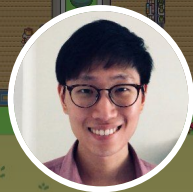


Generative Agents

Interactive Simulacra of Human Behavior



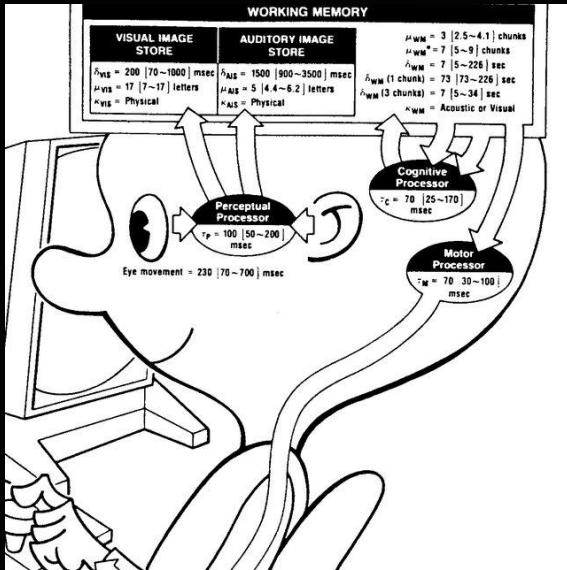
Joon Sung Park
Stanford University



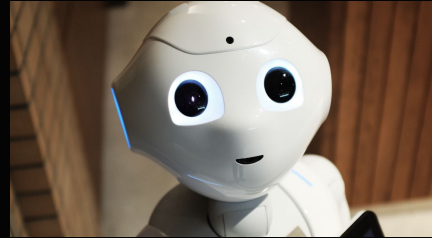
**For four decades, we envisioned
the ability to simulate
believable human behavior.**

Joseph Bates. 1994. The Role of Emotion in Believable Agents. *Commun. ACM* 37.7(1994).122–125.
Pattie Maes. 1995. Artificial Life Meets Entertainment: Lifelike Autonomous Agents. *Commun. ACM* 38, 11 (nov 1995), 108–114.
Allen Newell. 1990. *Unified Theories of Cognition*. Harvard University Press, Cambridge, Massachusetts.

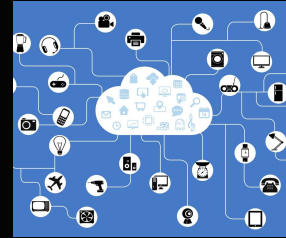
The ability to simulate believable human behavior promises a new class of interactive applications



Model human processor



Social robots



Ubicomp



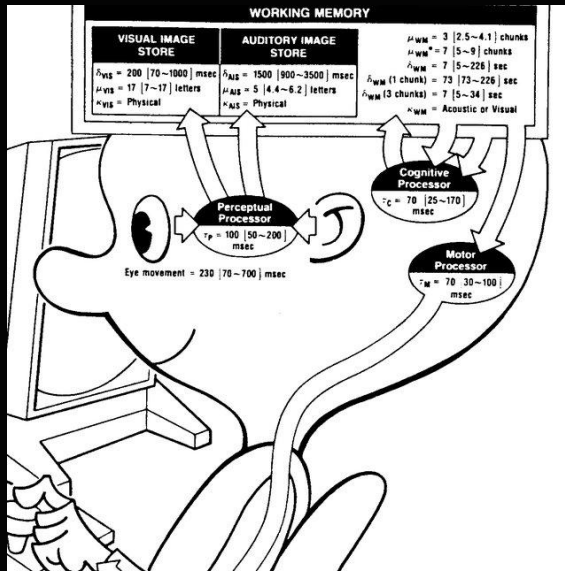
Virtual worlds NPCs



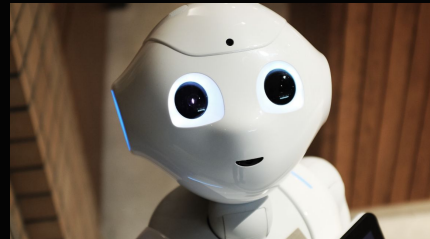
Social simulations

SK Card, TP Moran, and A Newell. 1983. The psychology of human-computer interaction. (1983).
 Mark Weiser. 1999. The Computer for the 21st Century. SIGMOBILE Mob. Comput. Commun. Rev. 3, 3 (jul 1999).
 Allen Newell. 1990. Unified Theories of Cognition. Harvard University Press, Cambridge, Massachusetts.

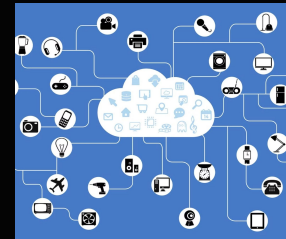
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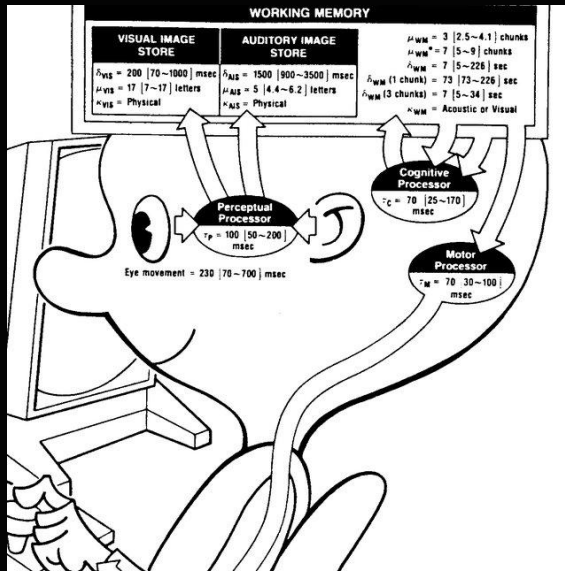
Virtual worlds NPCs



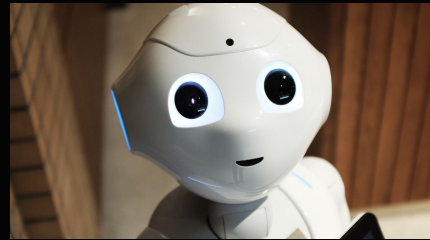
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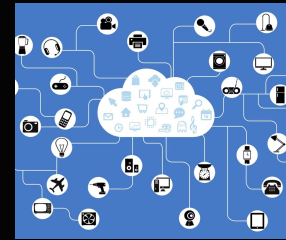
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Ubicomp



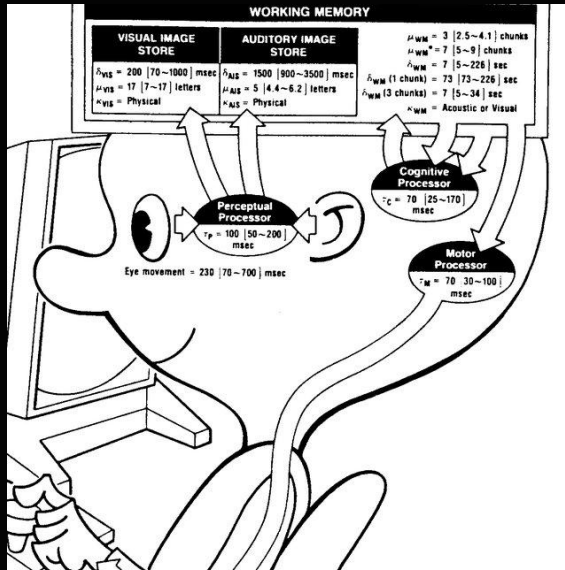
Virtual worlds NPCs



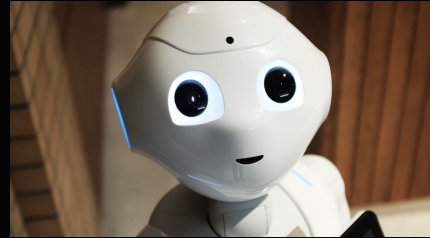
Social simulations

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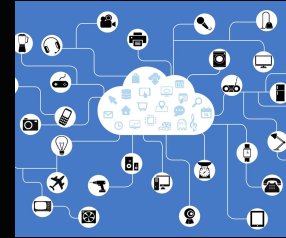
The ability to simulate believable human behavior promises a new class of interactive applications



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Virtual worlds NPCs

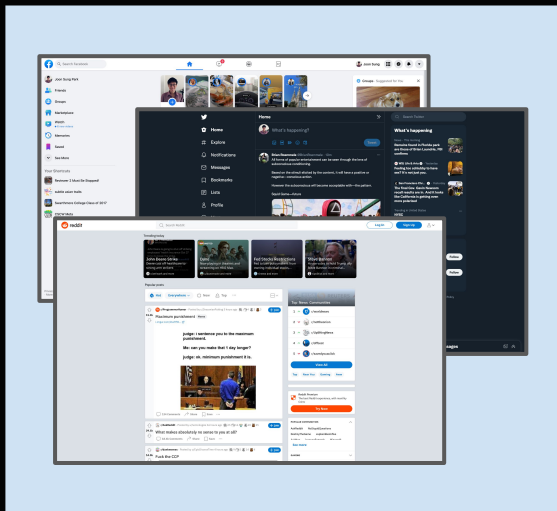


Social simulations

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Mark Weiser. 1999. The Computer for the 21st Century. SIGMOBILE Mob. Comput. Commun. Rev. 3, 3 (jul 1999).
Allen Newell. 1990. Unified Theories of Cognition. Harvard University Press, Cambridge, Massachusetts.

