Designing a Conversational Agent for User-Centric Gut Health Support Through Generative AI-Based Digital Personas

Supplementary Materials for Submission #1188

Investigated Mobile Apps in the Context of Gut Health

#	Name of the App	Link to Android App	Link to iOS App
1	Ayble Health	https://play.google.com/store/apps/details?id=com.ayblehealth.app&hl=de	https://apps.apple.com/us/app/ayble-health-gi-gut-care/id1642365544
2	Belly Boi	*Not available*	https://apps.apple.com/de/app/belly-boi/id1592909416
3	Biotys	*Not available*	https://apps.apple.com/de/app/bio-tys/id6443545029
4	Bowelle – Das Tagebuch für RDS	*Not available*	https://apps.apple.com/de/app/bowelle-das-tagebuch-f%C3%BCr-rds/id1436064640
5	Cara Care	https://play.google.com/store/apps/details?id=com.gohidoc.caraeu	https://apps.apple.com/de/app/cara-care/id1526811241
6	Darmgesund	https://play.google.com/store/apps/details?id=com.p6k2wfvx40x3.pu7831gslapp&pcampaignid=web_share&pli=1	https://apps.apple.com/de/app/darmgesund/id6449847359
7	Digo Health Tagebuch	https://play.google.com/store/apps/details?id=org.medocs.gerdiary&hl=de	https://apps.apple.com/de/app/digo-health-tagebuch/id1504425563
8	Eatrack - Ernährungstagebuch	*Not available*	https://apps.apple.com/de/app/eatrack-ern%C3%A4hrungstagebuch/id6475624331
9	Elsavie – Gut Health Tracking & Insights	https://play.google.com/store/apps/details?id=com.elsavie.gutsecret	https://apps.apple.com/de/app/elsavie-gut-health-tracking/id1641853015
10	Endive – IBS Food Diary	https://play.google.com/store/apps/details?id=app.endive&hl=gsw	https://apps.apple.com/de/app/endive-ibs-food-diary/id1505121271
11	FLORA – Acid Reflux/ Gut Health	https://play.google.com/store/apps/details?id=com.arketa.flora&pli=1	https://apps.apple.com/us/app/flora-acid-reflux-gut-health/id1665459896
12	Fodmap: SIBO Diät Tracker	https://play.google.com/store/apps/details?id=com.prestigeworldwide.fodmap&hl=de	https://apps.apple.com/de/app/fodmap-1-sibo-di%C3%A4t-tracker/id1510994461
13	Gesund + Aktiv - Ernährungsplan	https://play.google.com/store/apps/details?id=com.gesundaktiv.app	https://apps.apple.com/de/app/gesund-aktiv/id1570427550
14	Gesünder leben: MyFoodDoctor	https://play.google.com/store/apps/details?id=de.myfooddoctor.app	https://apps.apple.com/de/app/ges%C3%BCnder-leben-myfood-doctor/id1493411240?l=en-GB
15	Glückliches Kacken: Poop Track	https://play.google.com/store/apps/details?id=com.casadozeps.cocofeliz	https://apps.apple.com/ch/app/gl%C3%BCckliches-kacken-poop-track/
16	Gut2Know: Gut Health Partner	https://play.google.com/store/apps/details?id=com.jnj.gut2know	https://apps.apple.com/gb/app/gut2know-gut-health-partner/id6473721848
17	Gut Health Diet Recipes	https://play.google.com/store/apps/details?id=gut.health.app.diet.recipes	https://apps.apple.com/de/app/gut-health-diet-recipes-app/id6446131779
18	Histamin, Fructose & Co.	https://play.google.com/store/apps/details?id=de.baliza.hifmco&hl=de	https://apps.apple.com/de/app/histamin-fructose-co/id419098758
19	IBS Coach: FODMAP Diet Planner	https://play.google.com/store/apps/details?id=org.healthsimplified.ibscoach&hl=gsw	https://apps.apple.com/us/app/ibs-coach-fodmap-diet-planner/id1566098174
20	Injoy: Gut Health Tracker	https://play.google.com/store/apps/details?id=com.phyla.phyla	https://apps.apple.com/il/app/injoy-gut-health-tracker/id1537632721

