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Artificial Intelligence for Social Connection, Personalized Assistance, and Smart Living for Senior Citizens: A Review

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ABSTRACT

Many older adults want to stay socially active and independent, but loneliness, limited mobility and unfamiliar technology often get in the way. We examine twenty research papers on artificial intelligence for companionship, healthcare, recommendation, conversation and mobility, looking at each paper's approach, findings and limitations, and at what it means for a platform built around senior citizens. The evidence shows that digital tools can strengthen social connectedness, offer conversational help, personalize recommendations, deliver health information and be made easier for older people to use, yet the studies rarely combine these functions. Reciprocal companion matching for seniors, meetup planning, mobility-aware personalization, multilingual interaction and AI answers grounded in trusted sources remain largely unexplored. Using a literature search, relevance screening, full-text checks and thematic grouping, we map these gaps to the technical direction of SilverConnect AI, our proposed system: semantic embeddings, reciprocal and personalized recommendation, retrieval-augmented generation, large language models and multi-agent orchestration.

Keywords—Senior Citizens, Social Companion, Artificial Intelligence, Recommendation Systems, Conversational AI, Multi-Agent Systems.

I. INTRODUCTION

Older adults now use digital technology to talk with family, manage their health and organize everyday tasks, yet loneliness, isolation, reduced mobility and complicated interfaces still lower their quality of life. A large meta-analysis has linked loneliness and social isolation to higher mortality [1], so researchers have asked whether

ICT tools, social robots, conversational agents and other intelligent systems can offer older people real support.

The answers are scattered across several fields. Loneliness research has tested ICT and social robots [2]–[4]; healthcare research has studied assistive sensing and clinical language models [6]–

[8]; recommender-system work offers personalization and two-sided matching [9]–[13]; and conversational AI and speech recognition support natural interaction [14]–[17]. Accessibility studies add that adoption depends on more than technical capability [18], while retrieval-augmented generation and agent research show how answers can be grounded in knowledge and how multi-step tasks can be coordinated [19], [20]. We wrote this review to read these studies side by side and ask which approaches have worked, what limitations remain and how the findings should shape the algorithms, tools and architecture of SilverConnect AI, a multi-agent platform we propose for social connection, personalized assistance and smart living for senior citizens.

II. LITERATURE REVIEW

A. SOCIAL CONNECTIVITY AND COMPANION SYSTEMS

Chen and Schulz [2] systematically reviewed ICT interventions for elderly people and found gains in social support and connectedness, though the effect on loneliness was inconsistent. Pooling only randomized controlled trials of social robots, Pu et al. [3] saw encouraging effects on anxiety, agitation and quality of life, but noted methodological weaknesses. Gasteiger et al. [4] argued that robots and computer agents help most when they prompt people to interact with one another rather than stand in for human company. Marziali et al. [5] found voice assistants promising for reducing loneliness, although most of the evidence they gathered measured usability and acceptance rather than social outcomes. Together, these studies suggest that a senior companion system should not stop at conversation; its more valuable role is to lead users toward real activities and relationships.

B. HEALTHCARE AND ELDERLY ASSISTANCE

The fall-detection literature surveyed by Chaudhuri et al. [6] points to real safety benefits from sensors, but few devices had been tested with older users in real settings, and privacy remained a concern. When Singhal et al. [7] tested large language models (LLMs) on medical questions, the models showed considerable clinical knowledge, but the study also documented problems with factuality, reasoning, bias and potential harm.

Zakka et al. [8] addressed part of this problem with Almanac, which retrieves external clinical sources before answering, and reported gains in factuality, completeness, user preference and safety. Health support should therefore pair AI explanations with trusted sources, output checks and a clear route to a human professional.

C. RECOMMENDATION AND PERSONALIZATION

With Neural Collaborative Filtering, He et al. [9] replaced the simple inner product of classic matrix factorization with a neural network that can capture non-linear user-item relationships. Zhang et al. [10] surveyed deep-learning recommender systems more broadly, and De Croon et al. [11] reviewed recommenders built for health and lifestyle personalization.

The work closest to companion matching is RECON by Pizzato et al. [12], which scores a pair by how much each person is likely to appeal to the other. On online-dating data, this reciprocal approach lifted top-10 recommendation success from 23% to 42%. Senior friendship is a different setting, but a good match must still work for both sides. LightGCN [13] adds another option: it reduces graph convolution to neighbourhood aggregation and learns embeddings from the interaction graph.

None of these studies, however, addresses friendship matching for seniors that weighs interests, personality, location, availability, mobility and activity preferences together.

D. CONVERSATIONAL AI AND VOICE ASSISTANTS

CareCall, the LLM-driven calling service studied by Jo et al. [14], checked on socially isolated people living alone. It offered emotional support and reduced monitoring work for public-health staff, but also ran into problems caused by the limits of current LLMs. Interviews by Pradhan et al. [15] showed that older adults may see a smart speaker either as a companion-like presence or as a plain information tool, depending on the socio-emotional context. Reviewing health-related chatbots, Laranjo et al. [16] found real potential but little rigorous evidence on efficacy and safety.