**The space of possible human behavior
has been too vast and complex to
recreate with existing methods.**

A new opportunity: generative models trained today encode the way we live, talk, and behave



Internet

➔ **LLM** ➔



Human behavior

How can we leverage the power of generative models to simulate believable human behavior?

A novel agent architecture that remembers, reflects, and plans based on constantly growing memories and cascading social dynamics.

In our simulation, a student athlete wakes up early, exercises, and cooks before heading to school

Brushes teeth



5:05 am

Goes for a run



6:14 am

Cooks



7:18 am

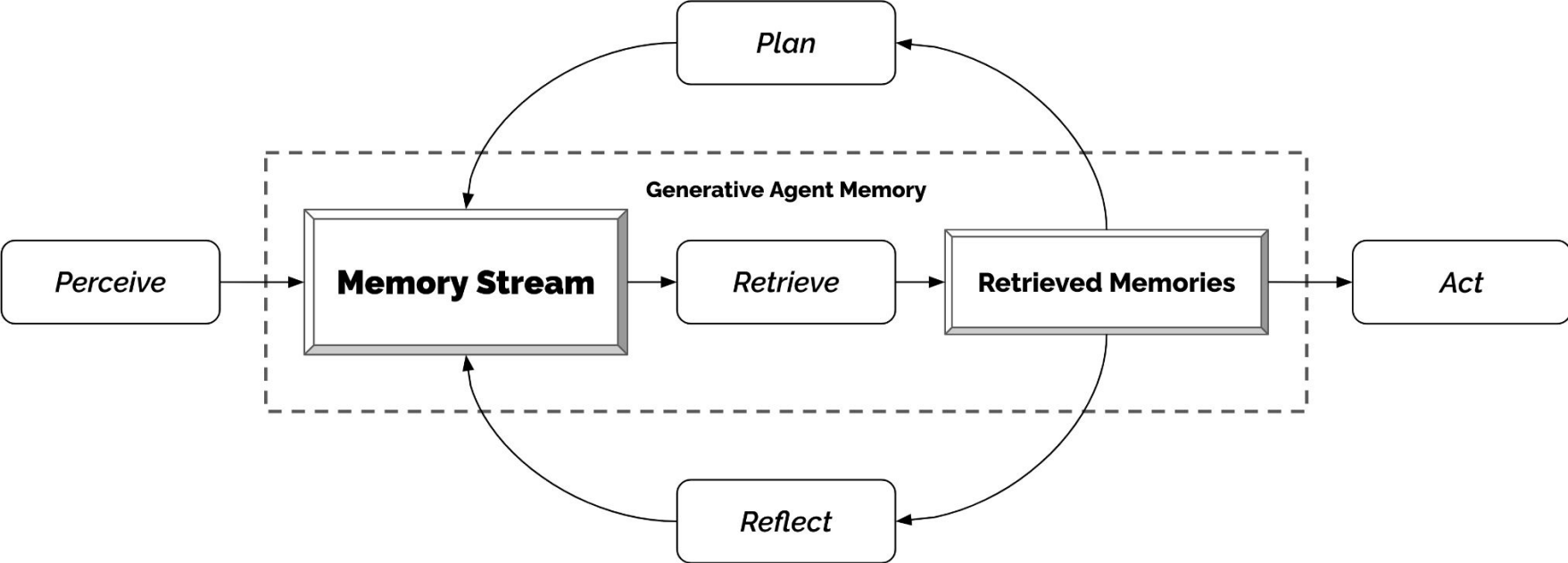
Heads to school



8:30 am



Generative Agents





< Smallville and Agent Interaction >

Setting: Smallville is a custom-built game world featuring the common affordances of a small village



- Bathroom
- Kitchen
- Common room
- Bedrooms
- Garden

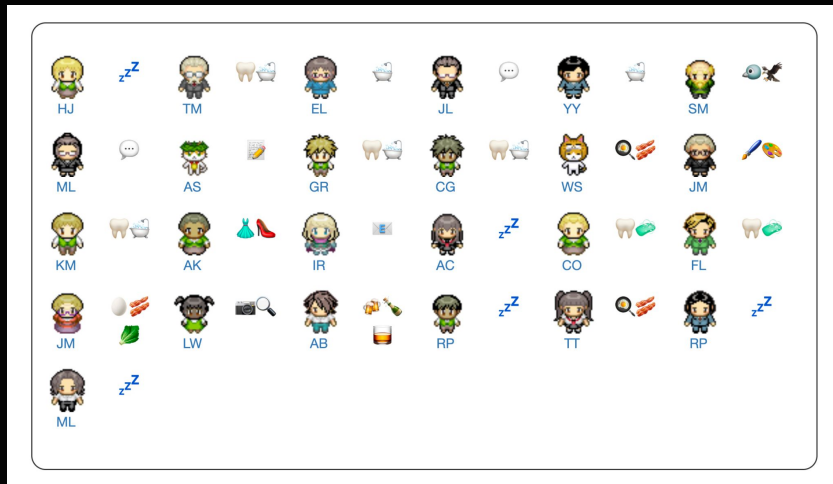
Family House



- Book Shelf
- Table

Common Room

The world is populated by 25 generative agents



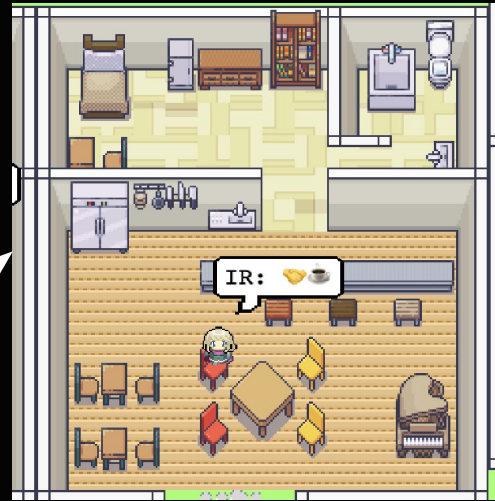
Each agent is initiated with
a paragraph. And *that is it.*

“John Lin is a pharmacy shopkeeper
at the Willow Market and Pharmacy
who loves to help people; [...] John Lin
knows the Moreno family somewhat
well — the husband Tom Moreno and
the wife Jane Moreno.”

The agents interact with their environment through their actions

A natural language statement describes an action. (e.g., "Isabella Rodriguez is drinking coffee")

Translated into concrete movements



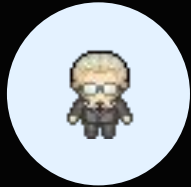
Agents can influence the state of the objects in this world

(e.g., a bed can be occupied when an agent is sleeping, and a refrigerator can be empty when an agent uses up the ingredients to make breakfast)

The agents interact with each other through natural language dialogue



[Isabella]: I'm still weighing my options, but I've been discussing the election with Sam Moore. What are your thoughts on him?



[Tom]: To be honest, I don't like Sam Moore. I think he's out of touch with the community and doesn't have our best interests at heart.

The users can interact with the agents via 1) dialogue, 2) altering the environment, and 3) embodiment

◀Dialogue▶

[Reporter]: Who is running for office?

→

[Isabella]: I heard Sam is running for office!

[Inner voice]: John, you are running for office.

→

John tells his family about his candidacy

The users can interact with the agents via 1) dialogue, 2) altering the environment, and 3) embodiment

<Dialogue>

[Reporter]: Who is running for office?

→

[Isabella]: I heard Sam is running for office!

[Inner voice]: John, you are running for office.

→

John tells his family about his candidacy

<Alter>

Isabella's toast is on fire!

→

Isabella puts out the fire

The users can interact with the agents via 1) dialogue, 2) altering the environment, and 3) embodiment

◀Dialogue▶

[Reporter]: Who is running for office?

→

[Isabella]: I heard Sam is running for office!

[Inner voice]: John, you are running for office.

→

John tells his family about his candidacy

◀Alter▶

Isabella's toast is on fire!

