Children’s Privacy Protection Engine for Smart Anthropomorphomorphic Toys

Patrick C. K. Hung
Faculty of Business and IT
University Of Ontario Institute Of Technology, Canada

September 20, 2016
Market Trends

Source: http://www.slideshare.net/Euromonitor/euromonitor-international-hong-kong-toy-fair-2015-09-12-2014/7
Toys

• A toy is a product intended for learning or play.
  • Common examples include dolls, cars, and board games
• Canada is one of the largest toy markets in the world.
• Toy companies such as Hasbro, Mattel, and Tech4Kids have released toys that integrate with mobile platforms, providing new capabilities and add-ons to traditional functionality.
• Toy Fair 2014, 2015 and 2016 indicate the future of toys is Internet of Thing (IoT), such as Smart Toys.

Tamagotchi
ME 2 Universe [2007]

ONLINE...ON THE GO!
Getting active pays off. But did you know how much? With ME2 there’s a whole new way to play online and on the go.

GET MOVING! Sometimes life is boring. You’ve got to go to school, do chores, walk the dog. Drag, right? What if you could make those activities work for you? Check it out: with the ME2 Electronic Handheld game, you’re earning points for amazing online game play every time you take a step! Seriously, just clip the game to your belt or wear it in your pocket. Each step registers a game point that powers your entire game in the more incredible 3-D environment! Wow! Now you’re getting great exercise. Everywhere!

GET CONNECTED! Now you’ve got all these points, so what? Connect the ME2 to your computer with the USB cable (you’ll need a high-speed Internet connection) and watch the points transfer to the ME2 online universe. Create your own avatar from more than a million combinations, swim across the lake, explore Skull Mountain or camp out yourself across the water. You can even compete against other players and chat. It’s like nothing you’ve ever seen.

Need more points to power up your game? Get active and plug it back in. The action never ends when you have Power Points! No fees, no micro-payments. You’re in total control.

GET YOUR GAME! Ready to head out again? Download new games, new avatars, style, maps, clubs and more onto your handheld to play anywhere, anywhere. With ME2, you really are the power!

DID YOU KNOW?
Playing soccer for 15 minutes earns you 2,240 Power Points.
Riding your bike for 10 minutes gives you 1,230 Power Points.
Cleaning your room can earn you 1,380 Power Points.

Launch Out of a Catapult at over 100mph?
Virtual extreme sport! Real adrenaline!

Use the code above to get in the game at:
www.me2universe.com
Tek Recon [2014] - BYOD

- A model of Bring Your Own Device (BYOD)
- Similar to traditional toy blaster
- Smart phone mounts to blaster and acts as a peripheral
- Mobile Application features:
  - Scope/Heads-up display (HUD)
  - Communication between players
  - Teams
  - Points
  - GPS
Hello Barbie [2015]

• “Hello Barbie can have real back-and-forth dialogue with a child about career goals, interests, favorite ice cream flavors and listen (and tell) jokes.”

• “But Mattel makes it clear that it never asks about personal information, like where a child lives or even their name.”

• Ref: Samantha Murphy Kelly, “The new Hello Barbie is like Siri trapped in a doll's body,” MashableAsia, September 15, 2015.
CogniToys Dinosaur [2016]

- Internet connected educational toys
- IBM Watson’s knowledge Elemental Path’s “friendgine” which is a kid-friendly database
- Using an Android or iOS app, parents connect CogniToys to their home’s Wi-Fi.
Pokémon Go becomes global craze as game overtakes Twitter for US users

Nintendo’s share price soars but there have been safety fears over players visiting secluded locations late at night.