For speech input, Whisper by Radford et al. [17] is a strong multilingual recognizer trained on large amounts of weakly supervised audio, but its accuracy on elderly voices and Indian regional languages still needs to be tested.

E. ACCESSIBILITY AND HUMAN-COMPUTER INTERACTION

Using data from the CREATE study, Czaja et al. [18] showed that computer anxiety, confidence in using computers and cognitive abilities all help predict technology use. Senior-oriented systems should therefore keep interaction simple, with clear navigation and controls, voice input, understandable recommendations and user control.

F. TRAVEL, MOBILITY AND ACTIVITY PLANNING

Mobility often decides whether older adults can join social and recreational activities. None of the twenty reviewed papers evaluates travel, outing or meetup planning for older people, so this part rests on our project requirements rather than a published result. A senior-oriented planner must consider venue accessibility, walking ability, health restrictions, weather, distance and the availability of companions and the group. We therefore intend the Travel and Hangout Planner in SilverConnect AI to handle planning, checklists, reminders, scheduling and the trip itself, not only destination suggestions.

G. RETRIEVAL-AUGMENTED GENERATION AND INTELLIGENT AGENTS

Retrieval-augmented generation (RAG), proposed by Lewis et al. [19], lets a language model draw on passages fetched from an external index while it answers. Because this knowledge sits outside the model, it can be updated without retraining, which suits fast-changing content such as welfare schemes, pension rules, hospital listings and local services.

The generative agents of Park et al. [20] wrap a language model in a memory stream that the agent can retrieve from, reflect on and use to plan, a useful basis for assistants that track context over time. They were tested only in a simulated sandbox world, however, so real-user validation is needed before relying on them for seniors.

TABLE I

COMPARATIVE ANALYSIS OF THE 20 REVIEWED PAPERS

Ref.	Area	Approach	Key Finding	Limitation / Gap
[1]	Loneliness	Meta-analytic review	Loneliness and social isolation are linked to higher mortality.	Does not test any AI intervention.
[2]	ICT	Systematic review	ICT can improve social support and connectedness.	Effect on loneliness is inconsistent.
[3]	Social robots	Systematic review and meta-analysis	Favourable trends for well-being outcomes.	Methodological weaknesses in trials.

Ref.	Area	Approach	Key Finding	Limitation / Gap
[4]	Companion agents	Scoping review	Agents may encourage human social interaction.	Long-term evidence is uneven.
[5]	Voice assistants	Bibliometric analysis with literature review	Promising for social support.	Loneliness outcomes rarely measured.
[6]	Fall detection	Systematic review	Sensing can support safety.	Little real-world testing; privacy concerns.
[7]	Clinical LLMs	LLM evaluation	LLMs encode substantial clinical knowledge.	Factuality, bias and safety issues.
[8]	Clinical RAG	Retrieval-augmented LLM	Better factuality and completeness.	Still needs validation and oversight.
[9]	Recommendation	Neural Collaborative Filtering	Learns non-linear user–item interactions.	Depends on interaction data.
[10]	Recommender systems	Survey	Deep learning supports personalization.	General-domain focus.
[11]	Health recommendation	Systematic review	Personalizes diet, activity and other health advice.	Does not consider matching people with each other.
[12]	Reciprocal matching	RECON	Models the preferences of both parties.	Dating domain, not senior friendship.
[13]	Graph recommendation	LightGCN	Simplified graph-based collaborative filtering.	Requires an interaction graph.
[14]	Public-health AI	LLM conversational system	Helps users and reduces staff workload.	Limitations of current LLMs.
[15]	Voice / HCI	User study	Socio-emotional context shapes perception.	Not a matching system.
[16]	Healthcare agents	Systematic review	Potential benefits in healthcare.	Little rigorous safety evidence.
[17]	Speech recognition	Whisper	Strong multilingual speech recognition.	Elderly and Indian-language speech untested.
[18]	Technology adoption	CREATE study	Cognition and self-efficacy affect adoption.	General technology-use study.
[19]	Knowledge services	RAG	Couples LLMs with external knowledge.	Answer quality depends on retrieval.
[20]	Intelligent agents	LLM with memory and planning	Supports memory, reflection and planning.	Evaluated only in simulation.

Table I makes one pattern clear: almost every study tackles a single main function. The literature provides solid building blocks, yet we found little work that combines social matching, personalized activities, conversational help, healthcare support, mobility-aware planning and knowledge services in one system designed for seniors.

III. METHODOLOGY

We carried out a focused literature review to find research that could inform an AI-enabled platform for the social life and daily assistance of senior citizens, and organized the selected studies by technical or application area.

A. Search Sources

Our searches covered IEEE Xplore, PubMed, the ACM Digital Library, JMIR, Springer and Nature journals, arXiv and publisher-hosted full-text pages. Full-text access was essential because every selected paper was read in detail.

