



# **CS MQP Interests 2012-2013**

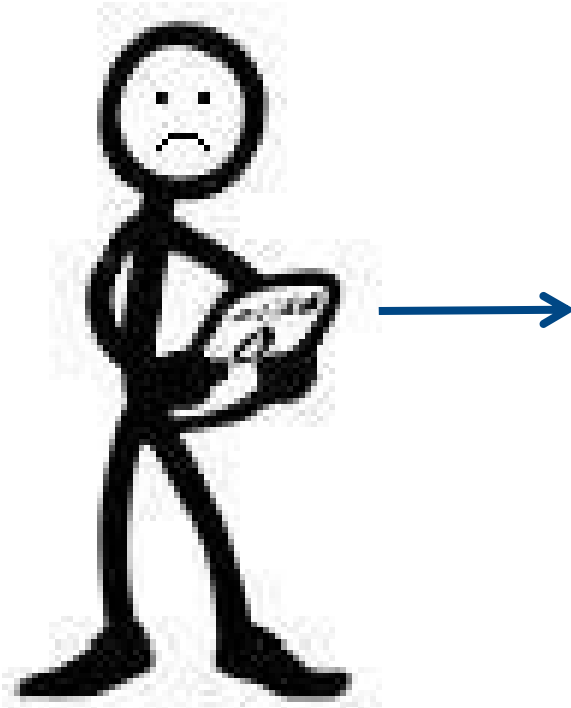
by Emmanuel Agu

- 3 projects
  1. **Homesite Sponsored MQP**
  2. **SmartPhone Activity Detection**
  3. **Graphics:** physically-based game engine

# The Problem

*Homesite: Company that sells home insurance  
Customers enter necessary information into a web based form.*

*“I’m not entering this much information on my phone!”*



Home Characteristics	
<b>Style of home</b>	Select <input type="button" value="v"/>
<b>Number of Stories</b>	Select <input type="button" value="v"/>
<b>Property type:</b>	<input type="radio"/> Single-Family <input type="radio"/> Multi-Family
<b>Is this property on a slope?</b>	<input type="radio"/> Yes <input type="radio"/> No
<b>Type of Exterior Siding</b>	Select <input type="button" value="v"/>
<small>For the majority of your home</small>	
<b>Roofing Material</b>	Select <input type="button" value="v"/>
<b>Type of Foundation</b>	Select <input type="button" value="v"/>
<b>Finished Basement</b>	Select <input type="button" value="v"/>
<b>Type of Garage</b>	Select <input type="button" value="v"/>
<b>Ceiling Height</b>	Select <input type="button" value="v"/>
<small>For the majority of your home</small>	
<b>Central Air Conditioning</b>	<input type="radio"/> Yes <input type="radio"/> No
<b>Primary Heating Type</b>	Select <input type="button" value="v"/>
<b>Custom Made Kitchen</b>	<input type="radio"/> Yes <input type="radio"/> No
<b>Electrical Wiring Type</b>	Select <input type="button" value="v"/>
How Many?	
<b>Standard Full Baths</b>	Select <input type="button" value="v"/>
<small>With shower/bath tub</small>	
<b>Custom Full Baths</b>	Select <input type="button" value="v"/>
<small>With shower/bath tub</small>	
<b>Standard Half Baths</b>	Select <input type="button" value="v"/>
<small>Without shower/bath tub</small>	
<b>Custom Half Baths</b>	Select <input type="button" value="v"/>
<small>Without shower/bath tub</small>	
<b>Rooms with Cathedral or Vaulted Ceilings</b>	Select <input type="button" value="v"/>
<b>Decks</b>	Select <input type="button" value="v"/>
<b>Porches</b>	Select <input type="button" value="v"/>
<b>Fireplaces</b>	Select <input type="button" value="v"/>
<small>Exclude: wood/coal burning stoves</small>	
<b>Standalone Masonry Chimneys</b>	Select <input type="button" value="v"/>
<small>Without fireplace</small>	

## Project Goal

*Use smartphones and tables to help customers acquire necessary information for quoting and purchasing a homeowners insurance policy*



# Envisaged Solution

*Customers use device features to derived necessary information.*

*"That was really easy!"*



Your Address	
Street Address	<input type="text" value="100 Institute Road"/>
Apartment, unit, floor, etc.	<input type="text"/>
City	<input type="text" value="Worcester"/>
State	<input type="text" value="MA"/>
Zip	<input type="text" value="01609"/>

Home Characteristics	
Style of home	<input type="text" value="Colonial"/>
Number of Stories	<input type="text" value="Two"/>
Property type:	<input checked="" type="radio"/> Single-Family <input type="radio"/> Multi-Family
Is this property on a <u>slope</u> ?	<input type="radio"/> Yes <input checked="" type="radio"/> No
Type of <u>Exterior Siding</u>	<input type="text" value="Vinyl siding"/>

My home has/is: (you must check all that apply)	
<input type="checkbox"/> A flat roof	<input checked="" type="checkbox"/> A swimming pool
<input checked="" type="checkbox"/> A trampoline	<input type="checkbox"/> A wood or coal burning stove
<input type="checkbox"/> Dog(s)	<input checked="" type="checkbox"/> An indoor sprinkler system



## Student Skills

**MQP co-advised with Prof Matt Ward**

**Project suitable for students with interest in:**

- **Programming for mobile devices**
- **Human-computer interaction**
- **User interface design**
- **Image analysis & processing**

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## Human Activity Classification

- Ubiquitous computing systems need to detect human activity
  - Walking, running => estimate calorie expenditure
  - Falling => Send EMS to help senior citizens
- Smartphones have lots of sensors
  - GPS, accelerometer, cameras, etc
- Project goal: Implement algorithms & smartphone apps that process smartphone sensors to detect human activity
- MQP co-advised with Prof Elke Rundensteiner



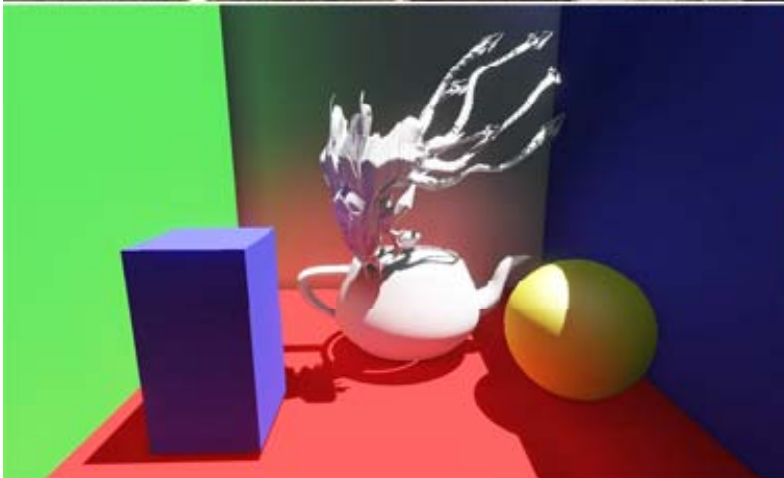
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# Project 3: Graphics

- Implement physically-based effects
  - Either in open source game engine or OpenGL
- Examples:
  - Caustics
  - Reflection/refraction
  - Shadows



# Global Illumination



# Time Of Day





## Contact/More info

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