is a key building block of PC plastic.

For ABS,

BPA free. But contain styrene--
a known endocrine disruptor.

How to prevent direct touch?

--Coating



Materials Research

Kidkusion Gummi Crib Rail

- Plastic
- Made in US
- Easy to install crib rail cover has a unique, **chewy texture that is perfect for teething babies while protecting their gum**
- The **non-toxic, non-vinyl rail cover** contains no phthalates and keeps baby's mouth off of the actual rail



Quantity

Dimensions: 10cm#5cm#5cm Hollow inside for putting the sensors: 0.5cm thick

$$10\text{cm} \times 5\text{cm} \times 5\text{cm} \times 0.5\text{cm} = 125\text{cm}^3$$

density of ABS 1.05g/cm

density of PC 1.2g/cm

Best ratio of ABS:PC= 3:7

$$\text{mass} = 1.05 \times 0.3 \times 125 + 1.2 \times 0.7 \times 125 = 39.375\text{g} + 105\text{g} = 144.375\text{g}$$

Future

I think it's better that our sensors and clamp can covered with something like towel ,cloth,the crib rail cover, make sure the babies cannot touch the potential harm.



Airborne?Fancy painting;Coating



Breathing Sensor

- went from developing in C# to developing in C++ to MATLAB, then interfacing C++ with MATLAB
- not as productive as wished, a lot of compile/build errors
- started to maintain an error log:

3/30/2015

```
1>----- Build started: Project: KinectBridgeWithMATLABBasics-D2D,
Configuration: Debug Win32 -----
1>Build started 3/30/2015 11:19:26 PM.
1>InitializeBuildStatus:
1> Touching "Debug\KinectBridgeWithMATLABBasics-D2D.unsuccessfulbuild"
1>MainWindow.obj : error LNK2019: unresolved external symbol _mxDestroyArray
referenced in function "public: __thiscall CMainWindow::~CMainWindow(void)"
(??1CMainWindow@@QAE@XZ)
1>MatlabFrameHelper.obj : error LNK2001: unresolved external symbol
_mxDestroyArray
1>MatlabHelper.obj : error LNK2001: unresolved external symbol
_mxDestroyArray
1>MainWindow.obj : error LNK2019: unresolved external symbol
_mxCreateNumericArray_730 referenced in function "private: long __thiscall
CMainWindow::CreateColorImage(void)" (?CreateColorImage@CMainWindow@@AAEJXZ)
1>MatlabFrameHelper.obj : error LNK2001: unresolved external symbol
```