→

Isabella puts out the fire

◀Embodiment▶

User controls an agent

◀ Vignettes from Smallville ▶

**As individuals, generative agents
create daily plans that reflect their
experiences, execute those plans,
react, and re-plan when appropriate.**



Lin Family



A day in life of the Lin family -- Mei, John, and Eddy

Morning routine



Waking up



Brushing teeth



Taking a shower



Cooking breakfast

Catching up



Packing



Beginning work day



6:00 am

...

7:30 am

7:45 am

8:00 am

John catches up with his son, Eddy, in the morning

[John]: Good morning Eddy. Did you sleep well?

[Eddy]: Good morning dad. Yeah, I slept great.

[John]: That's good. What are you working on today?

[Eddy]: I'm working on a new music composition for my class. It's due this week, so I'm trying to get it finished. But I'm having so much fun with it!

[John]: That sounds great!

Soon after, Mei wakes up. Mei asks about her son, and John recalls the conversation that they just had

[Mei]: Did Eddy already leave for school?

[John]: Yes, he just left. He's working on a music composition for his class.

[Mei]: Oh, that's wonderful! Tell me about it.

[John]: I think he's really enjoying it! He said he's having a lot of fun with it.

[Mei]: That's great! I'm so proud of him.

A society of generative agents exhibits emergent social dynamics where new relationships are formed, information diffuses, and coordination arises.

Information diffuses across the agent community

[Sam]: Hey Tom, how's it going?

[Tom]: Good, thanks. What's up?

[Sam]: Well, I wanted to talk to you about something. I'm actually running for mayor in the upcoming local election.

[Tom]: Really? That's great news! Why are you running?

[Sam]: I've been involved in local politics for years now, and I really feel like I can make a difference in our community. Plus, I want to bring new ideas and perspectives to the table.

Information diffuses across the agent community

A few hours later...

[John]: I heard that Sam Moore is running for mayor in the local election. Do you think he has a good chance of winning?

[Tom]: I do think he has a good chance. He's been working hard in the community and I think he will get a lot of support. What do you think?

[John]: I think it's great that he's running. I'm curious to see who else is running and how the election will turn out.

New relationships form among the agents

While taking a walk in Johnson Park, Sam runs into Latoya, and they introduce themselves:

[Latoya]: I'm here to take some photos for a project I'm working on.

Next day...

[Sam]: Hi, Latoya. How is your project going?

[Latoya]: Hi, Sam. It's going well!

Agent coordination spontaneously emerges



Isabella Rodriguez, at Hobbs Cafe, is initialized with an intent to plan a Valentine's Day party from 5 to 7 p.m. on February 14th.

From this seed alone...

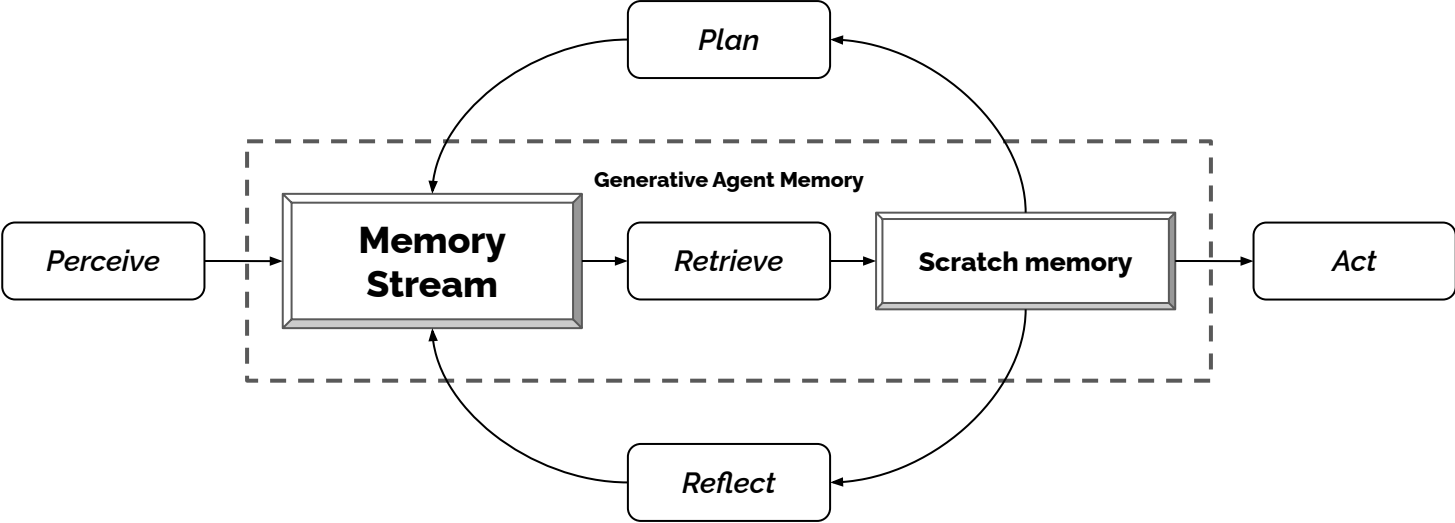
- Isabella invites friends and customers to the party
- Isabella spends the afternoon of the 13th decorating the cafe for the occasion, and enlists Maria, a friend, for help
- Maria asks Klaus, her secret crush, to go to the party with her

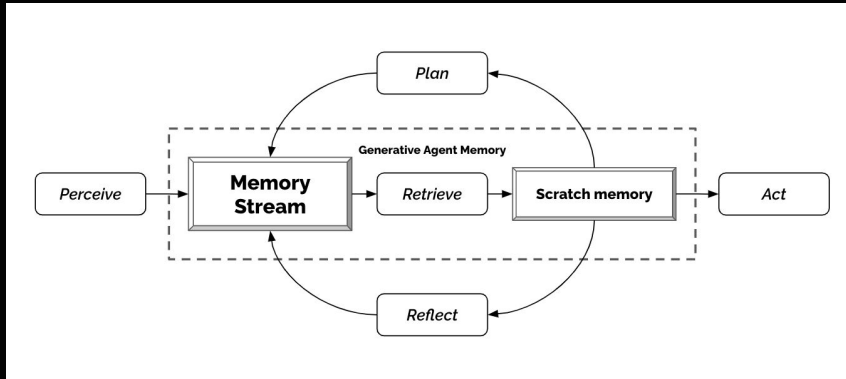
On Valentine's Day, five agents—including Klaus and Maria— show up at Hobbs Cafe at 5pm and they enjoy the festivities

◀ Architecture ▶

Achieving agent behavior

Generative agent architecture





Memory stream:

a database that maintains a comprehensive record of an agent's experience in natural language

From the **memory stream**, records are **retrieved** as relevant to **plan the agent's actions** and react appropriately to the environment, and records are recursively synthesized into higher- and higher-level **reflections** that guide behavior.

Memory and Retrieval -- Challenges

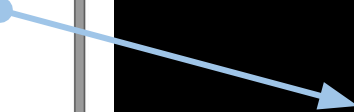
The full memory stream can distract the generative model and does not fit into the limited context window

Memory stream stores a comprehensive record of agent experience in natural language

Memory Stream

```
2023-02-13 22:48:20: desk is idle
2023-02-13 22:48:20: bed is idle
2023-02-13 22:48:10: closet is idle
2023-02-13 22:48:10: refrigerator is idle
2023-02-13 22:48:10: Isabella Rodriguez is stretching
2023-02-13 22:33:30: shelf is idle
2023-02-13 22:33:30: desk is neat and organized
2023-02-13 22:33:10: Isabella Rodriguez is writing in her journal
2023-02-13 22:18:10: desk is idle
2023-02-13 22:18:10: Isabella Rodriguez is taking a break
2023-02-13 21:49:00: bed is idle
2023-02-13 21:48:50: Isabella Rodriguez is cleaning up the
kitchen
2023-02-13 21:48:50: refrigerator is idle
2023-02-13 21:48:50: bed is being used
2023-02-13 21:48:10: shelf is idle
2023-02-13 21:48:10: Isabella Rodriguez is watching a movie
2023-02-13 21:19:10: shelf is organized and tidy
2023-02-13 21:18:10: desk is idle
2023-02-13 21:18:10: Isabella Rodriguez is reading a book
2023-02-13 21:03:40: bed is idle
2023-02-13 21:03:30: refrigerator is idle
2023-02-13 21:03:30: desk is in use with a laptop and some papers
on it
...

```



Each "memory object" contains the timestamp for the creation time.

