UCI Paul Merage School of Business

Use of Generative AI Chatbot to Aid Online Quit-Smoking Support Groups

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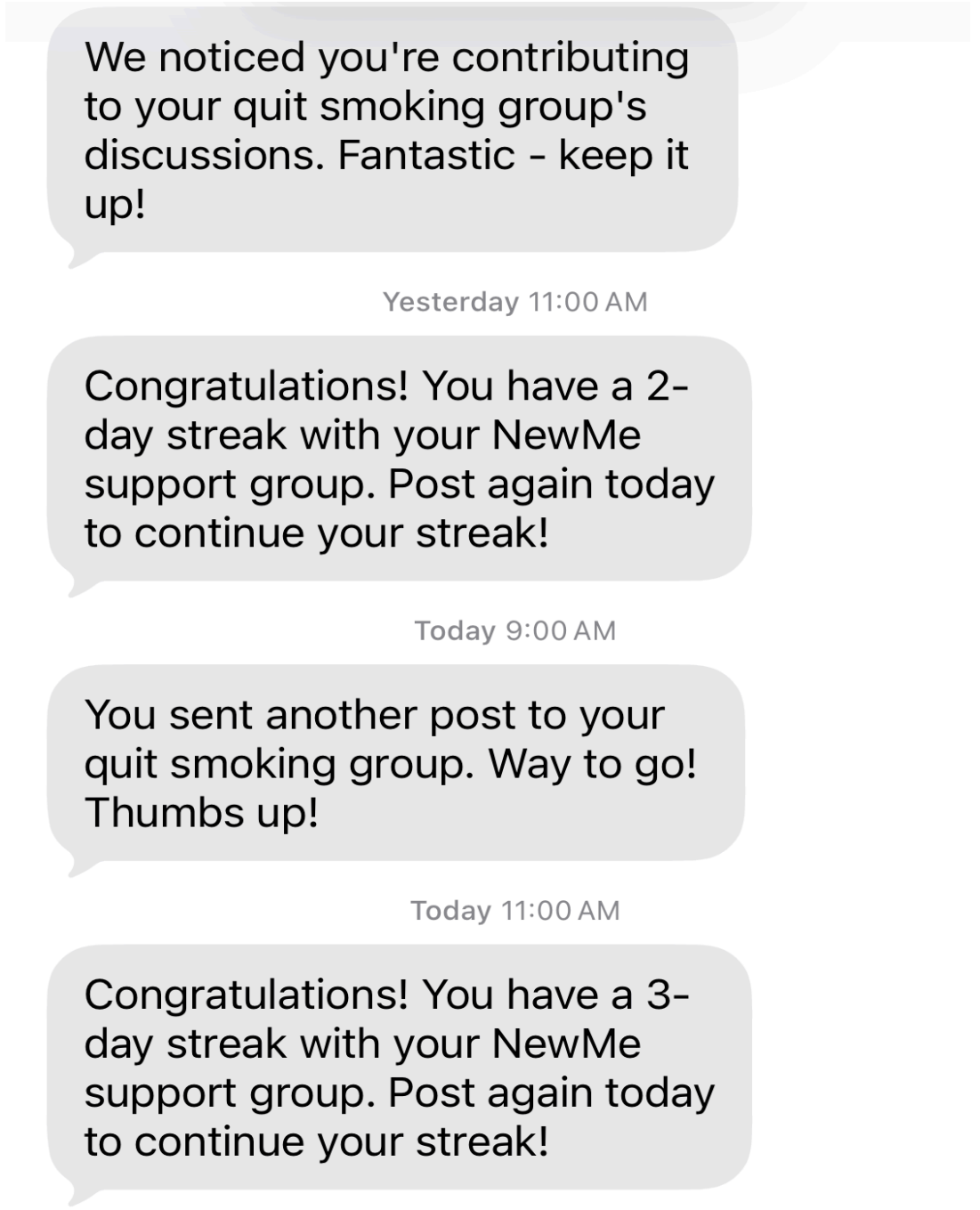
Prior Work on Online Quit-Smoking Support Groups

- 20-person 24-hour online support groups, peer-to-peer, 90 days
- Initially on Twitter → now on GroupMe (Microsoft's LinkedIn unit)
- Free NRT (Nicotine Replacement Therapy)

- Morning text reminder + streak report (Twilio)
- Afternoon discussion topic (posted by rudimentary chatbot, non-responsive)

- R34: Self-reported 3-month abstinence: 40% test vs. 20% control
- R01: Bioconfirmed 6-month abstinence: NS overall, but older men benefited

Morning text reminder + streak report (Twilio)



