

‘meeting people where they are’

Formative Research on using Natural Language markers to Identify Stage of Behavioural Change and Personalise Interventions in Digital Health Support Networks

Exploring Readiness to Change Amongst Online Behavioural Health Forum Users

INTRO

- For Digital Health Support Networks (DHSNs) to achieve their potential, the science of attrition must be advanced to mitigate low engagement in real world settings.
- Our formative research into phenotyping DHSN interactions led us to consider the importance of ‘Identifiable Context’: patterns of verbal behaviour which connect modal operators to personalised goals

METHODS

- Created a dictionary of regular expressions based on Motivational Interviewing (MI) textbook definitions and practical descriptions of Change Talk (CT - see table)
- Exploratory Data Analysis and labelling of individual sentences and utterances to provide full context.
- Collected results around patterns and differentiating features of positive and negative classes
- Create classification tool for the purpose of automating screening of level of readiness, returning a ‘score’ for unseen records
- Employ active machine learning to involve expert human raters (patients, clinicians, platform moderators & super-users in refining the model)

Examples of Change Talk

Desire	Ability	Reasons	Need	Commitment	Activation	Taking Steps
I want to	I can do	It would get better	I need to	I’m gonna	I am ready	I’ve been
I wanna	I know I	I’d feel better	I really should	I promise I will	I’m about to	I’ve done
I’d like	I have the ability	I think it would	I ought to	I intend to	I’ll start to	Recently I’ve attempted
I dream of	This is possible	It’d allow	This can’t continue	I will try	This week I am	I have completed

INITIAL RESULTS

- Inherent similarities in the structure of open and non-open examples made them difficult to distinguish; important pronouns and conjunctions are so common in general dialogue they are often removed in standard Natural Language Processing.
- Readiness to change relies more on ‘identifiable contexts’ than related problems such as sentiment analysis.
- Preliminary findings suggest this method for distilling practitioner expertise can elucidate the Identifiable Context of CT (matching recorded and inferred user goals and values)
- Empirical analysis of data revealed ‘openness’ as a precursor to MI CT, suggesting expanding the psychological constructs informing the language markers to include mindfulness

DISCUSSION

- If we can create a reliable enough classifier, we can potentially assess an individual’s readiness to change and then match suitable health coaching approaches, reducing disengagement and optimizing treatment efficacy

The ‘Recovery Ratchet’



Connection to Patient Activation

Level 1	Level 2	Level 3	Level 4
Disengaged and overwhelmed	Becoming aware, but still struggling	Taking action	Maintaining behaviours and pushing further
Individuals are passive and lack confidence. Knowledge is low, goal-orientation is weak, and adherence is poor.	Individuals have some knowledge, but large gaps remain. They believe health is largely out of their control, but can set simple goals.	Individuals have the key facts and are building self-management skills. They strive for best practice behaviours, and are goal orientated.	Individuals have adopted new behaviours, but may struggle in times of stress or change. Maintaining a healthy lifestyle is a key focus.
Their perspective: “My doctor is in charge of my health”.	Their perspective: “I could be doing more”.	Their perspective: “I am part of my health care team”.	Their perspective: “I am my own advocate”.



Figure 2: PAM® activation characteristics by level
Source: Adapted from Insignia Health PAM® practice manual

Next Steps:

Triangulate against relevant in-platform progress measures & explore linkage to electronic health & social care records to measure impact on resource consumption and patient experience

Leverage ethical & technical expert assistance through ongoing collaboration with Manchester Metropolitan University via the GM AI Foundry, and Salford University via Innovate UK KTP scheme

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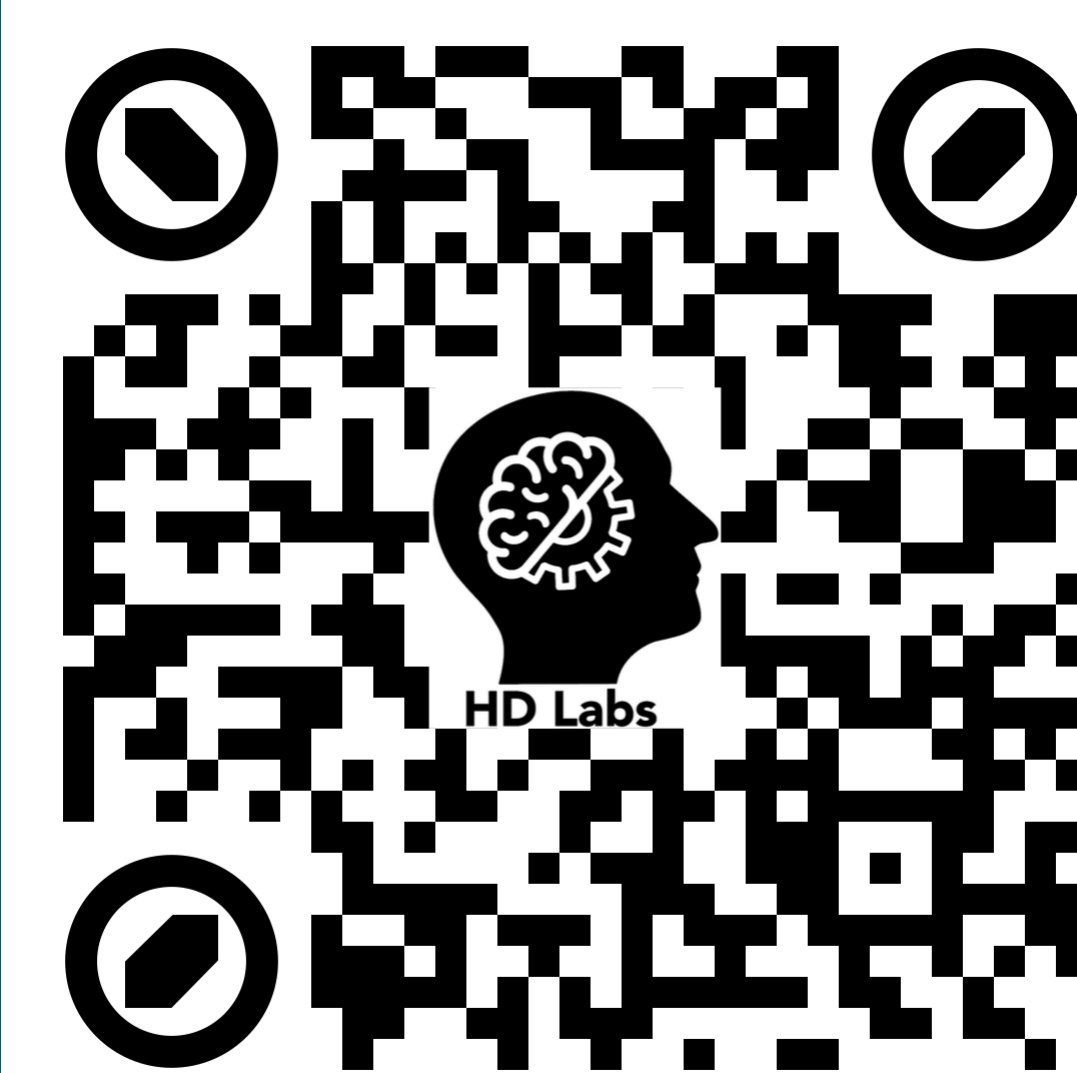
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