An app that began as an April Fools joke has become a worldwide phenomenon, as players seek to capture virtual creatures in real life.
<table>
<thead>
<tr>
<th></th>
<th>Traditional Toys</th>
<th>Electronic Toys</th>
<th>Smart Toys</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interaction Medium</strong></td>
<td>• Physical</td>
<td>• Physical (buttons)</td>
<td>• Physical: touch</td>
</tr>
<tr>
<td></td>
<td>• Mechanical</td>
<td>• Sensors – e.g. light, motion</td>
<td>• Visual: camera</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Auditory: microphone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Sensors: GPS, motion sensors, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Wireless interface (network)</td>
</tr>
<tr>
<td><strong>Data Collection</strong></td>
<td>None</td>
<td>Limited</td>
<td>High - pervasive</td>
</tr>
<tr>
<td><strong>Data Sharing</strong></td>
<td>N/A</td>
<td>Limited or none</td>
<td>Many recipients</td>
</tr>
<tr>
<td><strong>Potential to Collect</strong></td>
<td>No</td>
<td>Maybe</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Location Data</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Processing Capabilities</strong></td>
<td>N/A</td>
<td>Yes - limited</td>
<td>Yes - advanced</td>
</tr>
<tr>
<td><strong>Networking Capabilities</strong></td>
<td>N/A</td>
<td>Limited or none</td>
<td>• Communicates with other devices and services</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Wi-Fi, Bluetooth, NFC, RFID, USB</td>
</tr>
<tr>
<td><strong>Data Storage</strong></td>
<td>N/A</td>
<td>Limited to device</td>
<td>• On Device (flash memory, SD card)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• External to device (cloud, database, server)</td>
</tr>
<tr>
<td><strong>Platform</strong></td>
<td>Closed</td>
<td>Closed</td>
<td>Open</td>
</tr>
</tbody>
</table>

*Table 1. Comparison of traditional toys, electronic toys, and smart toys.*
Conceptual Model of Toy Computing Environment
Google Toy: Internet of Thing (IoT)

Social Cue (e.g., Movement, Spoken Word or Phase)
Is it Ted?
What the public is worrying about?

Google patents creepy internet 'toys' that could control your home, listen in on conversations and spy on children

- Patent suggests Teddy and rabbit-shaped machines would constantly listen for commands, and turn their heads and talk in response
- Toys containing microphones and cameras could record conversations
- Would be able to control appliances like TVs, music systems and lights
- Devices may never go to market but privacy campaigners are concerned

By SARAH GRAYTHE FOR MAILONLINE
Published: 15th May, 2015 updated: 17th May, 2015

Buzz Lightyear and Woody may have been able to switch lights on and off and drive remote controlled cars, but toys of the future could take control of all sorts of household appliances and

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Google Patents Toys That Watch and Listen to Your Kids
Humanoid Toy

• A smart anthropomorphism toy is defined as a device consisting of a physical toy component in the humanoid form that connects to a computing system through networking and sensory technologies to enhance the functionality of a traditional toy.

• Many studies found out that anthropomorphic designs resulted in greater user engagement. Children trusted such designs serve a good purpose and felt less anxious about privacy.
Trends in the Toy Industry

• **Pervasive** – toys follow child through everyday activities.

• **Social** – social aspects and multiplayer are becoming a mandatory aspect of games and interactive toys.

• **Connected** - Toys connect and communicate with other devices, toys and services through networks.
Privacy and Regulations

Privacy is a state or condition of limited access to a person.

Information privacy relates to an individual’s right to determine how, when, and to what extent information about the self will be released to another person or to an organization.

Public attitudes about privacy are turning into regulations and contract language.
Privacy and Regulations

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Year of Birth: [ ] 1975 (e.g. 1965)

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Consent Requirement

Section 164.506(a) - Consent Requirements

We make significant changes in the final rule to require disclosures of protected health information and health care operations. We do not propose to seek an individual’s written permission for the use of health information to carry out treatment, payment or health care operations.

Except as described below, we instead require providers to obtain the individual’s consent to use or disclose protected health information to carry out treatment, payment or health care operations. If the covered provider does not have the necessary consent, the provider is prohibited from using or disclosing the information about the individual for purposes other than health care delivery, obtaining payment for health care delivered, and provider’s health care operations. See § 164.508.

SECTION II - CRITERIA FOR MAKING DATA PROCESSING LEGITIMATE

Article 7

Member States shall provide that personal data may be processed only if:

(a) the data subject has unambiguously given his consent, or

(b) processing is necessary for the performance of a contract to which the data subject is party or in order to take steps at the request of the data subject prior to entering into a contract; or
Purpose

Data Protection Principles

Principle 1 -- Purpose and manner of collection
This provides for the lawful and fair collection of personal data and sets out the information a data user must give to a data subject when collecting personal data from that subject.

Principle 2 -- Accuracy and duration of retention
This provides that personal data should be accurate, up-to-date, and should not be kept for longer than it is necessary.