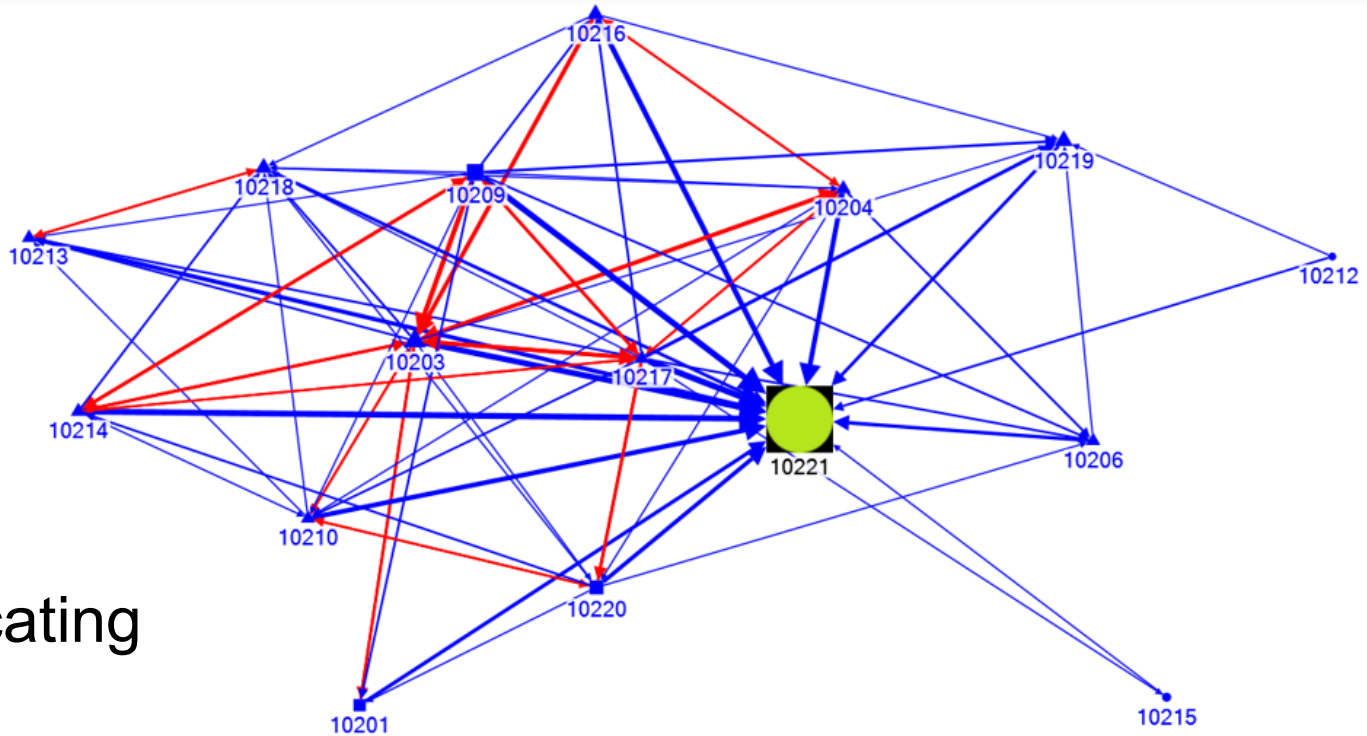
Value of Rudimentary Chatbot to Aid Support Groups