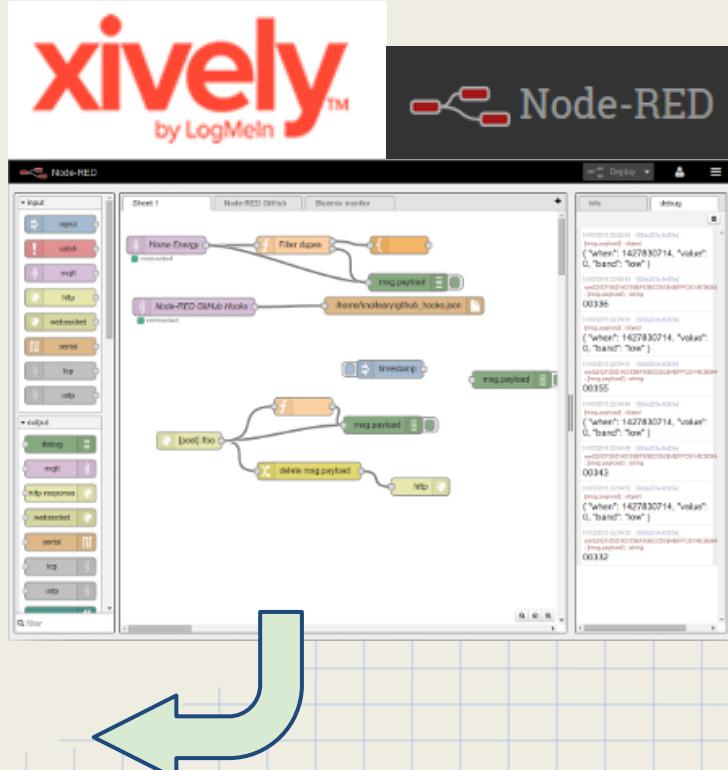
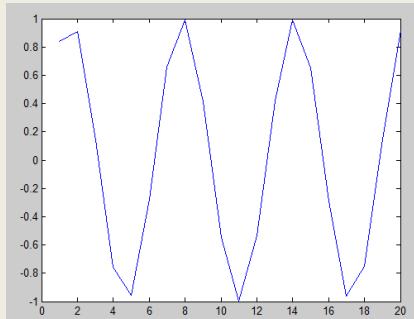
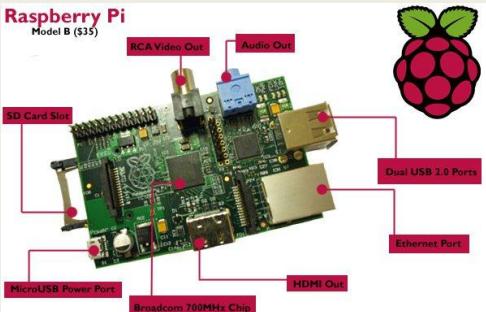
3/27/2015

```
libmx.dll → C:\Program Files\MATLAB\R2011a\bin\win64
copied to C:\Users\AtomicWest\Documents\code\c++\KinectBridgeMATLAB works;
but only displays rgb cam input and ir map blob-
using KinectBridge with Matlab
build error:
1>c:
\users\atomicwest\documents\code\c++\kinectbridgematlab\kinectbridgewithma
tlabbasics-d2d\MatlabHelper.h(15): fatal error C1083: Cannot open include
file: 'matrix.h': No such file or directory
matrix.h location: C:\Program Files\MATLAB\R2011a\extern\include
moved matrix.h to the kinectbridge project folder: C:
\Users\AtomicWest\Documents\code\c++\KinectBridgeMATLAB\KinectBridgeWithMA
TLABBasics-D2D
location of libmx/libmat/libeng: C:\Program
Files\MATLAB\R2011a\extern\lib\win64\microsoft
```



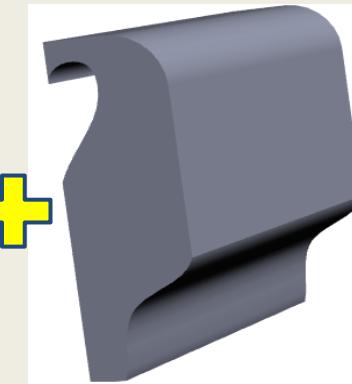
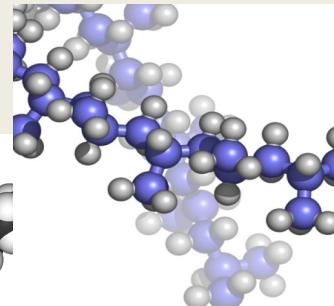
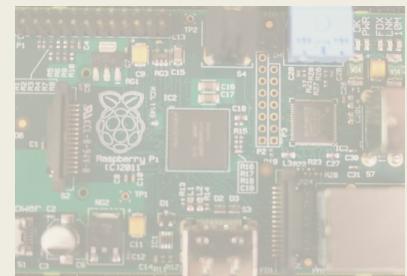
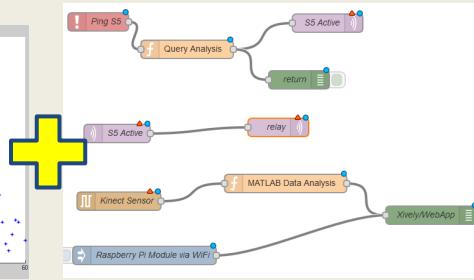
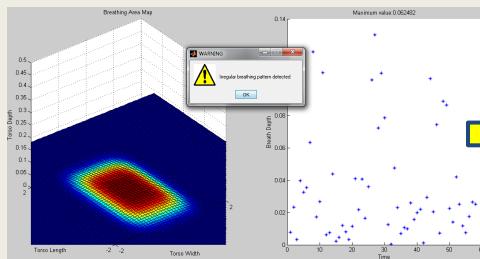
SMART Interfacing

- Move towards microcontroller module + platform-as-a-service (PaaS) connectivity
- Using either Arduino Uno or Raspberry Pi Model A/B with IR sensor mount/night vision cam?
- Faster prototyping for Internet-of-Things interactive modules
- IoT data control flow with Node-RED, xively for development (Scrum Goose demo)