3. In this Act,

"administrative purpose", "administrative purpose", "fins administratives",

"alternative format", "alternative format", "format administratif",


Individual to be informed of purpose

(2) A government institution shall inform any individual from whom the institution collects personal information about the individual or the purpose for which the information is being collected.

Exception

(3) Subsections (1) and (2) do not apply where compliance therewith might:

(a) result in the collection of inaccurate information; or

Article 10 Information in cases of collection of data from the data subject

Member States shall provide that the controller or his representative must provide a data subject from whom data himself or herself are collected with at least the following information, except where he already has it:

1. Identity of the controller and of his representative, if any;
2. Purpose of the processing for which the data are collected;
3. If data are collected for marketing purposes, the data subject's rights under the Directive;
4. The categories of recipients or classes of recipients to whom the data are disclosed or will be disclosed.

Another important provision is that the data subject has the right to object to the processing of personal data concerning him or her for direct marketing purposes.
Disclosure (Recipients)

2. Use and disclosure

2.1 An organisation must not use or disclose personal information about an individual for a purpose (the **secondary purpose**) other than the primary purpose of collection unless:

(a) both of the following apply:

(i) the secondary purpose is related to the primary purpose of collection and, if the personal information is sensitive information, directly related to the primary purpose of collection.

Disclosures of Protected Health Information

For any type of disclosure that is made on a routine, recurring basis, a covered entity must implement policies and procedures (which may be standard protocols) that permit only the disclosure of the minimum protected health information reasonably necessary to achieve the purpose of the disclosure. Individual review of each disclosure is not required. Instead, under § 164.514(d)(3), these policies and procedures must identify the types of protected health information to be disclosed, the types
Use (Obligations in use)

SECTION 164.502 - GENERAL RULES FOR USES AND DISCLOSURES OF PROTECTED HEALTH INFORMATION

Section 164.502(a)  Use and Disclosure for Treatment, Payment and Health Care Operations

As a general rule, we proposed in the NPRM to prohibit covered entities from using or disclosing protected health information except as authorized by the individual who is the subject of such information or as explicitly

Uses of Protected Health Information

A covered entity must implement policies and procedures to identify the persons or classes of persons in the entity's workforce who need access to protected health information to carry out their duties, the category or categories of protected health information to which such persons or classes need access, and the conditions, as appropriate, that would apply to such access. Covered entities must also implement policies and procedures to limit access to only the identified persons, and only to the identified protected health information. The policies and procedures must be based on reasonable determinations regarding the persons or classes of persons who require protected health information, and the nature of the health information they require, consistent with their job responsibilities.
Retention

Duration of the Right of Access

As in the proposed rule, covered entities must provide for as long as the protected health information is maintained in the record set.

Exceptions to the Right of Access

In the NPRM, we proposed to specifically exclude any protected health information used for an administrative purpose. Though we proposed to specifically exclude any protected health information used for an administrative purpose, we specifically excluded any protected health information used for an administrative purpose.

In the final rule, we specifically exclude any protected health information used for an administrative purpose.

Retention of personal information used for an administrative purpose

6. (1) Personal information that has been used by a government institution for an administrative purpose shall be retained by the institution for such period of time after it is so used as may be prescribed by regulation in order to ensure that the individual to whom it relates has a reasonable opportunity to obtain access to the information.

Data Protection Principles

Principle 1 -- Purpose and manner of collection This provides for the lawful and fair collection of personal data and sets out the information a data user must give to a data subject when collecting personal data from that subject.

Principle 2 -- Accuracy and duration of retention This provides that personal data should be accurate, up-to-date and kept no longer than necessary.

Principle 3 -- Use of personal data This provides that unless the data subject gives consent otherwise personal data should be used for the purposes for which they were collected or a directly related purpose.