21	Kot und Toilette - Diät	*Not available*	https://apps.apple.com/de/app/kot-und-toilette-di%C3%A4t/id6449427818
22	Low FODMAP diet A to Z Foods	https://play.google.com/store/apps/details?id=uk.co.temeraire1798.fodmapaz	https://apps.apple.com/us/app/low-fodmap-diet-a-to-z/id1356683228
23	Low FODMAP Diät: IBS-Tracker	https://play.google.com/store/apps/details?id=com.healthfitness.fodmap	https://apps.apple.com/us/app/low-fodmap-diet-ibs-tracker/id1617282212
24	My IBD Care	https://play.google.com/store/apps/details?id=nhs.ibd.com.nhsibd&hl=de	https://apps.apple.com/de/app/my-ibd-care-crohns-colitis/id1257828274
25	mySymptoms Food Diary	https://play.google.com/store/apps/details?id=com.sglabs.mysymptoms	https://apps.apple.com/us/app/my-symptoms-food-diary/id405231632
26	Oshi Health	https://play.google.com/store/apps/details?id=com.oshimobile&hl=gsw	https://apps.apple.com/us/app/oshi-health/id1518331430
27	Plantversify Ihr Mikrobiom	*Not available*	https://apps.apple.com/de/app/plantversify-ihr-mikrobiom/id6471838762
28	Plop – Poop Tracker & Analyzer	https://play.google.com/store/apps/details?id=com.notiis.plop	https://apps.apple.com/us/app/plop-poop-tracker-analyzer/id1505427265
29	Poop Aufzeichnung: Erfrischend	https://play.google.com/store/apps/details?id=com.h2acreate.bs&hl=de	https://apps.apple.com/de/app/poop-aufzeichnung-erfrischend/id1071616084
30	Poop Chat – AI Gut Wellness	*Not available*	https://apps.apple.com/us/app/poop-chat-ai-gut-wellness/id6507656328
31	Poop Tracker: Bowel Movements	https://play.google.com/store/apps/details?id=stool.bowel.poop.poo.tracker.journal.log.diary	*Not available*
32	Poop Tracker – Toilet Log	https://play.google.com/store/apps/details?id=com.appstronautstudios.pooplog	https://apps.apple.com/us/app/poop-tracker-toilet-log/id1270884638
33	Poopify – Kenne deinen Darm	https://play.google.com/store/apps/details?id=com.etcho.poopify	*Not available*
34	Tami – Deine CED App	https://play.google.com/store/apps/details?id=com.temedica.tami&hl=de	https://apps.apple.com/de/app/tami-deine-ced-app/id1669015203?l
35	THEralution - Darmgesundheit	https://play.google.com/store/apps/details?id=de.app.theralution	https://apps.apple.com/de/app/theralution-darmgesundheit/id6469146924
36	The Gut Stuff	https://play.google.com/store/apps/details?id=com.gutstuff	*Not available*
37	Thrive35: Gut Health Fiber Log	*Not available*	https://apps.apple.com/de/app/thrive35-gut-health-fiber-log/id6478638536

Investigated Conversational Agents in the Context of Gut Health

#	Name of the Conversational Agent	Link to the Conversational Agent
1	Gut Health Chatbot AI Health	https://play.google.com/store/apps/details?id=dinoxz.ai.gut.health.chatbot.apps&hl=gsw
2	Gut Health Guru Chatbot	https://www.nourishmeorganics.com.au/pages/gut-health-guru-chat-bot
3	Gut Health Guide Chatbot	https://www.yeschat.ai/gpts-9t557kNLrGt-Gut-Health-Guide
4	Gut Genius Chatbot	https://t.me/LifeCo_bot
5	Dr. E's Gut Health Guide	https://www.yeschat.ai/gpts-9t56Ms8qJsp-Dr-E-s-Guide

User Stories for the Gut Health Conversational Agent

The procedure for developing the user stories for the gut health conversational agent featuring the gut health digital persona was aligned to the recommendations as proposed by Schilling (2016, pp. 230 and following). Below, we elaborate three user stories we have derived for the gut health conversational agent. These three user stories served as the basis for deriving design requirements for the intended solution.

| **Beate:** Diagnosed irritable bowel syndrome; recurring bowel problems | **Scenario:**
Beate has been diagnosed with irritable bowel syndrome, which frequently causes her recurring problems and discomfort, especially when she is tense or under a lot of stress. Consuming too much coffee, milk, or sugar often triggers abdominal cramps for her. She hopes that the gut health conversational agent will help her with her everyday symptoms.

User Story:
Beate turns to the gut health conversational agent whenever experiencing stomach issues in her daily life — whether it's right after waking up, relaxing on the sofa in the evening, or in the middle of a busy workday. She communicates her issues to the conversational agent to find recommendations for simple, effective remedies that can quickly ease her symptoms, such as using a hot water bottle, taking probiotics, or avoiding sugar and fat. As soon as Beate starts the dialog with the conversational agent, she reports that she is suffering gut issues right now. Then, the conversational agent records the severity of her symptoms on a scale from 1 (symptom-free) to 10 (severe pain). Later, she logs the times when she notices improvement, allowing her to track symptom progression and assess the effectiveness of different measures. She is particularly interested in identifying patterns over the course of a day or week.