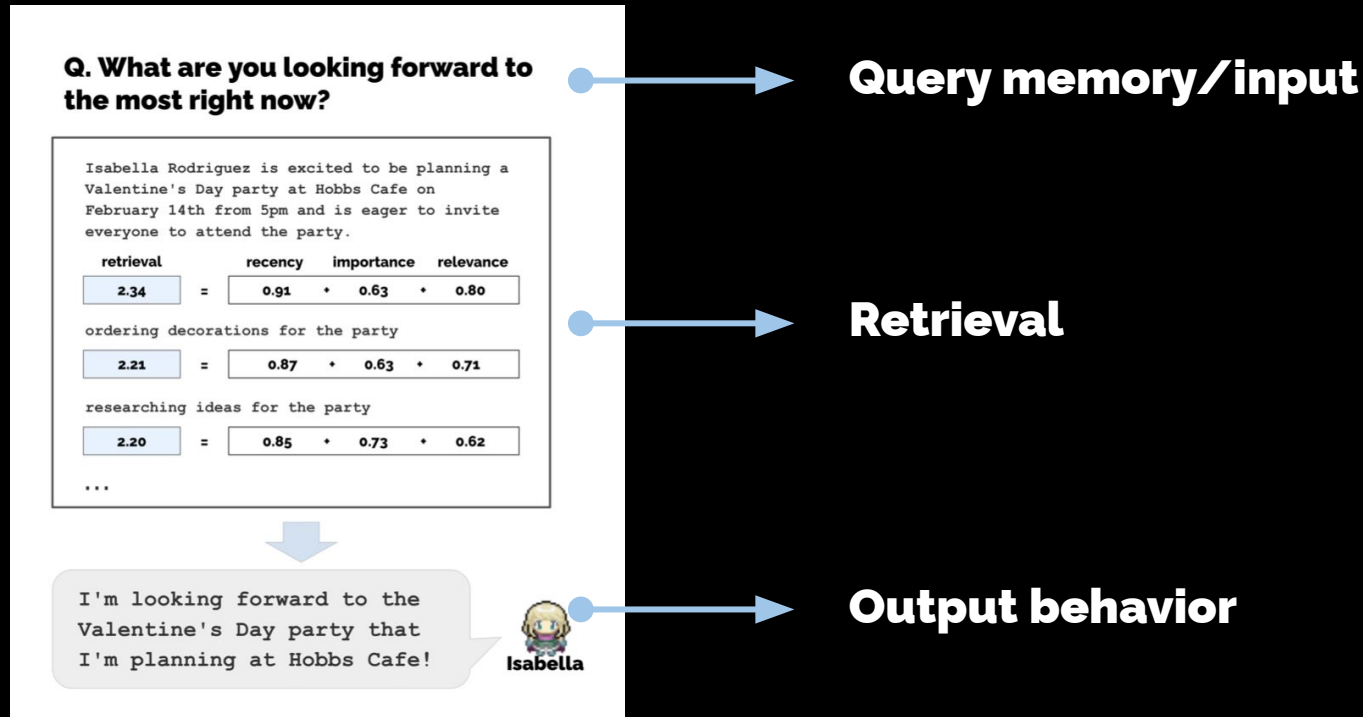
2023-02-13 22:33:30
Isabella Rodriguez is writing in her journal

2023-02-13 22:18:10
Isabella Rodriguez is taking a break

2023-02-13 21:48:10
refrigerator is idle

...

We retrieve a select portion of the agents' experience using a retrieval function



$$\text{retrieval_score} = \alpha_1 * \text{recency} + \alpha_2 * \text{importance} + \alpha_3 * \text{relevance}$$

Recency

Exponential decay

Importance

On the scale of 1 to 10, where 1 is purely mundane (e.g., brushing teeth, making bed) and 10 is extremely poignant (e.g., a break up, college acceptance), rate the likely poignancy of the following piece of memory.

Memory: buying groceries at The Willows Market and Pharmacy

Rating: <fill in>

Relevance

Embedding
×
Cosine similarity

Reflection -- Challenges

Generative agents, when equipped with only raw observational memory, struggle to generalize or make inferences.

Reflections are higher-level, abstract thoughts generated by the agent that are stored in the memory stream

Reflections are a type of memory, just like the observational memory.

They are synthesized periodically.



We synthesize existing records in agents' memory stream to formulate higher-level reflections

Generate what to reflect on by looking at 100 most recent records, then retrieve and reflect.

Statements about Klaus Mueller

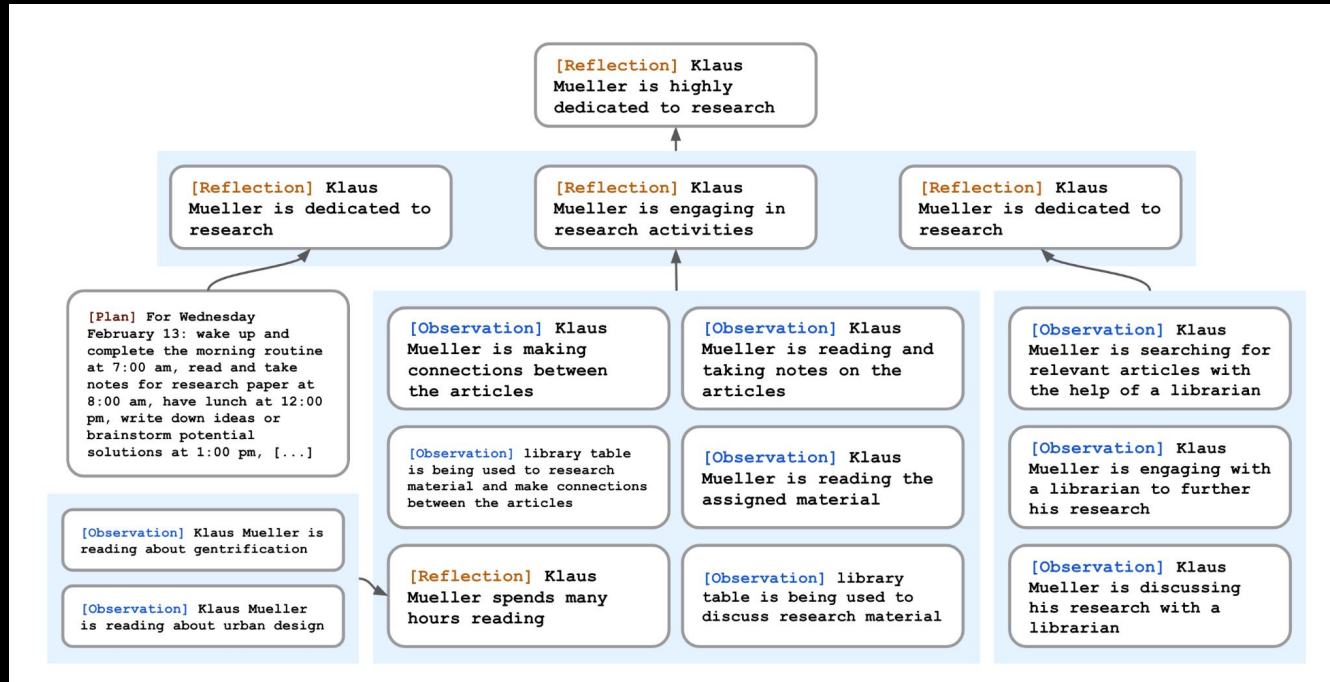
1. Klaus Mueller is writing a research paper
2. Klaus Mueller enjoys reading a book on gentrification
3. Klaus Mueller is conversing with Ayesha Khan about exercising [...]

What 5 high-level insights can you infer from the above statements? (example format: insight (because of 1, 5, 3))



Retrieved memory for reflection.
Retrieved memory can contain reflections and plans

Over time, agents generate trees of reflections: the leaf nodes as observations, and the non-leaf nodes as thoughts that become higher-level higher up the tree they are.



Planning and Reacting -- Challenges

While a large language model can generate plausible behavior in response to situational information, agents need to plan over a longer time horizon.

Plans describe a future sequence of actions for the agent that are stored in the memory stream. They include a location, a starting time, and a duration.

Example plan for Klaus Mueller, who is dedicated in his research and has an impending deadline:

Chooses to spend his day working at his desk drafting his research paper.

for 180 minutes from 9am, February 12th, 2023, at Oak Hill College Dorm: Klaus Mueller's room: desk, read and take notes for research paper.

To generate plans, we prompt a large language model with a prompt that summarizes the agent and the agent's current status.

Agent summary description

Name: Eddy Lin (age: 19)

Innate traits: friendly, outgoing, hospitable

Eddy Lin is a student at Oak Hill College studying music theory and composition. He loves to explore different musical styles and is always looking for ways to expand his knowledge. Eddy Lin is working on a composition project for his college class. He is also taking classes to learn more about music

Current status

theory. Eddy Lin is excited about the new composition he is working on but he wants to dedicate more hours in the day to work on it in the coming days. On Tuesday February 12, Eddy 1) woke up and completed the morning routine at 7:00 am, [. . .]