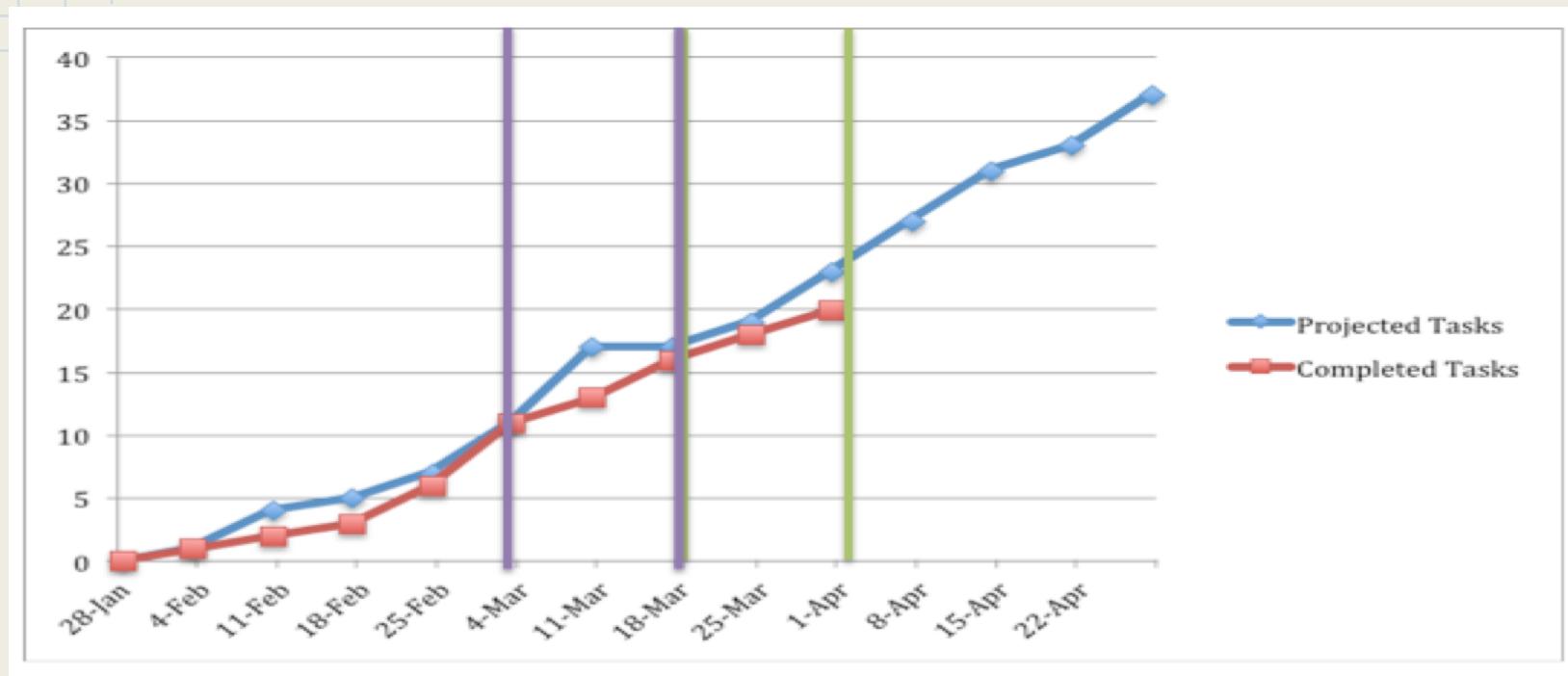
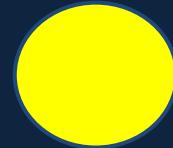


Summary: The Whole Product

What do we have so far? → building up different pieces, still need to connect everything together



Burn up chart



Scrum 4 Goals/Project Status

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Molly	Crib Module/CAD model	
Gary	Crib Module/CAD model	
Bruce	Materials Research	
Don	Breathing Sensor/Manufacturing	
Jesson	Breathing Sensor/Smart App Capability	start building the Raspberry Pi module, try to demonstrate a basic/complete data stream from RasPi sensor (or Kinect if possible), perform some analysis, then transmit to the cloud