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Emotional Bonds with AI Companions Analyzing AI Companion Usage, Loneliness & Emotional Well-Being

Data Science & Data Analytics – Project Presentation

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IBM 3

Motivation (Why this topic?)

- Rising use of AI companions (e.g. Replika, Character.ai)
- AI as emotional support for lonely users
- Limited empirical research available
- High societal and ethical relevance

Research Question

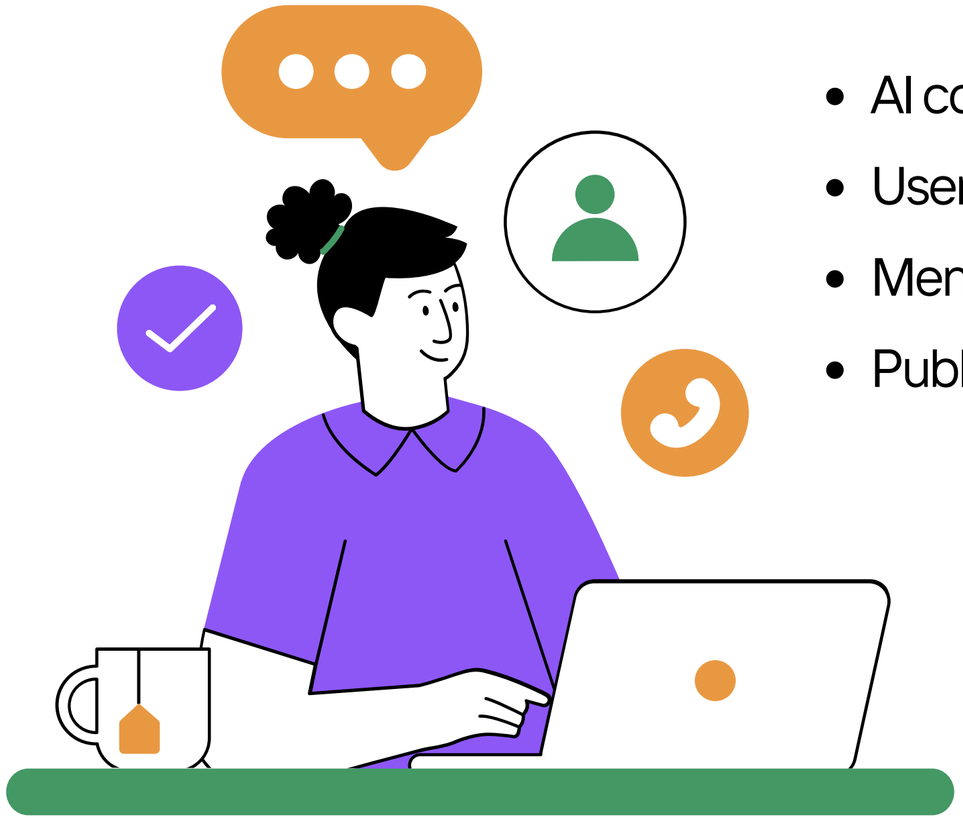
How does the intensity of AI companion use affect:

- Perceived loneliness
- Emotional well-being?

Focus on potential:

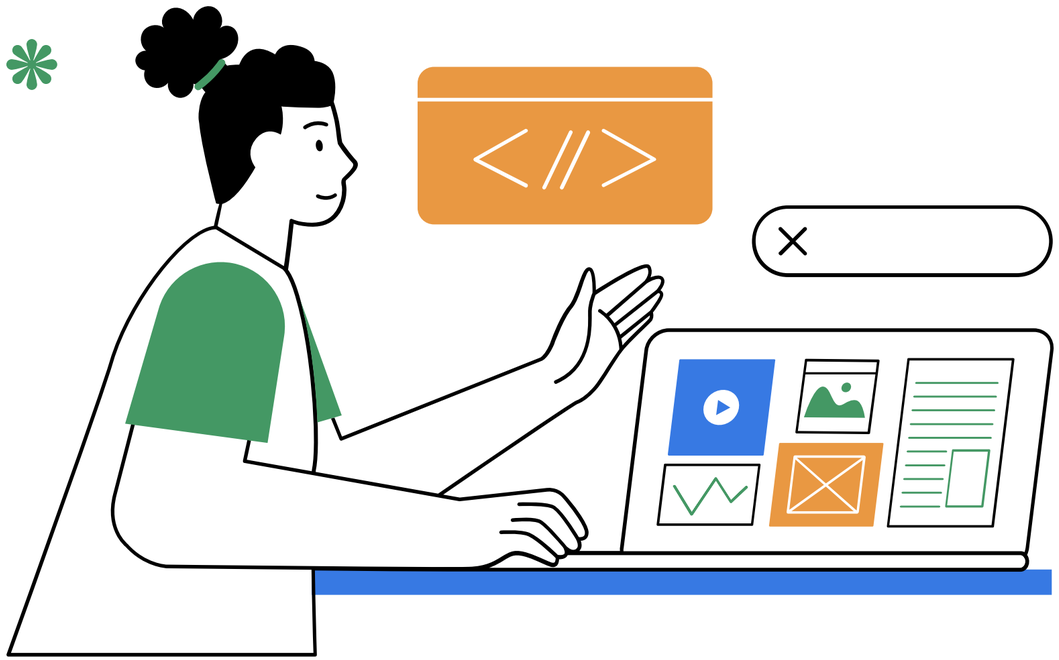
- Benefits (reduced loneliness)
- Risks (emotional dependency)

Research Context



- AI companions simulate social interaction
- Users form emotional bonds with AI
- Mental health discussions increasingly visible online
- Public data allows empirical exploration

Data Strategy



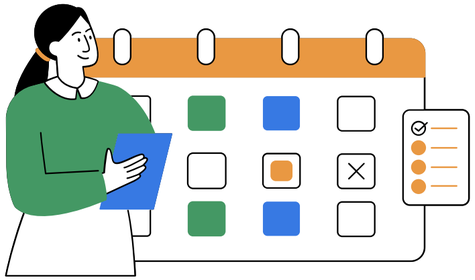
No single dataset links:

- AI companion usage and
- Mental health outcomes

Solution:

- Combine multiple public datasets
- Use proxies and sentiment analysis

Dataset 1:Mental Health



Mental Health Dataset.csv (31.1 MB)

Detail | Compact | Column

10 of 17

About this file

This data has nearly 300k raws and 17 columns.

Timestamp Time the survey was submitted	Gender Respondent gender	Country Respondent country	Occupation	self_employed Are you self-employed?	family_history Do you have a family history of mental illness?	treatment Have you sought treatment for a mental health condition?	Days_Indoors
2014-08-27 2016-02-02	Male 82% Female 18%		Housewife 23% Student 21% Other (164219) 56%	 true 29.2k 10% false 258k 88% [null] 5202 2%	 true 116k 40% false 177k 60%	 true 148k 50% false 145k 50%	1-14 days 22% 31-60 days 21% Other (168111) 58%
8/27/2014 11:29	Female	United States	Corporate		No	Yes	1-14 days
8/27/2014 11:31	Female	United States	Corporate		Yes	Yes	1-14 days
8/27/2014 11:32	Female	United States	Corporate		Yes	Yes	1-14 days
8/27/2014 11:37	Female	United States	Corporate	No	Yes	Yes	1-14 days
8/27/2014 11:43	Female	United States	Corporate	No	Yes	Yes	1-14 days
8/27/2014 11:49	Female	Poland	Corporate	No	No	Yes	1-14 days
8/27/2014 11:51	Female	Australia	Corporate	No	Yes	Yes	1-14 days

Dataset 2: Daily AI Assistant Usage Behavior

Daily_AI_Assistant_Usage_Behavior_Dataset.csv (18.31 kB)