Principle 4 -- Security of personal data This requires appropriate security measures to be applied to personal data (including data in a form in which access to or processing of the data is not...
Privacy Concerns

<table>
<thead>
<tr>
<th></th>
<th>Traditional Toy</th>
<th>Electronic Toy</th>
<th>Toy Computing</th>
<th>Online/Mobile Services/Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Toy</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Child’s Identity</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Collects Data</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Networking Capability</td>
<td>?</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>BYOD model</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Threats to Privacy

• Three items affect the privacy in toy computing:
  • Child’s identity
  • Location data
  • Networking capabilities

• Threats:
  • Marketing and Behavioral Profiles
  • Child Predators
# Laws and Regulations for Children’s Privacy

<table>
<thead>
<tr>
<th>Country/Category</th>
<th>Details</th>
</tr>
</thead>
</table>
| **Canada** | • Personal Information Protection and Electronic Documents Act (PIPEDA)  
• 10 Privacy Principles  
• OPC comments about children’s privacy |
| **United States** | • Children’s Online Privacy Protection Act (COPPA)  
• Amendment in 2010 to include geolocation information as “personal information” |
| **Industry Guidelines and Best Practices** | • UNICEF/ITU Industry Guidelines on Child Online Protection  
• Mobile marketing regulations (MMA, CTIA) |
| **Toy Industry** | • Toy safety guidelines do not mention privacy  
• North American Toy Industry Association (TIA)  
• Identifies privacy and data security landscape in toy industry with emerging popularity of child-directed mobile apps |
OFFICIAL MEMBERSHIP PAGE

This page confirms that the website, mobile app, or other technology shown below is a member in the kidSAFE Seal Program. This means that the product below has been independently reviewed, certified, and/or listed by kidSAFE to meet certain standards of online safety and/or privacy, and is authorized to display the kidSAFE Seal shown below. To learn more about our program, click here.

Hello Barbie doll

Product Type: Connected Product
Current Status: MEMBER
Member Level: kidSAFE COPPA CERTIFIED

Product Description:
Hello Barbie, from Mattel and ToyTalk, is the first fashion doll that can have a two-way conversation with girls. The doll features speech recognition and progressive learning features that enable girls to engage with Barbie like never before. Hello Barbie features more than 5,000 lines of dialogue, inspires imagination and storytelling, plays more than 20 interactive games, and tells jokes.

Company Information:
ToyTalk, Inc.
77 Maiden Lane, 3rd Floor
San Francisco, CA 94104
support@toytalk.com
About our seals

Any publisher or developer whose website, mobile app, or technology is displaying one of the kidSAFE Seals has demonstrated that their seal-bearing product complies with the kidSAFE-established guidelines corresponding to that Seal, as illustrated below.

If a product is awarded the “kidSAFE+ COPPA” Seal, which is an FTC-approved COPPA certification program, this means kidSAFE has also verified their compliance with our additional “COPPA Privacy Rules”. These rules are modeled after the Children’s Online Privacy Protection Rule, a U.S. federal privacy law commonly referred to as “COPPA” or the “COPPA Rule”. You can learn more about COPPA from this simple one-page COPPA educational guide.

### kidSAFE-CERTIFIED Seal

Requires compliance with the following “Basic Safety Rules” (as applicable):
- Safety measures for chat, community, and social features
- Rules and educational info about online safety
- Procedures for handling safety issues and complaints
- Parental controls over child’s account
- Age-appropriate content, advertising, and marketing

### kidSAFE+ COPPA-CERTIFIED Seal (FTC-Approved "Safe Harbor")

Requires compliance with the Basic Safety Rules above, plus the following additional “COPPA Privacy Rules” (as applicable):
- Neutral age questions
- Parental notice and consent procedures
- Parental access to child’s personal information
- Data integrity and security procedures
- COPPA-compliant privacy policy
- COPPA oversight and enforcement by the kidSAFE® Seal Program

### kidSAFE-LISTED Seal (BETA)

Requires compliance with the following general principle:
- Designed and intended for use by children and families

If you are a business interested in learning more about our certification guidelines and/or becoming a member in our program, please contact us [here](#).
### Analysis of Hello Barbie Privacy Policy on ToyTalk.com