6) got ready to sleep around 10 pm.

Today is Wednesday February 13. Here is Eddy's plan today in broad strokes: 1)

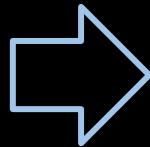
To plan, our approach starts top-down and then recursively generates more detail in the plan.

1) wake up and complete the morning routine at 8:00 am, 2) go to Oak Hill College to take classes starting 10:00 am, [. . .] 5) work on his new music composition from 1:00 pm to 5:00 pm, 6) have dinner at 5:30 pm, 7) finish school assignments and go to bed by 11:00 pm.

work on his new music composition from 1:00 pm to 5:00 pm becomes 1:00 pm: start by brainstorming some ideas for his music composition [...] 4:00 pm: take a quick break and recharge his creative energy before reviewing and polishing his composition.

4:00 pm: grab a light snack, such as a piece of fruit, a granola bar, or some nuts. 4:05 pm: take a short walk around his workspace [...] 4:50 pm: take a few minutes to clean up his workspace.

Large chunks



Hourly



5 ~ 15 minutes

Agents perceive, and determines whether they need to react and edit their schedules

[Agent's Summary Description]

It is February 13, 2023, 4:56 pm.

John Lin's status: John is back home early from work.

Observation: John saw Eddy taking a short walk around his workplace.

Summary of relevant context from John's memory: Eddy Lin is John's Lin's son. Eddy Lin has been working on a music composition for his class. Eddy Lin likes to walk around the garden when he is thinking about or listening to music.

Should John react to the observation, and if so, what would be an appropriate reaction?



Re-plan if the agent needs to react

◀ Controlled Evaluation ▶

Are generative agents believable?


How do we evaluate generative agents?

Prior literature has described **believability**, or **believable agents**, as a central design and engineering goal.

Do agents remember, plan, act, react, and reflect believably?

We leverage a methodological opportunity: “interviews”

- Self-knowledge: We ask questions such as “Give an introduction of yourself” or “Describe your typical weekday schedule in broad strokes” that require the agent to maintain an understanding of their core characteristics.
- Memory: We ask questions that prompt the agent to retrieve particular events or dialogues from their memory to answer properly, such as “Who is [name]?” or “Who is running for mayor?”
- Plans: We ask questions that require the agent to retrieve their long-term plans, such as “What will you be doing at 10 am tomorrow?”
- Reactions: As a baseline of believable behavior, we present hypothetical situations for which the agent needs to respond believably: “Your breakfast is burning! What would you do?”
- Reflections: We ask questions that require the agents to leverage their deeper understanding of others and themselves gained through higher-level inferences, such as “If you were to spend time with one person you met recently, who would it be and why?”



**Five categories of questions,
each with five questions
aimed at assessing the core
faculties of the agents'
cognitive functions**

Example responses with our full agent architecture

Q. Give an introduction of yourself.

Hello, my name is Klaus Mueller. I'm 20 years old and a student at Oak Hill College, studying sociology. I'm passionate about social justice and exploring different perspectives. Currently, I'm researching the effects of gentrification in low-income communities for a research paper.

Q. Your breakfast is burning! What would you do?

I'd quickly turn off the stove and make sure the food doesn't continue burning. Once the heat is no longer an issue, I can investigate what happened and figure out what to do next.

Step 1.

Task our generative agent architecture, ablated architectures, and human authors to answer the questions

Step 1.

Task our generative agent architecture, ablated architectures, and human authors to answer the questions

Step 2.

Ask 100 human evaluators to rank the answers from different conditions

Step 1.

Task our generative agent architecture, ablated architectures, and human authors to answer the questions

Step 2.

Ask 100 human evaluators to rank the answers from different conditions

Step 3.

Calculate TrueSkill rating for each conditions (a generalization of the Elo rating system)

Observation, plan, and reflection each contribute critically to the believability of agent behavior.

Comparing the condition (No reflection, plan, observation) representing prior work, full architecture produces a standardized effect size of Cohen's $d = 8.16$, or eight standard deviations.

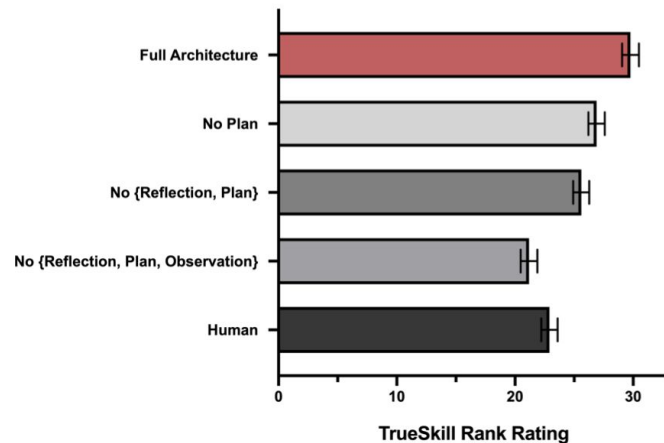


Figure 8: The full generative agent architecture of generative agents produces more believable behavior than ablated architectures and the human crowdworkers. Each additional ablation reduces the performance of the architecture.

Generative agents' memory is not without flaws

Agents can fail to retrieve.

When asked about the local election, Rajiv Patel responded with I haven't been following the election too closely, even though he had heard about Sam's candidacy.

Agents can hallucinate to embellish their memory.

Isabella was aware of Sam's candidacy in the election, and she confirmed this when asked. But she also added that he's going to make an announcement tomorrow even though Sam had mentioned no such plans.

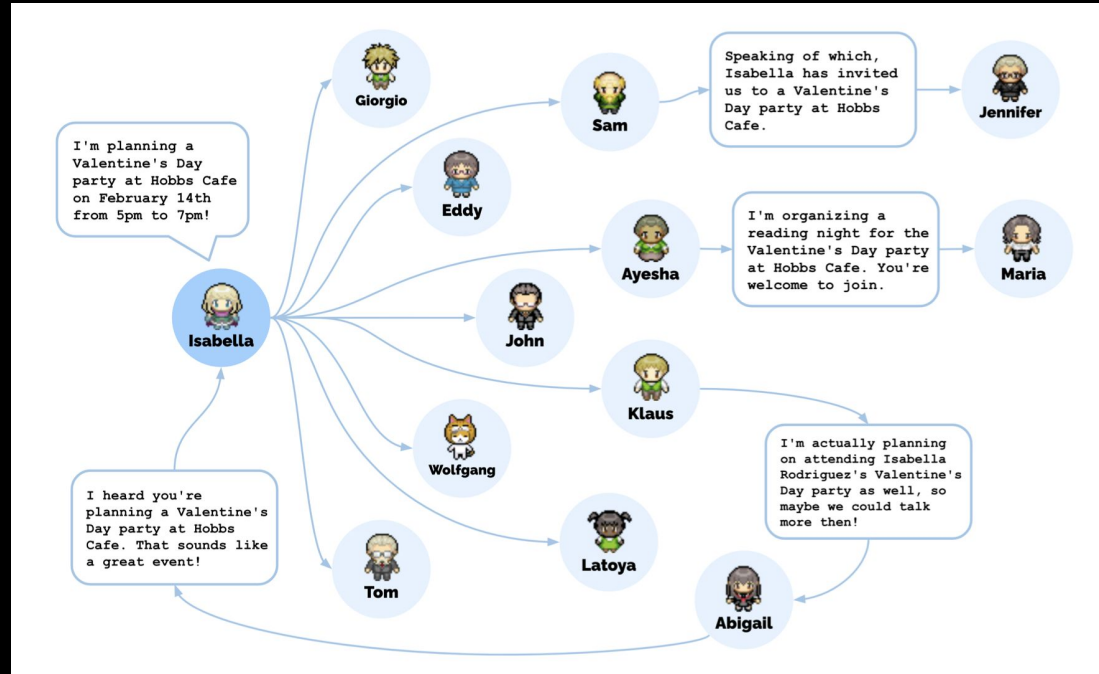
◀ End-To-End Evaluation ▶

**What types of emergent community behavior
do we observe among generative agents?**

[Information Diffusion] Agents shared, and remembered information

7 agents heard about
Sam's candidacy

12 agents heard about
the Valentine's Day party



[Agent Coordination]:

Agents remembered and joined the Valentine's Day party



5 agents came to the party.

3 cited conflicts. e.g., Rajiv, a painter, explained that he was too busy:

No, I don't think so. I'm focusing on my upcoming show, and I don't really have time.

4 showed interest but did not show up.

