Faculty Project Information

Long-term Mobile Route Recommendation via Multi-agent Reinforcement Learning	
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Research Field:	Data Mining, Machine Learning, Parallel Computing, Recommendation System

Brief Description

The global rise of chronic diseases alongside rapid population ageing has intensified the need for sustainable, family-centered approaches to health management. Existing chronic disease research and interventions, however, remain largely adult-centric and biomedical, focusing on older adults as individual patients and prioritizing clinical adherence, symptom control, and self-management. While family support is frequently acknowledged, it is often treated as a background factor rather than an active, relational process, and children — particularly grandchildren — are rarely recognized as meaningful participants in chronic disease communication and lifestyle support within families.

At the same time, research on intergenerational relationships has primarily emphasized caregiving burden, value transmission, or conflict, with limited attention to how health knowledge, emotions, and daily practices are communicated across generations. In health contexts, intergenerational communication is typically conceptualized as one-directional assistance rather than a bidirectional, meaning-making process that shapes motivation, understanding, and long-term behavior. This leaves a critical gap in both theory and practice regarding how families can intentionally leverage intergenerational relationships to support chronic disease management and holistic healthy lifestyles.

Health literacy and health education interventions further operate in parallel age-based silos, targeting either older adults (through simplified materials or digital reminders) or children (through school-based education). Few interventions are designed to be simultaneously accessible to older adults and engaging for children, and even fewer integrate cognitive understanding with emotional resonance and relational motivation. As a result, many families struggle to communicate about chronic illness in ways that are

developmentally appropriate, emotionally safe, and sustainable over time.

Despite strong evidence that storytelling, play, and narrative-based approaches enhance comprehension, empathy, and engagement, such methods remain underutilized in chronic disease communication. Similarly, digital health innovations often prioritize individual efficiency and technological sophistication, inadvertently excluding older adults or reinforcing generational divides. Participatory and co-creation approaches that involve both children and older adults in designing health communication tools are also notably scarce.

This project addresses critical gaps in chronic disease research by reframing disease management as an intergenerational, relational, and communicative process, rather than an individual, adult-centric responsibility. While family involvement is widely recognized as important, existing interventions rarely engage children or leverage intergenerational communication as a mechanism for health promotion. This project responds by developing evidence-based, creative communication tools that support meaningful dialogue between children (or grandchildren) and older family members around chronic disease management and holistic healthy lifestyles.

Drawing on public health, health communication, psychology, education, design, and technology, the project adopts a participatory co-creation approach, actively involving both older adults and younger family members in the design process. It focuses on common chronic conditions (e.g., hypertension, diabetes, multimorbidity) and key lifestyle domains including nutrition, physical activity, medication adherence, mental well-being, and social connection. Using iterative qualitative research, participatory design workshops, and pilot testing, the team will develop age-appropriate, culturally responsive, and emotionally engaging tools, such as children's book prototypes, interactive storytelling kits, and low-threshold digital or hybrid products.

The project advances theory on intergenerational communication and health literacy while delivering scalable, practical tools applicable in households, schools, community health settings, and health education programs. It is innovative yet feasible, well-suited for student-faculty collaboration, and positioned to generate both scholarly and translational impact.

Expected Outcome(s)

Research report；Application development