B. Search Terms

We used combinations of terms such as “older adults,” “senior citizens,” “loneliness,” “social isolation,” “social companion,” “elderly healthcare,” “recommendation systems,” “reciprocal recommendation,” “voice assistants,” “large language models,” “retrieval-augmented generation,” “multi-agent systems,” “mobility” and “multilingual AI.”

C. Inclusion and Exclusion Criteria

A study was included if it made a clear research contribution or reported an evaluation, dealt with help for older adults or intelligent personalization, and could be read in full. Papers were excluded if the full text was unavailable, the topic was only loosely related or the methodology was too thin for a fair comparison.

D. Analysis Procedure

For every paper, we recorded the research problem, approach, technology or model, main finding, main limitation and relevance to SilverConnect AI. We then grouped the papers by theme, identified recurring findings and gaps, and mapped each gap to candidate algorithms, frameworks or system components.

IV. RESULTS AND DISCUSSION

The central finding is that useful technology already exists for separate parts of the problem but is seldom assembled around what senior citizens need. Integration and personalization therefore become core design requirements.

A. Major Findings

Digital interventions can help people stay socially connected, but the larger opportunity is to use AI to encourage contact between people rather than to replace it [2]–[5].

Meaningful recommendations depend on knowing the user. Recommender research shows how user–item relationships can be learned [9], [10], and reciprocal recommendation shows why both sides of a potential connection must be considered [12]. Health and knowledge services need firmer footing than casual conversation. The clinical LLM and RAG studies show that language models can help, provided they are backed by safeguards and trusted external information [7], [8].

Ease of use has to be designed in from the start, because interaction complexity and socio-emotional context affect both adoption and perception [15], [18].

B. Research Gaps

- 1) Integration gap: research on companionship, healthcare, recommendation, accessibility and assistance has developed in largely separate strands.
- 2) Senior-specific reciprocal matching gap: two-sided recommendation has so far been tested in dating, not in helping older people find friends.
- 3) Personalization gap: few studies model interests, personality, location, availability, mobility and activity preferences together.
- 4) Mobility and travel gap: none of the reviewed studies plans trips or outings around seniors’ accessibility needs, health constraints, companion compatibility, weather and group schedules.
- 5) Multilingual accessibility gap: recognition of elderly speech and interaction in Indian regional languages still need dedicated validation.
- 6) Grounded assistance gap: knowledge services for seniors require dependable retrieval and clear tracking of sources.
- 7) Data gap: senior-specific interaction data for training personalized recommendation models are scarce.

C. Path from Review Findings to Technical Selection

We used the review to justify the technical direction of SilverConnect AI. Each choice in Table II therefore traces back to a requirement drawn from the literature, not merely to convenience of implementation.

TABLE II

MAPPING REVIEW FINDINGS TO TECHNICAL CHOICES

Requirement	Implication	Selected direction
Preferences expressed in natural language	Profiles need a semantic representation.	Sentence-BERT embeddings
Two-sided compatibility	A match must suit both people.	Reciprocal matching with personalized recommendation

Requirement	Implication	Selected direction
Little data at launch	A cold-start strategy is required.	Survey-based profiling with a content / semantic baseline
Personalized recommendations	Users and items need learned representations.	Two-Tower model as a later learned component
Trustworthy knowledge	Information must be external and easy to update.	RAG with vector retrieval
Multi-step tasks	Specialized actions must be coordinated.	LangChain and LangGraph
Voice accessibility	Users must be able to speak to the system.	Speech recognition with a multilingual pipeline
Carrying out trips and outings	Schedules, reminders, locations and constraints must be handled.	Rules, external APIs and LLM-assisted planning
Predicting future behaviour	Behavioural signals are needed.	XGBoost / Random Forest as candidates

The data gap means that advanced recommendation models cannot be fully trained on the initial survey alone. The survey can build user profiles and a cold-start baseline; accepted or rejected suggestions, attendance, ratings and feedback collected later can then train and evaluate more advanced models.

We therefore plan to start with survey-based profiling and semantic matching, integrate the recommendation and conversational components, collect feedback during a pilot, and train the learned models once enough interaction data exist.

V. CONCLUSION

We reviewed twenty studies on social connectivity, elderly assistance, healthcare AI, recommendation, conversational agents, accessibility, mobility, RAG and intelligent agents. They show that AI can support several parts of older adults' social and independent lives, but current solutions are fragmented.

The main gaps are the lack of reciprocal companion matching for seniors, weak integration of social and healthcare support, limited mobility-aware planning, unvalidated multilingual interaction for elderly users and scarce senior-specific interaction data. Closing them points toward SilverConnect AI as an integrated platform for social connection, personalized assistance and smart living.

The review also guided the technical choices summarized in Table II. Because interaction data will be scarce at first, the system should start from a cold-start baseline and learn progressively from real user feedback.

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