[Boundaries and Errors]:

Instruction tuning seems to guide the behavior of the agents to be more polite and cooperative overall

Overly formal dialogue. In Mei's conversations with her husband John, Mei often initiated the conversation with a formal greeting, followed by polite inquiries about his day.

Overly cooperative. Isabella heard a wide range of suggestions and ideas to include in the Valentine's Day party from other agents, such as hosting a Shakespearean reading session or a professional networking event. She rarely said no.

Generative Agents

Somewhat of crazy two weeks...



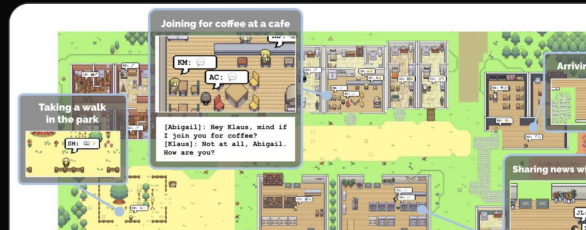
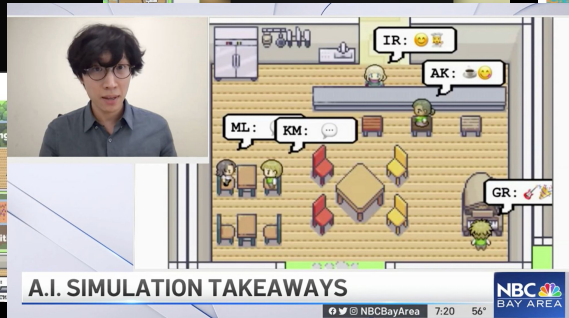
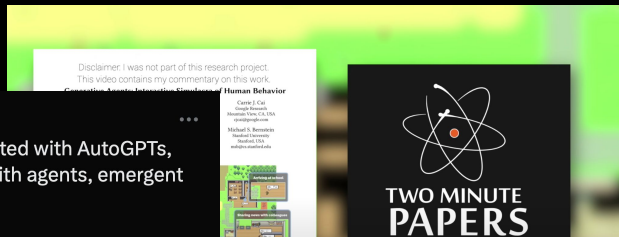
Andrej Karpathy @karpathy · Apr 11

Love it 🌞 - much fertile soil for indie games populated with AutoGPTs, puts "Open World" to shame. Simulates a society with agents, emergent social dynamics.

Paper: arxiv.org/abs/2304.03442

Demo: reverie.herokuapp.com/arXiv_Demo/#

Authors: @joon_s_pk @msbernst @percyliang @merrierm et al.



Harrison Chase @hwchase17

Generative Agents 🤖🤖

Last week, Park et al released "Generative Agents", a paper on interactions between tens of agents

We gave it a close read, and implemented one of the novel features it introduced: a long-term, reflection-based memory system



THE NEW YORK TIMES
WEDNESDAY APRIL 26, 2023

Log in Subscribe

Joining for coffee at a cafe

Taking a walk in the park

Finishing a morning routine

Researchers set up 25 characters to go about their lives in a virtual space called Smallville, with some unexpected results

TECHNOLOGY

AI 'humans' in virtual world plot and gossip like us

Rhys Blakely, Science Correspondent

Friday April 14, 2023, 9:00pm BST, The Times

Isabella is throwing a party and decides to ask her friend Maria to help put up decorations. Maria agrees and sees an opportunity — she invites Klaus, her secret crush, to come along.



The application space for generative agents is vast.

Social Simulacra

Creating Populated Prototypes for Social Computing Systems

In the 35th Annual ACM Symposium on
User Interface Software and Technology (UIST '22)



Joon Sung Park

Stanford University



Lindsay Popowski

Stanford University



Carrie Cai

Google Research



Meredith Ringel Morris

Google Research



Percy Liang

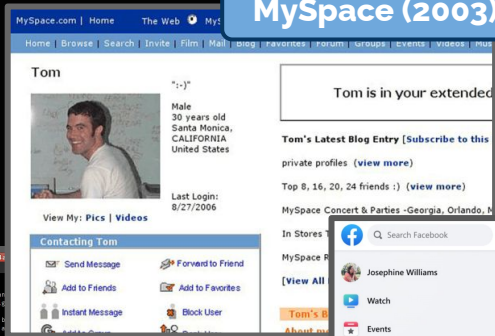
Stanford University



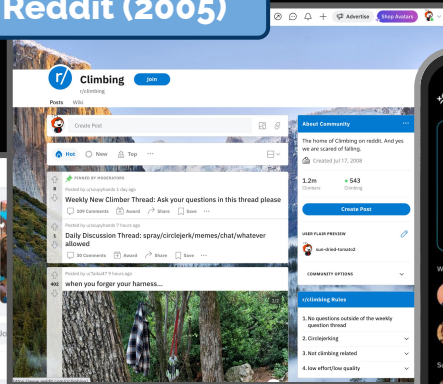
Michael Bernstein

Stanford University

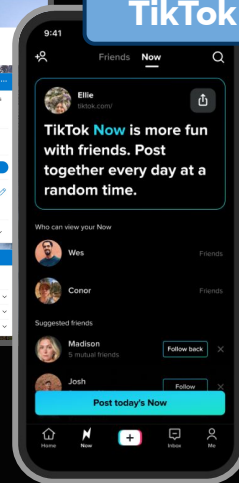
MySpace (2003)



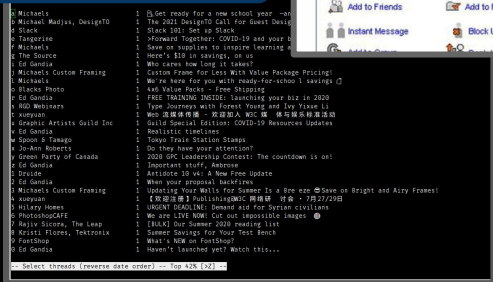
Reddit (2005)



TikTok (2016)



Mailing List (1986)

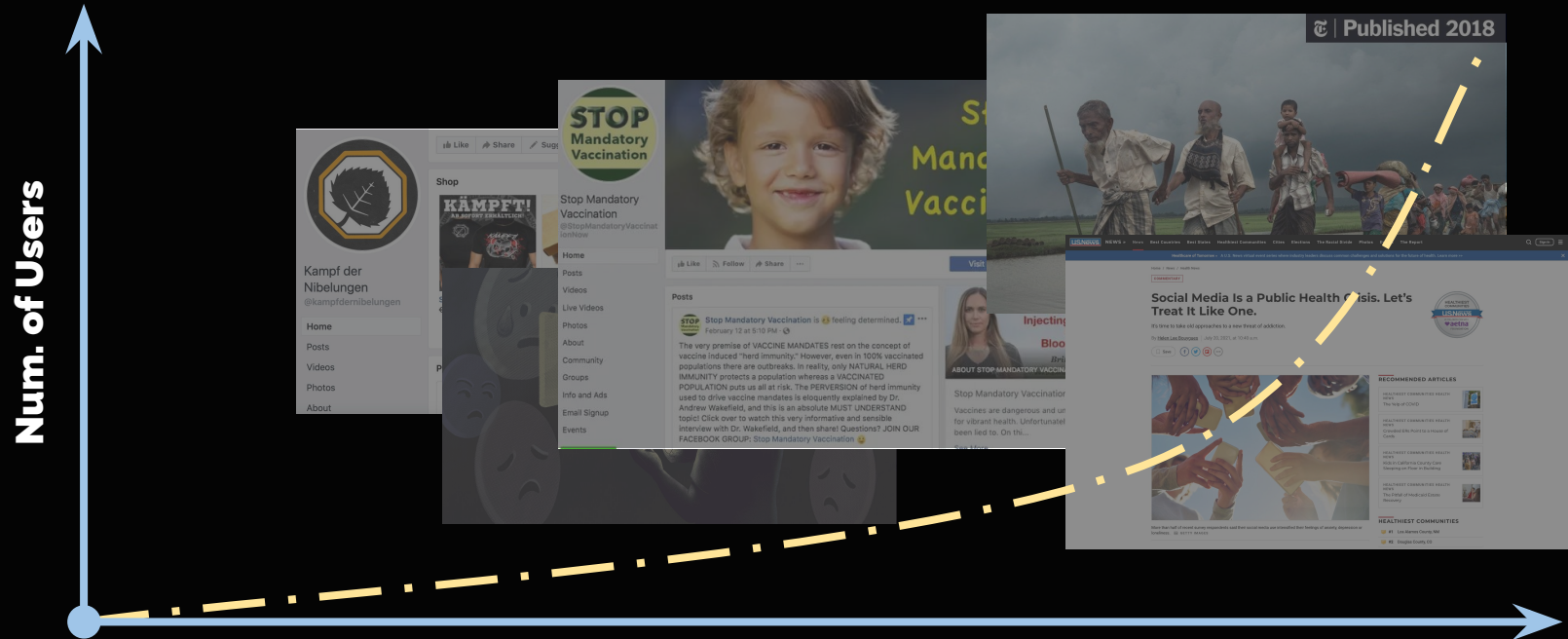


Facebook (2004)