| Privacy Requirement for Toy Computing (Hung, 2015) | Hello Barbie Privacy Policy  
Last Revised: January 5, 2016  
(https://toytalk.com/hellobarbie/privacy/) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The right for a parent/guardian to request restrictions on the use or disclosure of private information of their child. This allows parents/guardians to provide restrictions to purpose, recipients, obligations, and retention regarding their child’s information.</td>
<td>We use Recordings only for limited purposes as described in this Policy. We use Recordings in order to provide and maintain the Services. We may also use, store, process, convert, transcribe, analyze or review Recordings in order to provide, maintain, analyze and improve the functioning of the Services, to develop, test or improve speech recognition technology and artificial intelligence algorithms, or for other research and development and data analysis purposes. We do not use Recordings or their content, including any personal information that may be captured therein, to contact children or to advertise to them.</td>
</tr>
<tr>
<td>2. The right for a parent/guardian to access, copy, and inspect collected records on their child. This allows a parent/guardian to access their child’s records to see that data that is collected on them.</td>
<td>ToyTalk uses parental email in order to obtain parental consent for your children’s use of the Services and to create a parent account, which allows you to access the Parental Settings section of the ToyTalk website. For your convenience, ToyTalk offers a unified parent account so if your children also use or want to use other ToyTalk children’s products or services, you may use the same account to manage your children’s use of all such products or services.</td>
</tr>
<tr>
<td></td>
<td>The right for a parent/guardian to request deletion of their child’s private data records, or correction if records are inaccurate. This allows parents/guardians to request that their child’s location records be deleted, or to request a correction if their child’s records are incomplete or incorrect.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>4</td>
<td>The right for a parent/guardian to request acknowledgements through a communication channel when private information of their child is collected. This allows parents to set up a communication channel such as phone number or email address to receive acknowledgements there is an update pertaining to the collection of their child’s records. This allows parents/guardians to keep track of how their child’s information.</td>
</tr>
<tr>
<td>5</td>
<td>The right to file complaints to toy company. If a parent/guardian believes that their child’s data has been mishandled in any way by the toy company or service provider, or if they believe that they have not acted in compliance with their policies, they are able to file complaints.</td>
</tr>
<tr>
<td>6</td>
<td>The right to find out where the child’s private data has been shared for purposes other than a game. This allows a parent/guardian to be notified if their child’s records have been shared with another party for any purpose other than for a game.</td>
</tr>
</tbody>
</table>
Context Data

- Many mobile services collect **context data** – information about the user and their environment

Source: https://www.prime-project.eu/events/standardisation-ws/positionpapers/cdmfp.pdf
Types of Data

- **Volunteered Data**: data that is explicitly provided by the user.
- **Observed Data**: data not directly given by the user, but is detected by the device/application often through a sensor.
- **Inferred Data**: deduced based on analysis of a combination of volunteered and/or observed data (e.g. where a user is likely to be going based on typical behavior).
  - A lot can be interpreted about a user and their environment through inferences based on collected data. There is great value on this inferred data that would not be explicitly provided by the user.
Hello Barbie’s Phrases Analysis by Voyant (http://voyant-tools.org/)
## Analysis of the 8,000 Phrases in Hello Barbie