Support group's social network

Weeks 4 – 8

15 active humans, 11 reciprocating

10221 (green) chatbot, non-reciprocating

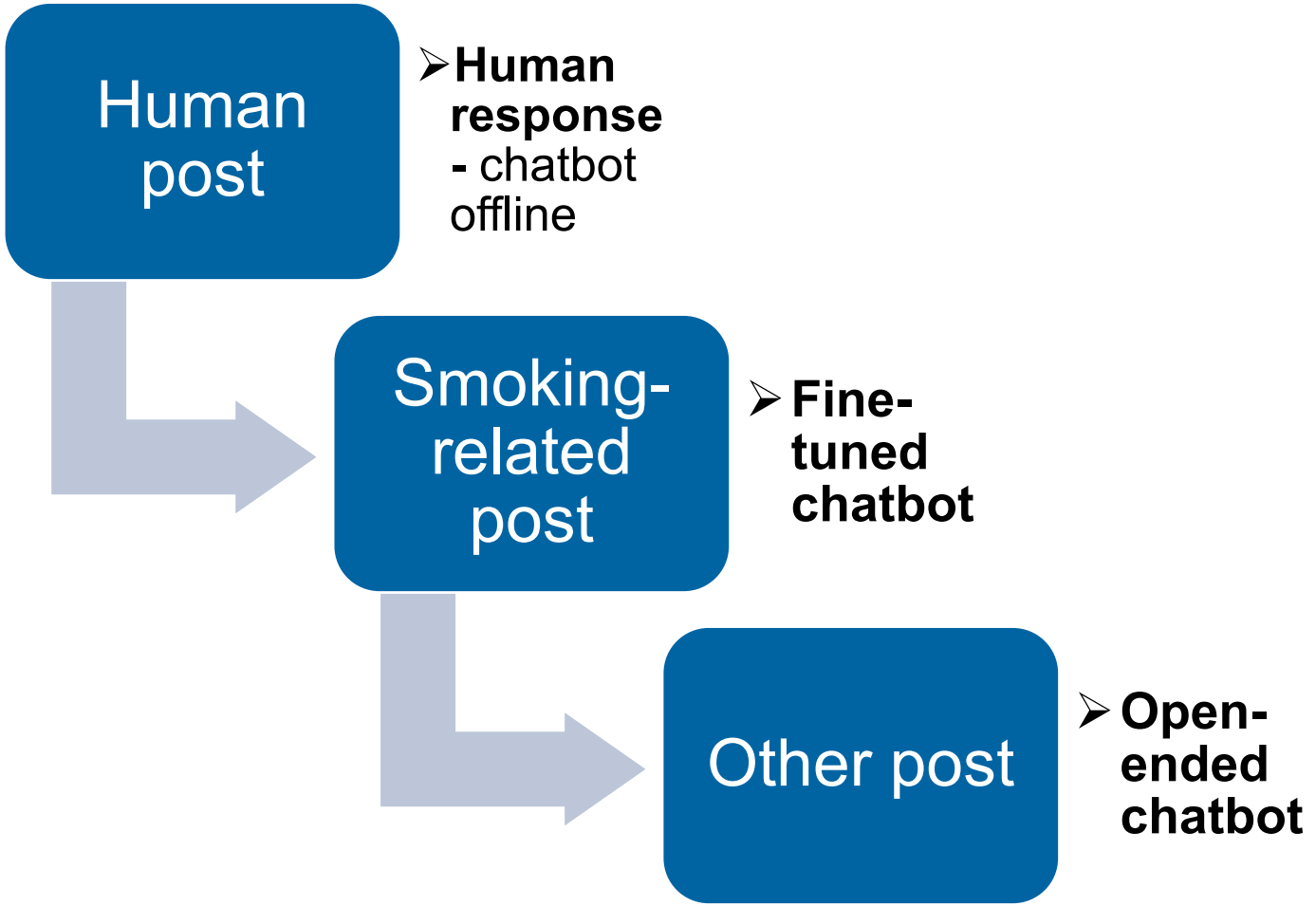


Legend

In-Degree Centrality (Node size)
Larger nodes were more popular than smaller nodes

Reciprocity (Tie color)
Red - Reciprocated ties
Blue - Non-reciprocated ties

Integration of AI Chatbot to Aid Support Groups



Development of AI Chatbot: Overview

Uses Large Language Models (LLM)

- Available from Meta, open source
- Prior model: Llama - 3 - 8B
- New model: Llama - 3.3 - 70B
  - Requires new server
- Downloaded from Hugging Face
  - Posts stay on our server
- Pre-trained → We then fine-tune



Development of AI Chatbot: Intent Detection

LLM fine-tuned to detect communication intent of each post

- Fine-tuning needed, as posts are cursory, e.g., “I’m on day 4”
- 80k prior posts → human annotations of intents
- 24 smoking-related intents, e.g., success, failure, nicotine patch use

- LLM without fine tuning: **.38** F1-score
- LLM with fine tuning: **.91** F1-score

Development of AI Chatbot: Responses

LLM libraries: Responses to smoking-related posts

- 24 libraries for 24 intents
- Evidence-based info about smoking cessation
- Multiple intents in post ➔ multiple libraries used
- Retrieval Augmented Generation (RAG) ➔ further increases realism

LLM with guardrails: Responses to other posts

- Standard guardrails: derail discussions of violence, hate, sex
- Additional guardrails: derail discussions of politics, etc.

Discussion topic →

Human post →

Chatbot response

@newme 5:00 PM
There are so many benefits to being smoke-free. What are you looking forward to the most? Share these benefits with your group!



Connie Pechmann 5:02 PM
I have a lot more energy and I don't get out of breath when I take my dog for a walk

@newme 5:03 PM
Connie Pechmann It's wonderful to hear that you're experiencing more energy and improved breathing after quitting. Your lung capacity is gradually improving, allowing you to stay active and feel more energized. Keep up the great work, and remember that you're on the road to better health!

NIDA-Funded R34 on Chatbot-Aided Support Groups

Aim 1: 2026 - 2027

1 **Development of Chatbot using human-centered design**

1a Recruitment of participants in target population

1b Human-centered design sessions

1c Chatbot refinement and technological upgrades

NIDA-Funded R34 on Chatbot-Aided Support Groups

Aim 2: 2027 - 2028

2 **Single-armed field trial of chatbot feasibility, acceptability**

2a Recruitment of participants in target population

2b Field testing of chatbot within support groups

2c Chatbot refinement and technological upgrades

NIDA-Funded R34 on Chatbot-Aided Support Groups

Aim 3: 2028 - 2029

3 **Randomized Controlled Trial of Chatbot Efficacy**

3a Recruitment of participants in target population

3b Pilot RTC completion and abstinence assessment

3c Data analysis and manuscript preparation

3d R01 preparation and conference presentations



Q & A

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See online CV for publications