Emotional Identity in Assistive Technology for Aging

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Cognitive Assistive Technologies
Emotional Alignment

need to go **beyond the functional abilities** of the person and system, and start thinking about:

- *who this person believes they are, their self*,
- *how they are feeling about themselves, the caregiver, the system, the handwashing task, and*
- *how assistive technology will effect them emotionally*

How do we build assistive technology that is:

- *emotionally aligned*, and
- *fosters uptake and adoption*?
Emotional Alignment in Practice

father–daughter?
lawyer–client?
husband–wife?
Emotional Alignment in Practice

- father–daughter?
- lawyer–client?
- husband–wife?

STAFF

RESIDENT

counter

counter

lawyer–client
Emotional Alignment in Practice

- father-daughter?
- lawyer-client?
- husband-wife?
Affect Control Theory

Shared sentiments in a 3D space Evaluation, Potency, Activity
Shared emotional dynamics
Shared consistency → Cooperation


Current/Ongoing work

- **ACT@HOME** - Qualitative study of biographical identities in dementia
  - Alexandra König (Waterloo), Alex Mihailidis (Toronto)
- **EMOTEC** - Understanding perceptions of identity
  - Julie Robillard (UBC)
- **VIPCare** - Building applications for caregivers
  - Linda Francis (Cleveland State), Moojan Ghafurian (Waterloo)
- **NEATO** - Understanding biographical narratives
  - Heather Love, Heather Eustace, Renée Leung (Waterloo)
ACT@HOME - Qualitative Study

- Semi-structured interview
- 33 Residents
- 20 Caregivers
- Biographical Identities
- Current Identities
- Loss of identity
- Identity of virtual human

Interactive Assistance Lab, University of Colorado @ Boulder
<table>
<thead>
<tr>
<th>Demographic information</th>
<th>Biographical identities (Persona)</th>
<th>Persona sentiments</th>
</tr>
</thead>
<tbody>
<tr>
<td>male, 63 years old</td>
<td>Father, husband, brother</td>
<td>Father- E:1.8/P:1.8/A:0.0</td>
</tr>
<tr>
<td>Young-onset dementia</td>
<td>Canadian, lawyer</td>
<td>Lawyer- E:0.2/P:2.1/A:0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Husband- E:1.2/P:1.0/A:0.1</td>
</tr>
<tr>
<td>male, 82 years old</td>
<td>different jobs, manager,</td>
<td>Father- E:1.8/P:1.8/A:0.0</td>
</tr>
<tr>
<td>Moderate dementia</td>
<td>lost father in war, widow,</td>
<td>Salesman- E:0.3/P:0.2/A:0.7</td>
</tr>
<tr>
<td></td>
<td>husband - lover, father,</td>
<td>Husband- E:1.2/P:1.0/A:0.1</td>
</tr>
<tr>
<td></td>
<td>brother</td>
<td>Gentleman- E:2.2/P:1.2/A:0.6</td>
</tr>
<tr>
<td>female, 93 years old</td>
<td>English, immigrant,</td>
<td>Briton- E:1.3/P:0.4/A:0.3</td>
</tr>
<tr>
<td>Mild dementia</td>
<td>housewife, mother, sister</td>
<td>Mother- E:2.2/P:1.8/A:0.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Housewife- E:1.5/P:-0.2/A:0.3</td>
</tr>
</tbody>
</table>
The Alzheimer’s Persona: Losing Identities but Retaining the Self

People remember "how they should feel, not who they are"
▶ **Tapestry Retirement Living** (Vancouver)
▶ 2018: **Non-demented** residents
▶ **identities** of “memory supplement” sellers

▶ **identities** of residents/caregivers
▶ Future: integration into **prompting** system
Memory Booster with Ginkgo Biloba

Would you purchase this product?

1 2 3 4 5 6 7

NO YES
Dr. Dharma

Dr. Dharma is a Doctor of Medicine (M.D.), an ordained minister and yogi. He is also a best-selling author.

He is dedicated to fighting Alzheimer’s disease and finding a cure through research and prevention.

He is one of the original voices on the integrative medical approach to the prevention and treatment of memory loss. He recently called on Congress to fund a national campaign to inform the public of the benefits of an integrative medical approach to Alzheimer’s.