Beate also turns to the agent as an informational resource to support her gut health in the medium and long term. She primarily looks for practical tips on maintaining a balanced diet and making gut-friendly choices in everyday life.

Actions Performed within the Gut Health Conversational Agent:
• Starting the dialog with the gut health conversational agent
• Searching remedies for a quick relief from acute gut concerns: **DR4, DR6**
• Recording the time the symptom has started and when it was resolved: **DR1**
• Analyzing the progression of the symptom: **DR8**
• Finding health tips for maintaining a healthy gut: **DR6** |
| **Hans:** Sigmoid resection six months ago due to complicated diverticulitis | **Scenario:**
Hans was hospitalized six months ago with acute abdominal pain. Tests revealed complex diverticulitis with fistula formation, leading to a sigmoid resection. Since then, he has been cautious about his health and turns to the gut health conversational agent to learn more about gut health and quickly find help if any issues arise.

User Story:
Hans started turning to the conversational agent immediately after being discharged from the hospital and has been using it daily. Every morning, he logs his current condition, ranging from pain-free to severe pain, and updates this information again at lunchtime and in the evening. By tracking his pain progression, he regularly reviews trend curves, searching for patterns that might indicate recurring pain episodes.

Every morning, after documenting his gut health status, Hans uses the conversational agent to find recipes for the following day, allowing him to purchase the necessary ingredients in the afternoon. In light of his condition, he has decided to shift from his previous diet of traditional Bavarian cuisine to healthier options to reduce the risk of a relapse.

Whenever Hans feels a slight pressure in his abdomen, he turns to the gut health conversational agent to check if his gut may be inflamed again. He records details such as stool consistency, body temperature (for possible fever), and the presence of blood in his stool. Based on this information, the conversational agent can accurately assess whether inflammation is likely or if the symptoms point to something other than intestinal inflammation. This is possible because the conversational agent's recommendations are grounded in the latest medical knowledge. |

	If the conversational agent suggests seeking a doctor or if it detects a potentially severe gut health issue, Hans uses the conversational agent to find appropriate experts to discuss his concerns. **Actions Performed within the Gut Health Conversational Agent:** • Starting the dialog with the gut health conversational agent • Recording parameters regarding the current gut health status: **DR1** • Analyzing the progression of the symptom: **DR8** • Searching for recipes supporting his individual gut health: **DR3** • Seeking medically-grounded advice for acute gut concerns: **DR4, DR 5** • Establishing contact to gut health experts: **DR7**
Torben: Struggling with bowel problems accompanied by bloating and diarrhea	**Scenario:** Torben has been experiencing frequent and urgent needs to use the restroom in his daily life. These episodes cause discomfort and make him feel disconnected from social activities, especially when symptoms like bloating or diarrhea occur. Seeking answers, Torben turned to the gut health conversational agent, hoping to better understand the causes of his symptoms. **User Story:** Torben began using the conversational agent to identify the causes of his gut issues. The gut health conversational agent recommended him to track his dietary habits, physical activities, and stress level, as these are common triggers for his symptoms. Now, whenever Torben experiences bloating or diarrhea, he reports his symptoms by communicating with the agent. Based on the provided information, the gut health conversational agent can identify potential links between Torben's habits and symptoms, such as food intolerances (e.g., gluten or lactose), too much alcohol consumption, physical inactivity, or high stress levels. Regarding the detected triggers and situations that are possibly causing his gut health problems, the conversational agent provides recommendations for remedies that are grounded in the latest medical knowledge. Torben also logs whether he notices improvement, allowing him to track symptom progression and assessing the effectiveness of different remedies. If the agent detects from Torben's health parameters a potentially severe cause for his bloating and diarrhea, it immediately recommends seeking a doctor's advice and assists him in finding the right expert to discuss his concerns. As a result, Torben noticed that his symptoms often occurred after eating pasta at restaurants with friends. With the help of the agent, he suspected a gluten intolerance. Medical tests confirmed this, enabling him to take appropriate measures and resolve the issue. **Actions Performed within the Gut Health Conversational Agent:** • Starting the dialog with the gut health conversational agent • Recording parameters regarding the current gut health status: **DR1** • Analyzing the links between the symptom and habits: **DR8** • Understanding possible causes and remedies for the gut problems: **DR5, DR6** • Establishing contact to gut health experts*: **DR7**