<table>
<thead>
<tr>
<th>Keyword (Times)</th>
<th>Hello Barbie Phrases</th>
<th>Appeared on Page Number</th>
<th>Potential Privacy Concerns</th>
<th>Example of a Child’s Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name (48)</strong></td>
<td>&quot;What's your middle name?&quot;</td>
<td>18</td>
<td>Revealing the child middle name or the parents name</td>
<td>My middle name is Jean, My full name is Alice Jean Mark</td>
</tr>
<tr>
<td></td>
<td>My mom's name is Margaret, and my dad's name is George.</td>
<td>66</td>
<td>Revealing the parents name</td>
<td>My mom name is Mary and my father name is George.</td>
</tr>
<tr>
<td></td>
<td>I'll be a visitor and you'll show me around! So...what's the name of your family's town?</td>
<td>94</td>
<td>Revealing the child current town</td>
<td>My family town is Toronto.</td>
</tr>
<tr>
<td></td>
<td>This is so cool. But so tell me, bestie, about one of your other friends. What's your friend's name?</td>
<td>154</td>
<td>Revealing the child’s friend name</td>
<td>My best friend name is Bill.</td>
</tr>
<tr>
<td></td>
<td>Maybe you could name it after one of your family members? Or a close friend?</td>
<td>179</td>
<td>The child could recall a close family member or friend</td>
<td>Okay, I'll name it after my sister Susan.</td>
</tr>
<tr>
<td><strong>Old (9)</strong></td>
<td>(GIDDY) I've been waiting all year to sing that! And remind me...how old are you today? Oh that's right...So? How does it feel being five?</td>
<td>58</td>
<td>The system identifies the child age.</td>
<td>I am six years old.</td>
</tr>
<tr>
<td></td>
<td>Oh that's right...So? How does it feel being six?</td>
<td>58</td>
<td>This phrase repeated the ages from six to ten</td>
<td>I am happy to be six years old.</td>
</tr>
<tr>
<td>Born (1)</td>
<td>Oh, well, I was born in Wisconsin, but I live in Malibu now.</td>
<td>64</td>
<td>This phrase could lead the child to say their place of birth</td>
<td>Oh nice, I was born in Calgary, but I live in Toronto now.</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------------------------------------</td>
<td>----------</td>
<td>-------------------------------------------------------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>School (67)</td>
<td>How different do you think high school will be from Kindergarten?</td>
<td>151</td>
<td>The system can identify the child’s grade.</td>
<td>I am still in junior high school.</td>
</tr>
<tr>
<td>Teacher (26)</td>
<td>A teacher? That’s a great idea! What made you want to be a teacher?</td>
<td>116</td>
<td>This could lead the child to say their teacher’s name.</td>
<td>My science teacher Mrs. Marui, she is smart and funny.</td>
</tr>
<tr>
<td></td>
<td>Oh, ok. Well, what class have you had fun in? Or is there a class where you really like the teacher?</td>
<td>116</td>
<td>This could lead the child to provide more information about their school.</td>
<td>Mathematics class as it is the best in York High School.</td>
</tr>
<tr>
<td>Bank (19)</td>
<td>Oh, a bank! You have to be responsible to work there. Who in your family runs the bank?</td>
<td>107</td>
<td>If a family member is actually working in a bank the child may reveal that information.</td>
<td>My father works at TD Bank in Markham.</td>
</tr>
<tr>
<td>Money (5)</td>
<td>My dad has always taught my sisters and me why it’s important to save the money</td>
<td>108</td>
<td>The child could reveal their parents’ saving plans.</td>
<td>My parents are saving a lot of money to buy a...</td>
</tr>
<tr>
<td>Category</td>
<td>Sentence</td>
<td>Page 103</td>
<td>User Notes</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------</td>
<td>---------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Jewelry</td>
<td>(CUTE GASP) A jewelry store! So sparkly and pretty! Who in your family runs the jewelry store?</td>
<td>103</td>
<td>Similar to the bank situation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>My mom has lots of jewelry, but what she loves most is the macaroni necklace Chelsea made her in school!</td>
<td></td>
<td>My mother loves jewelry as well. She keeps them in her bedroom.</td>
<td></td>
</tr>
<tr>
<td>Necklace</td>
<td>Honestly, my favorite necklace doesn't have a jewel in it. It's the first necklace my parents got me, and it says my name. It's more precious to me than any diamond!</td>
<td>103</td>
<td>The child could reveal their mother's jewelry information.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I have a golden necklace with a heart shape and I wear it all the time even when I go to school.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job</td>
<td>(LAUGHS) There you go! Ok, so what job might you like...</td>
<td>145</td>
<td>Information about a family member's occupation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I would like to be a computer expert like my father who works at TD Bank.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>(EXCITED) Oh I just know your home will look so amazing!! Tell me more!</td>
<td>30</td>
<td>The child may miss understand the phrase and may start describing his actual house</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I live in a house with a big front yard and we have a fish tank in the front.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is your home decorated in red, black, and green?</td>
<td>35</td>
<td>More details about the child house</td>
<td></td>
</tr>
<tr>
<td></td>
<td>My house is red color.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Home IS where the heart is! Why do you like drawing your house?</td>
<td>188</td>
<td>More details about the child house</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I like to draw flowers on the front door.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House (20)</td>
<td>My dream house is in Malibu, California!</td>
<td>67</td>
<td>The location of the house</td>
<td>My dream house is in Florida.</td>
</tr>
<tr>
<td>-----------</td>
<td>----------------------------------------</td>
<td>----</td>
<td>---------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td></td>
<td>My parents helped my sisters and me build a treehouse! That was such a fun day!</td>
<td>102</td>
<td>More details about the appearance of the house.</td>
<td>We have big backyard so my father built a tree house.</td>
</tr>
<tr>
<td></td>
<td>You have a vacation house? Do you go there every year?</td>
<td>203</td>
<td>Details about a vacation house such as location and time of being there could be reveals.</td>
<td>We go to our vacation house near the beach every year in December.</td>
</tr>
<tr>
<td>Town (9)</td>
<td>I’ll be a visitor and you’ll show me around! So... what’s the name of your family’s town?</td>
<td>94</td>
<td>A direct question of the family’s town</td>
<td>It is Toronto!</td>
</tr>
<tr>
<td>Driver’s license (10)</td>
<td>Oh, totally! I’m pretty sure my sister Stacy already has her license, ’cause, let me tell you, she can Drive.</td>
<td>152</td>
<td>The child might reveal his parents’ car information.</td>
<td>My father has a black car and my mother has a blue car.</td>
</tr>
<tr>
<td>Activity (5)</td>
<td>What’s something you’re really “dedicated” to? Maybe a favorite after school activity? Or a pet?</td>
<td>53</td>
<td>Information about the child’s habits</td>
<td>I go to the swimming pool every Thursday after school.</td>
</tr>
<tr>
<td>Hobby (1)</td>
<td>Well I think collecting books is a fantastic hobby.</td>
<td>198</td>
<td>Information about spending time in the library could be mentioned</td>
<td>I love reading books that’s why I spend time in library every Sunday.</td>
</tr>
</tbody>
</table>
Mockup Interface Demo