Detail Compact Column 8 of 8

About this file

This dataset is designed to help researchers, developers, and data enthusiasts analyze how people rely on AI tools for productivity, creativity, learning, and routine tasks. It is ideal for building models around u behavior prediction, recommendation systems, personalization, and conversational AI improvements.

timestamp	device	usage_category	prompt_length	session_length_...	satisfaction_rating	assistant_model	tokens_used
2025-01-01 2025-03-11	Smart Speaker 28% Desktop 27% Other (136) 45%	Education 18% Productivity 15% Other (200) 67%	103.00 - 127.50 Count: 37 5 250	0.2 15	1 5	GPT-4o 26% o1 20% Other (162) 54%	32 1500
2025-02-20 03:29:00	Desktop	Education	14	7.08	5	GPT-5.1	44
2025-01-08 18:28:00	Mobile	Daily Tasks	32	13.07	2	GPT-4o	1047
2025-01-12 17:56:00	Smart Speaker	Education	236	10.15	4	GPT-4o	1379
2025-01-04 09:11:00	Smart Speaker	Productivity	98	14.45	1	GPT-5	1105
2025-02-14 19:59:00	Smart Speaker	Research	220	4.5	5	GPT-5.1	107
2025-02-08 00:37:00	Smart Speaker	Coding	245	8.01	2	GPT-5.1	598
2025-01-13 09:21:00	Desktop	Entertainment	214	9.46	4	o1	1387

Why These Datasets Fit the Research

Mental Health Dataset:

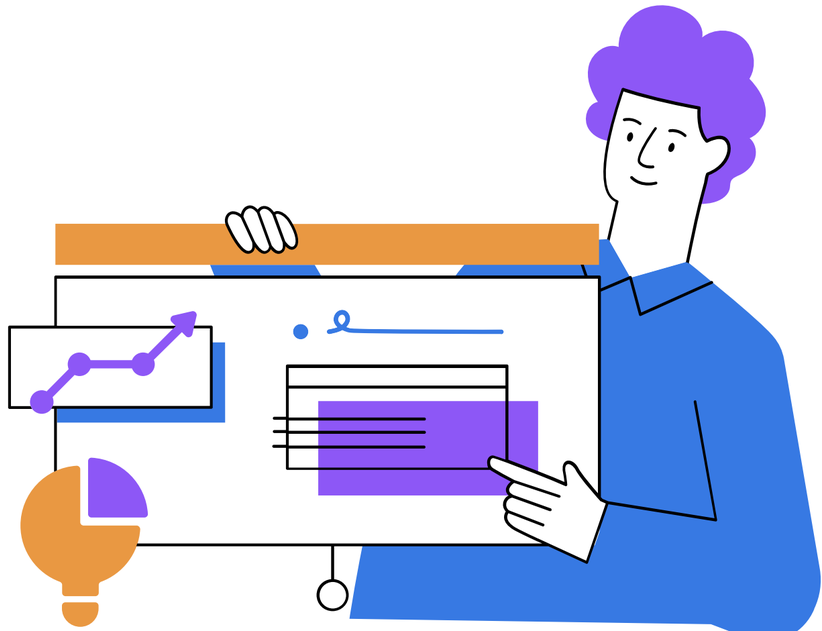
- Captures emotional well-being indicators

AI Usage Dataset:

- Captures intensity of AI interaction

Combined approach:

- Enables indirect relationship analysis
- Methodologically transparent & justified



Planned Sentiment Analysis

Apply sentiment analysis to:

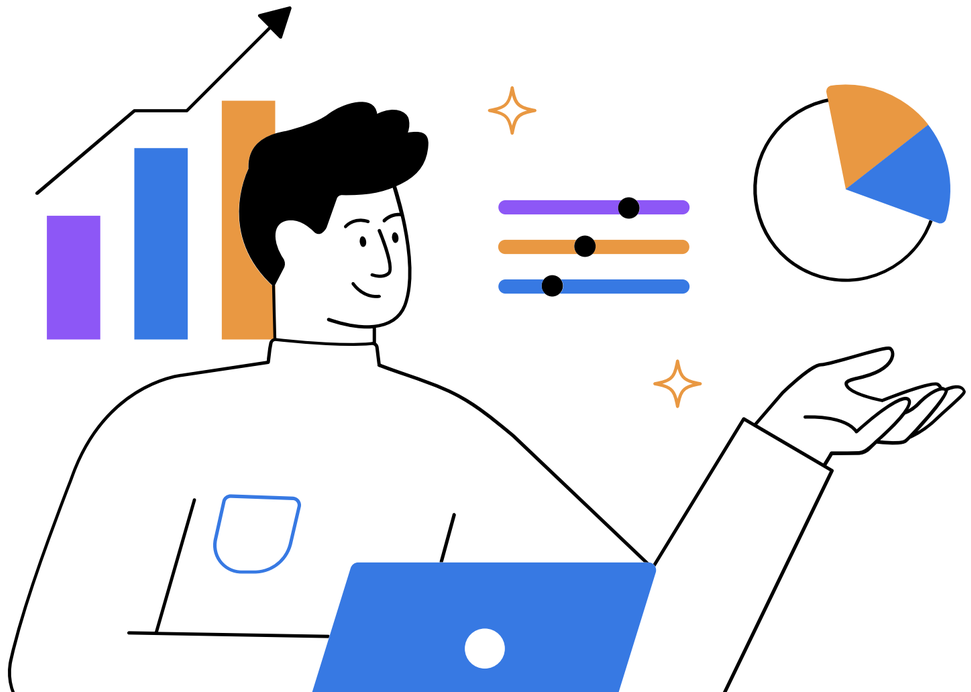
- AI interaction text (if available)
- Mental health–related text variables

Methods:

- Lexicon-based sentiment (e.g. VADER)
- Emotional polarity scores

Goal:

- Identify emotional tone linked to AI usage intensity



Analytical Approach

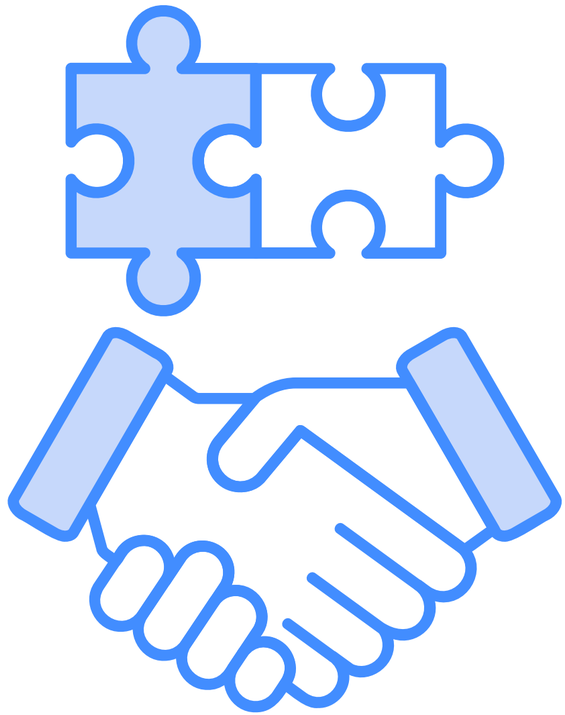
- Data preprocessing in R
- Descriptive statistics

Correlation analysis:

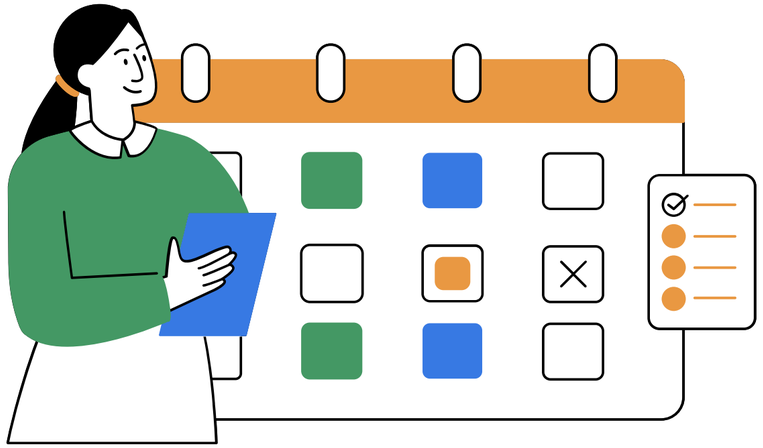
- AI usage intensity vs. well-being indicators

Sentiment score comparison:

- Low vs. high AI usage groups

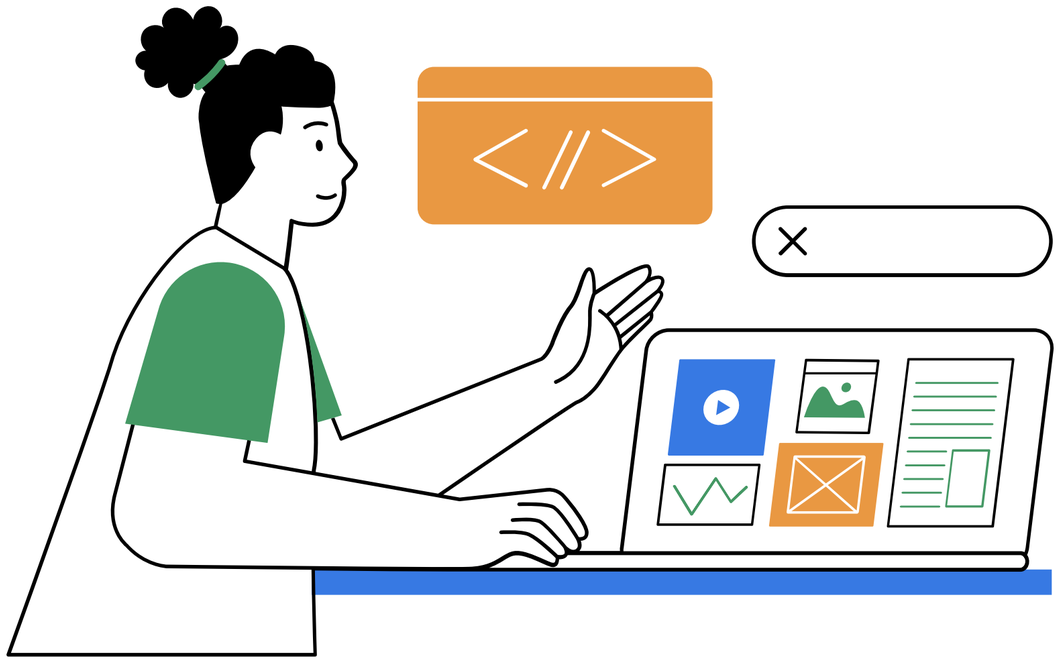


Ethical Considerations



- Sensitive mental health data
- Fully anonymized public datasets
- No individual identification
- Responsible interpretation of emotional content

