Bot-to-Bot Conversations —
automated testing for empathetic interaction in healthcare

February, 2018

Péter Boda
enabling seamless & empathetic interaction for parental engagement
“design.ist"
Multimodal Interaction

Speech Recognition
Acoustics

Spoken Dialogue Systems
Natural Language Understanding
Dialogue Management

Mobile Wireless Sensor Systems
SensorPlanet

Experience Design

Usability
Human Factors

User Experience
Interaction Design

Visualization

Design-Driven
AI solutions
Patient Experience

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Design-Driven
AI solutions
supporting parents of premature babies, with the power of AI, for better parental engagement and shared decision making with the care team
we all have a journey
.... but some of us might got an extra mile or two to fight
Design Study: parents’ lived experience
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Figure 1: Kangaroo-care given to a premature child by the father. (Permission to use the above picture was received from the child and the father.)

Prematurity in numbers:
- 15 million premature babies born globally per year,
- 90% of babies are saved in wealthy parts of the world,
- 90% mortality rate in developing countries,
- premature birth rate 18% in some parts of Africa and Asia, in Scandinavia as low as 5-8%,
- the global average is 11%,
- in the U.S. 500,000 premature births per year, or 11% of all the live births.

Source: WHO report[1]
Design Study: parents’ lived experience

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Design Study: parents' lived experience

**Benefits:**
- Improved in weight
- Reduction in infections
- Reduction in the length of NICU stay
- Reduced stress
- Improved communication between parents and staff
- Enhanced emotional well-being
- Increased sense of belonging
- Reduced hospital anxiety
- Improved family relationships
- Increased confidence in parenting

**Source:** Levin's Estonian Baby-Friendly NICU [5]
Design Study: parents’ lived experience

Designing Multimodal Tools for Parents of Premature Babies

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Abstract
The paper describes our efforts in designing and developing a tool for supporting parents of premature babies during their critical time in a Neonatal Intensive Care Unit (NICU). The identification of the needs are described from the parents’ perspective, and supporting evidence is presented from the babies’ development point of view. The paper presents our research on identifying the lived experience of parents of premature babies through a large scale international study. The findings of the study are detailed to show how they led to the experience design criteria of a multimodal journaling tool. The paper closes with an overview of ongoing research of practical solutions to multimodal interfaces, the implementation of multimodal integration techniques, and a discussion on the generalization of the multimodal journaling tool to the larger context of patient engagement applications.

Author Keywords
User-centered design, experience design, multimodal interfaces, parents, healthcare, neonatal care, patient engagement

ACM Classification Keywords
H.5.2 [Information Interfaces and Presentation]: User Interfaces, User-centered design

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Table 1: The top 6 countries of the respondent parents, representing ca. 90% of the 298 participants.
Overwhelmed
worried
scared
urged
Fed
Stressed
Exhausted
Frightened
Sad
Hopeful
Helpless
Confused
Experienced
Relief
Numb
Hopeful
Hospital
Preparing
Anxious
Scary
Tired
Great
Insecure
Preparing
Surprise
Hospitals
Life
Health
Care
Feeling
Time
Day
Night
Elation
Relief
Joy
baby
baby
Design Study findings

- better communication with the care team (60%)
- real time flow of information (52%),
- better way to understand the baby’s development, the most important metrics, and the “big picture” (51%)
- tools must be easy to use, seamless interaction
- important role of peers
the product

Progress
At the core of the solution is the visualization of the baby’s development.
Visualization that is easy to understand and seamless to interact with.
Accessible across languages and across platforms.

Knowledge
The amount of information, especially in the early days, can be just simply overwhelming.
Learning new terms, understanding developmental issues and their impact should be grasped at a glance. Becoming more knowledgeable is reassuring.

Sharing
Parents should also have access to the best experts: to parents who already did the journey with a preemie.
Sharing their lived experience with new parents of preemies provides much-needed peer support.

Analytics
How can we measure we are on the right track?
On the long run, big data of tiny fighters will show how parents’ involvement in the care makes a difference.
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How to ....

- interact with parents under stress?

- provide empathetic interaction? —> support & engagement

- build a system that can interact with a wide variety of mentally, emotionally and/or physically exhausted users?

- let parents care for their babies in the NICU and not be distracted?
Conversational interaction development

- no data available for stressful inputs

- our solution: simulate wide variety of users .... with bots

- the ultimate use of bots for automation: bots training bots

- probabilistic Natural Language Generation
Hey, you ....
Task to solve — work in progress

- through language generation (content, wording), various personalities can be simulated

- e.g. politeness, verbosity, being under stress, etc.

- state machines with “personalized” transitional probabilities

- why? how data could boost the process?
thank you

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