- Mockup interface for parents/guardians to use as an initial setup to configure preferences and create policy rules
- Initial setup of a toy computing application
Parental/Guidance Control

- While they will also likely be even more concerned with their child’s privacy, it is important to parents/guardians that they are able to understand and correctly control their child’s private data.
- A children privacy protection engine is required to allow parents to easily and effectively set preferences to control and restrict the personal data that can be collected on their child.
References


Computing in Smart Toys

1pm - 4pm, January 4, 2017, Queen's 4

Half-day Symposium
SWT Theme: Software Development Approach

A toy is an item or product intended for learning or play, which can have various benefits to childhood development. Children's toys have become increasingly sophisticated over the years, with a growing shift from simple physical products to toys that engage the digital world as Internet of Things (IoT). Toy makers are seizing this opportunity to develop products that combine the characteristics of traditional toys such as dolls and stuffed toys with computing software and hardware called Smart Toys. A smart toy is defined as a device consisting of a physical toy component in an electronic form that connects to a computing system with online services through networking and sensory technologies to enhance the functionality of a traditional toy. Toy makers such as Hasbro and Mattel are increasingly producing smart toys and it is important to understand the various research and practical issues. This leads to toy computing. Toy computing is a recently developing concept which transcends the traditional toy into a new area of computer research using ubiquitous technologies. This symposium aims to cover the research issues of toy computing for smart toys from both technical and non-technical perspectives.

SWT Leaders:

Patrick C. K. Hung (primary contact)
University of Ontario Institute of Technology, Canada
National Taipei University of Technology, Taiwan
patrick.hung@uoit.ca

Marcelo Fantinato
University of São Paulo, Brazil
m.fantinato@usp.br

Fakhruddin Iqbal
Zayed University, UAE
fakhruddin.iqbal@zu.ac.ae
Our Industry Strategic Partner

GLOBAL R&D NETWORK WITH CAPABILITIES IN ADVANCED TECHNOLOGIES AND ROBOTICS

- Global R&D operations and network of 3rd party collaborators
  - Strategically located internal R&D centres
  - Collaborative model that leverages external inventors and designers
- History of introducing technology to revolutionize traditional toys
  - Within the Radio / Remote Control subclass, Air Hogs was the #1 selling brand of flying toys in the United States in 2014\(^1\)
  - #1 in the Robotics and Interactive toys category in 2014\(^1\)
- Numerous toy and technology industry awards for innovation across multiple categories
  - Recognized with 11 Toy of the Year nominations for “Innovative Toy of the Year”\(^2\) - more than any other competitor
  - Zoomer brand recipient of three Toy of the Year awards over last two years\(^2\)
  - Meccanoid recipient of 2015 CES\(^3\) “Last Gadget Standing” award

Technology allows Spin Master to develop differentiated products, bring iconic characters to life and enhance consumer engagement.

\(^{1}\) Source: NPD
\(^{2}\) Source: Toy Industry Association, Inc., calculated since 2005
\(^{3}\) Consumer Electronics Show
Thank you for your listening!

- My email: patrick.hung@uoit.ca

“On the Internet, nobody knows you’re a dog.”

The New Yorker Collection 1993