Dr. Dharma spearheaded research studies on healthy subjects, in conjunction with the Amen Clinic. He also helped design several additional groundbreaking scientific research studies with prestigious Universities, and the renown Karolinska Institute.

Would you purchase the product from Dr. Dharma?

[1, 2, 3, 4, 5, 6, 7]
Emotional Alignment in Practice

father–daughter?

New Staff/Family member

lawyer–client

RESIDENT
Emotional Alignment in Practice

New Staff/Family member

father–daughter?
lawyer–client?
husband–wife?

RESIDENT

lawyer–client
VIPCare (Alzheimer’s Association)

- **Avon Oaks Caring Community** (Cleveland)
- 9 sessions with 18 professional staff
- **Focus groups** (2 sessions)
- **Co-Design** (7 sessions)
- Staff learns through **trial and error**
  
  “I think that would help people in the community, because a lot of people, especially when they are new, even after they are new for a while, they don’t know how to talk to the people”

- **Role Playing**
  
  “...there are 30 residents, and you live in 30 different realities in a matter of 24 hours, so you have to figure out which one you are in.”

“We had a lady who we called grandma but she would call us granny... I would play like the granny role and say ‘grandma, come on, I have made this for you’ and then she like trust me”
VIP early results
Moojan Ghafurian, Derek Tao, Elen Mullaj (Waterloo)
VIP early results

The app that bridges the gap between people with dementia and their caregivers.

“I have always explained that you walk into these doors, there are 30 residents... and you live in 30 different realities in a matter of 24 hours, so you have to figure out which one you are in.”

http://vip-care.ca

Moojan Ghafurian, Derek Tao, Elen Mullaj (Waterloo)
NEATO: Narrative Engagement for Adoption of Technology by Older Adults

- biographical interviews
- reminiscences
- local policy documents/decisions

Word embedding method
(Van Loon&Freese 2022)

EPA ratings for narrative keywords
- nurse 1.7, 0.9, 0.3
- employee: 1.2, 0.5, 0.7
- executive: 1.3, 1.9, 1.4

Affect Control Theory

Identity labeling method
(Joseph & Morgan, 2021)

Narrative deflections:
- "nurse criticizes patient" : 4.6
- "employee consult executive" : 1.3

Document corpus:
- biographical interviews
- reminiscences
- local policy documents/decisions

topic discovery method
(e.g. LDA, VAE)

Narratives:
- "nurse criticizes patient"
- "employee consult executive"

A narrative recommendation

Heather Love, Heather Eustace, Renée Leung (Waterloo)
Key Questions

- What **affective identities** are held by persons with Alzheimer’s disease?
- How quickly and by how much do these identities **change**?
- Can we **track** changing/different identities?
- Do affective prompts make a **difference**?
- Can **virtual humans** or other artifacts be used effectively for prompting?

- How can modeling of **sentiments and emotions** lead to more acceptable adaptive technologies for assistance with dementia?
Past and Current Collaborators:
- Alex Mihailidis (Toronto)
- Tobias Schröder (Potsdam)
- Linda Francis (Cleveland State)
- Julie M. Robillard (UBC)
- Heather Love (Waterloo)
- Kimberly B. Rogers (Dartmouth)
- Kathryn Lively (Dartmouth)
- Mary Step (Cleveland State)
- Sarel Van Vuuren (Colorado)
- James Tung (Waterloo)
- Rosalie Wang (Toronto)
- Neil MacKinnon (Guelph)
- Alexandra König (INRIA)
- Stefan Teipel (Rostock)
- Francois Michaud (Sherbrooke)

Current Students/Postdocs (Waterloo):
- Renée Leung
- Heather Eustace
- Elen Mullaj
- Moojan Ghafurian
- Zahra Sheihkbahaee
- Quentin Roy
- Joshua Jung
- Neil Budnarain
- Alex Sachs
- Rahul Iyer
- Alex Yun
- Daniel Tchorni
- Aarti Malhotra
- Derek Tao
Support

- American Alzheimer’s Assoc.
- Research Institute for Aging
- AGEWELL Canadian NCE
- NSERC
- SSHRC
- CIHR
- MITACS
- CCNA

More Information:

- Bayesian Affect Control Theory: bayesact.ca
- VIP-Care: vip-care.ca
- Jesse Hoey 🐦 @drjessehoey 💌 jhoey@cs.uwaterloo.ca