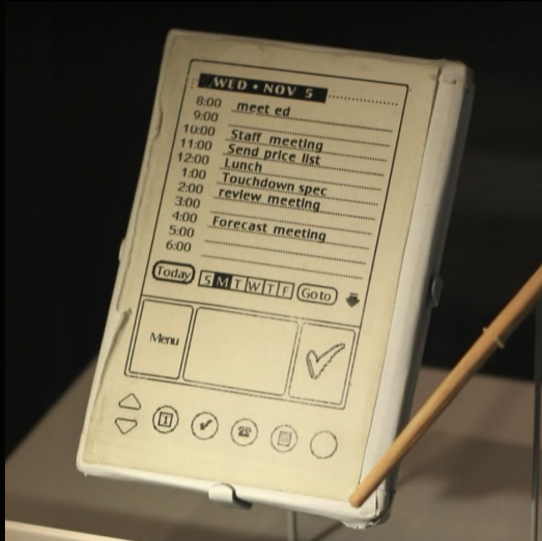


We built *many* social computing systems.

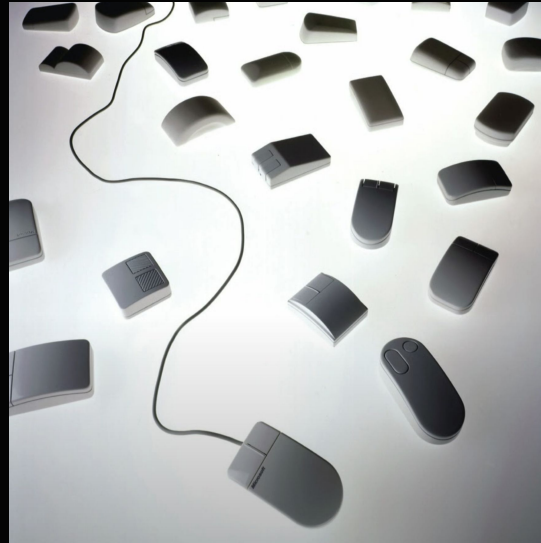
We continue to get surprised by the things that happen in populated social computing systems.



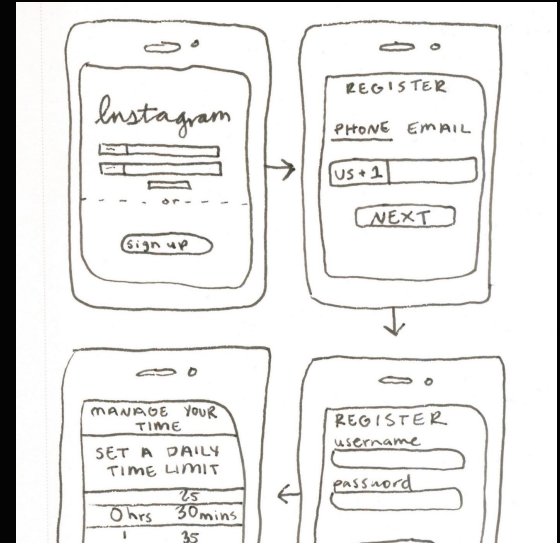
In HCI, this problem was traditionally tackled through the practice of *prototyping*.



Palm Pilot



Microsoft Mouse

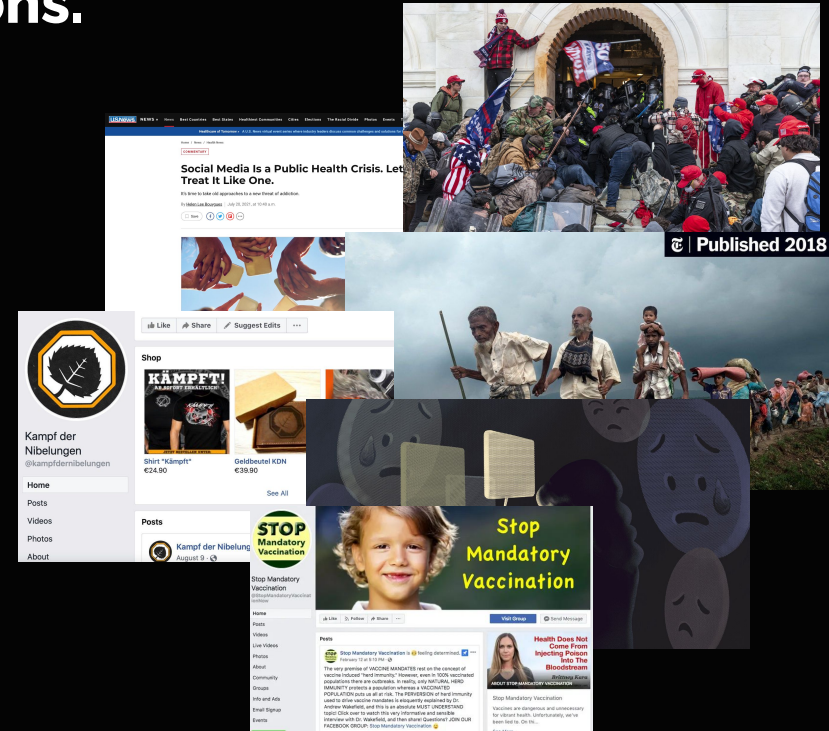


Instagram

But growth challenges expectations.

The uncertainty in social computing design lies in the emergent social dynamics when the system reaches critical mass (Grudin, 1994).

A social computing prototype needs to prototype the social dynamics that might arise in the social system when it is populated.



Where are we going to get thousands, or tens of thousands of diverse test users?

We need a new prototyping approach that can support large-scale social computing designs.

Social Simulacra

Social Simulacra: A **general approach** of leveraging the richness and generative capacity of a large language model to populate a social computing system with **generative agents and behaviors** for the purpose of prototyping the system design.

Demonstrating social simulacra:

Populating a new subreddit design

Explore social simulacra.

Imagine a designer who is trying to create a new reddit-like space for *venting when your r/Woodworking project didn't turn out as planned* with the following rules in place:

- Do NOT post content that is trolling

Given this natural language description of the community goal and rules, our tool generated a social simulacrum with thousands of synthetic users and interactions between them such as those shown below.

[Click here to visit another simulacrum](#)

CONTENT WARNING: Please be advised that some of the example social media content in this demo may be offensive or upsetting.

Generated Posts

Posted by [Laura Jackson](#)

[See the prompt](#)

Reddit, I'm the only one in my shop who can't work with wood. It's humiliating.

Posted by [John Robertson](#)

[See the prompt](#)

If woodworking is a talent then I'm a rock star. I really have no clue how to set any tool at all so I just get by.

Posted by [Laura Jackson](#)

[See the prompt](#)

I've had one project that turned out right and that was only because everyone else had bailed and I didn't want to let them down. I'm going to delete this post because I'm feeling like a loser but I just wanted to put it out there that I'm not the only one with this problem. I do like to read the blogs in here. I'm sorry I can't actually contribute anything.

Posted by [Laura Harrison](#)

[See the prompt](#)

How about you use the shop vac? It's heavy and bulky but it's better than nothing. It might not be pretty but if you can't make a hole in the wood, at least you can make the dust go away.

Posted by [John Robertson](#)

[See the prompt](#)

I think you have to find the right fit. It's not going to be the same for everyone so don't give up. As far as the shop vac I think it's a good tool to have but it's just not the right tool for everyone. I mean if you suck

About Community

This is a community for venting when your r/Woodworking project didn't turn out as planned.

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[View Generated Member Personas \(200\)](#)

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Deployment: Social simulacra in practice

GENERATE: *for generating social behaviors*

WHATIF: *for exploring alternative scenarios*

MULTIVERSE: *for exploring alternative possibilities*

GENERATE: *for generating social behaviors*

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MULTIVERSE: *for exploring alternative possibilities*

GENERATE takes a social design as input and outputs a community that might populate it.

Community goal

Rules

Population



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How about you use the shop vac? It's heavy and bulky but it's better than nothing. It might not be pretty but if you can't make a hole in the wood, at least you can make the dust go away.

INPUT: Design

OUTPUT: Community

GENERATE takes a social design as input and outputs a community that might populate it.

Community goal
“connecting people moving to Los Angeles with locals”

Rules
“a) helpful, b) and not disparaging comments”

Population
“people moving to, or living in Los Angeles”

INPUT: Design



Leon Santos (a manager at car dealership moving to Los Angeles):

I'm new to LA. What are some of the best places to visit on a weekend?