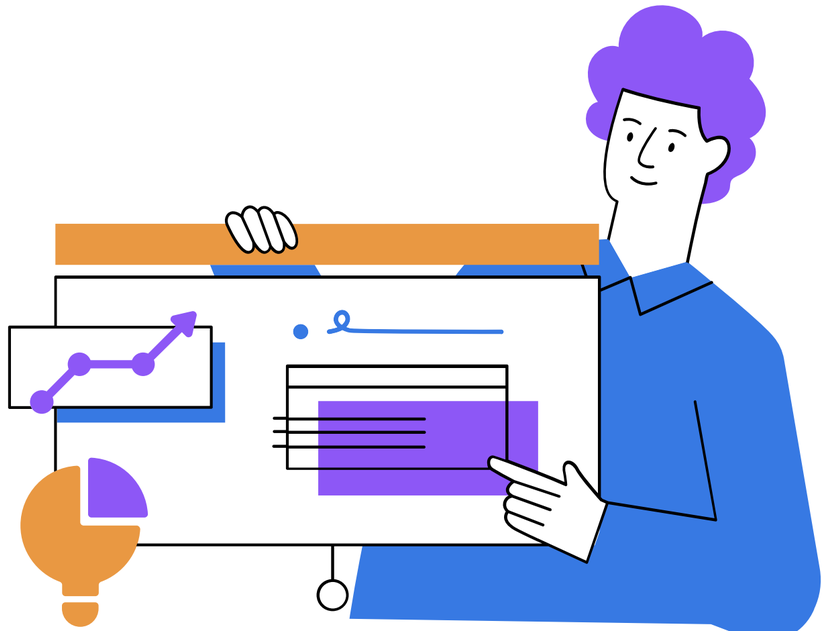
Current Challenges



- No direct AI companion mental health dataset
- Proxy-based measurement required
- Interpretation of emotional signals
- Risk of over-generalization

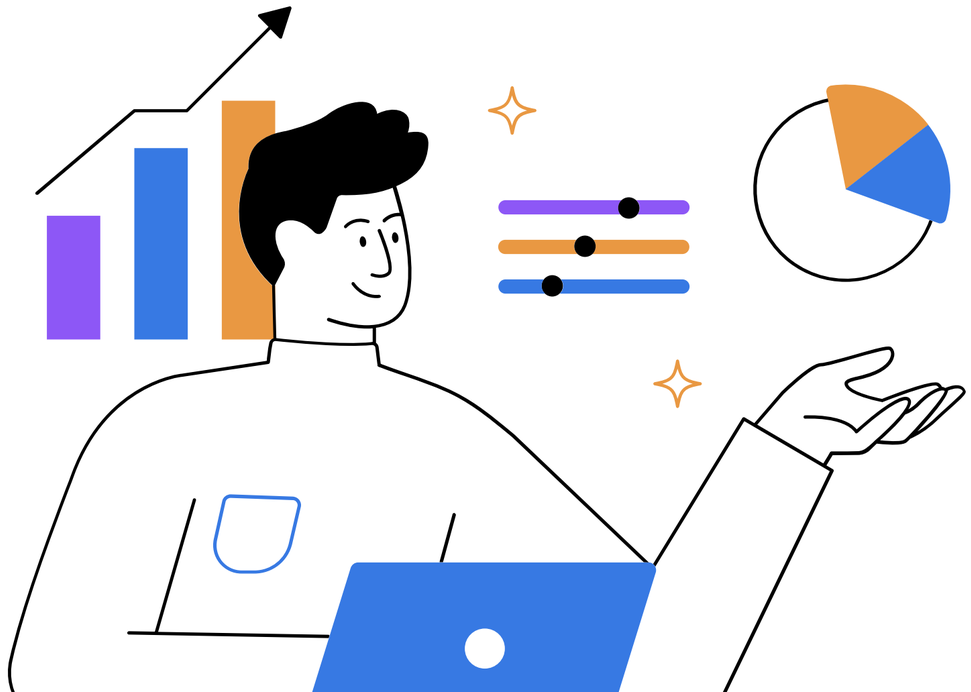
Next Steps

- Final dataset selection & cleaning
- Implement sentiment analysis in R
- Exploratory modeling
- Prepare final written project report



Conclusion

- Topic is timely and socially relevant
- Data-driven approach despite data limitations
- Transparent methodology
- Strong basis for empirical discussion



Thank You so much for your Attention!