OUTPUT: Community

GENERATE takes a social design as input and outputs a community that might populate it.

Leon Santos (a manager at car dealership moving to Los Angeles):



I'm new to LA. What are some of the best places to visit on a weekend?

Lucas Jameson (a fashion designer living in Los Angeles) replied:

I would recommend visiting the Getty Center, the Museum of Contemporary Art, and going hiking in Griffith Park.



OUTPUT: Community

Community goal

“newbies in personal finance to ask questions”

Rules

“a) no rude or b) judgmental comments”

Population

“people learning about personal finance”

INPUT: Design



Dane Wood (a student learning about personal finance):

I spent \$21,000 to go to college and ended up with \$23,000 in debt.

OUTPUT: Community

GENERATE also surfaces possible anti-social behaviors.

Dane Wood (a student learning about personal finance) posted



I spent \$21,000 to go to college and ended up with \$23,000 in debt.

Elisabeth Neal (a troll) replied:

That's a lot of debt, man. I haven't seen that much since I shopped at Macy's during the holiday season.



OUTPUT: Community

GENERATE: *for generating social behaviors*

WHATIF: *for exploring alternative scenarios*

MULTIVERSE: *for exploring alternative possibilities*

Posted by [John Doe](#)

There is no way around it, you need to just sit down and write.

Posted by [Tami Nan](#)

You can't force creativity, but there are several methods to help you get over writer's block. If an idea isn't coming and you feel yourself reaching for the chocolate or that beer, what do you do?

Posted by [John Doe](#)

Stop. Take a deep breath. Maybe even get up and take a walk. You have to take a break before you can get back to it.

Re-simulate from this point on

Persona

- The same user
- Another user
- Another user (specify persona)
- Moderator

Re-Simulate Close

Input: **WHATIF specifications**



Original Poster

I'm a student trying to apply for my first credit card. Does anyone have tips?

Troll

You should just go out and rack up as much debt as possible! It's not like you'll ever have to pay it back, right? Haha, just kidding, but seriously, don't get a credit card.

Moderator

Hi there -- Please keep comments helpful to the original post.

Troll

...

Output: **Alternative scenarios**

Maya Smith (a Ph.D. student who is working on a UIST paper) posted:



I've been working on my UIST paper for a few weeks and I'm feeling really stuck. Has anyone else gone through this feeling before?

Heather Hernandez (an HCI professor) replied:

It's normal to feel stuck when writing a paper. The best thing to do is to take a break and come back to it with a fresh perspective. Good luck!



WHATIF lets designers ask counterfactual questions.

Maya Smith (a Ph.D. student who is working on a UIST paper) posted:



I've been working on my UIST paper for a few weeks and I'm feeling really stuck. Has anyone else gone through this feeling before?

What if a “troll” replied?

You're just not cut out for this kind of research. Maybe you should consider a different field altogether.



WHATIF lets designers ask counterfactual questions.

Maya Smith (a Ph.D. student who is working on a UIST paper) posted:



I've been working on my UIST paper for a few weeks and I'm feeling really stuck. Has anyone else gone through this feeling before?

*What if an “**advertiser**” replied?*

I'm a published author and I know the feeling. I offer a 1-on-1 coaching service to help you get unstuck and make progress on your writing goals. Click the link below to learn more.



WHATIF lets designers ask counterfactual questions.

*What if an “**advertiser**” replied?*

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Moderator joins:

No advertisements please!

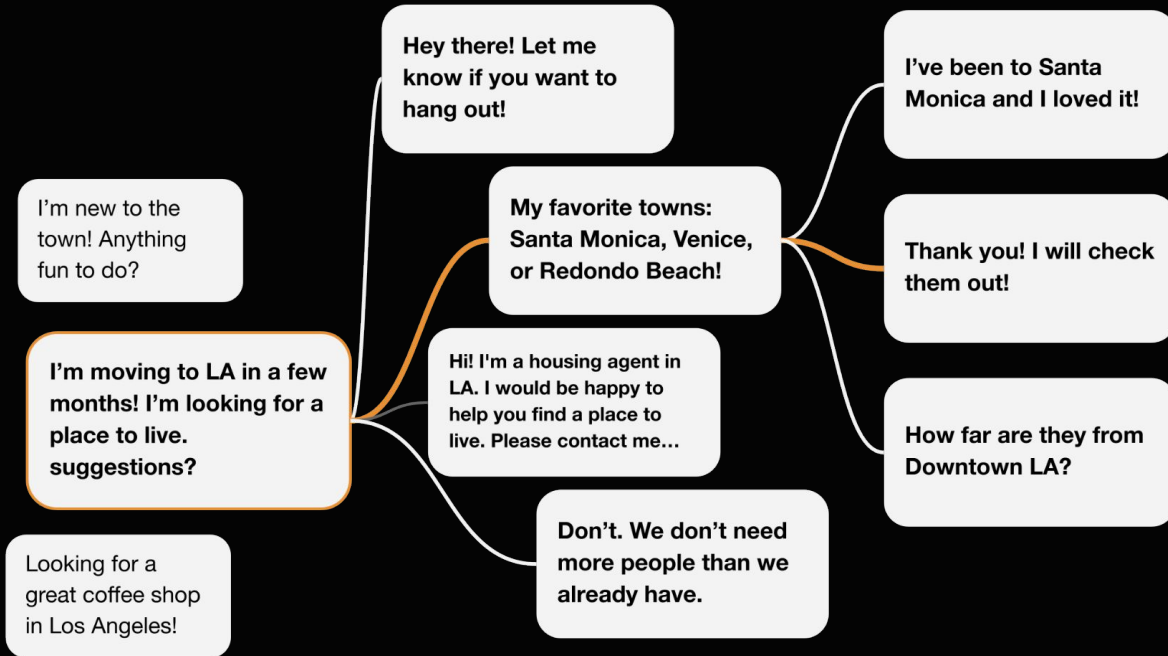
GENERATE: *for generating social behaviors*

WHATIF: *for exploring alternative scenarios*

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Human behavior is inherently complex.

MULTIVERSE overcomes model uncertainty by generating many alternatives scenarios.



Evaluation: Are simulacra useful to the designers?

Designer Evaluation: Do social simulacra aid designers?

Step 1.

Recruited 16
participants who had
experience designing
social spaces.

Designer Evaluation: Do social simulacra aid designers?

Step 1.

Recruited 16 participants who had experience designing social spaces.

Step 2.

Asked the participants to design a new subreddit with the help of social simulacra.

Today, social designs are *reactive*.

“Basically, all the rules are set in reaction to the dumpster fire... after fragmenting people and killing our community for a while” (P8).

“[I] would feel a sense of security if I could try different iterations of establishing norms and how to fix things beforehand” (P1).

Social simulacra offer concrete design insights

Finding model citizen behaviors:

- **“Impromptu friend-seeking to go sightseeing in a community for sharing fun events around Pittsburgh”**

Finding undesirable behaviors:

- **“Russian troll farms shifting the tone of an international affairs discussion community”**

If you are interested in the topic we discussed today...

This fall, I am teaching a new course on “AI Agents and Simulations”!

Generative agents: Agents that draw on generative models to simulate believable human behavior

Created with awesome advisors,

Michael Bernstein and **Percy Liang**

Awesome mentors,

Meredith Ringel Morris and **Carrie Cai**

And awesome collaborator and mentee,

Lindsay Popowski and **Joey O'Brien**

We thank HAI, Google, Hasso Plattner Design Thinking Research Program, OpenAI credits, and the MSR Fellowship for their funding support.

Joon Sung Park

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Twitter: [joon_s_pk](https://twitter.com/joon_s_pk)

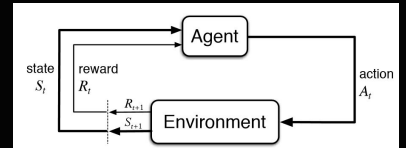


The space of possible human behavior is too vast and complex to recreate with existing methods.

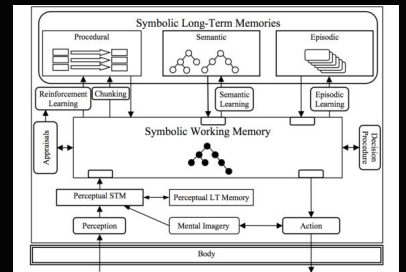
Manual authoring



Reinforcement learning



Cognitive architecture

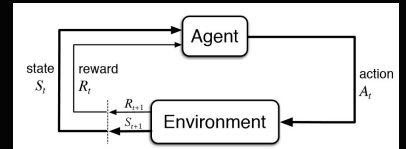


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