Welkom

What are the key barriers to affordable energy access?

We are facing a lack of affordable, reliable energy for heating, cooling, and lighting.

Impacts

Health risks

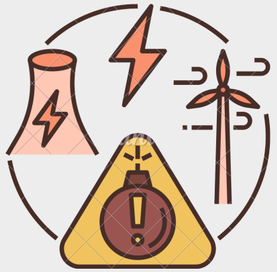
lower quality of life

climate vulnerability

Bouzarovski, S. (2013). Energy poverty in the European Union: landscapes of vulnerability. Wiley Interdisciplinary Reviews Energy and Environment, 3(3), 276–289. https://doi.org/10.1002/wene.89

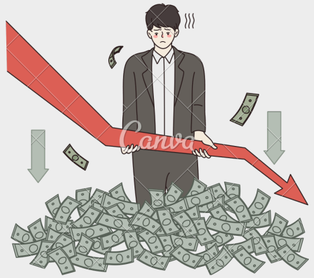
Barriers to Affordable, Accessible Energy

Global Change



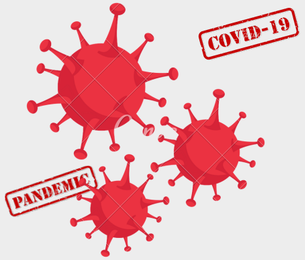
Energy Crisis

Political Conflicts



Economy Crisis

Armed Conflicts



Global Health Crisis

Burden

Energy-Vulnerable Households

Han, Xiao & Wei, Chu. (2021). Household energy consumption: state of the art, research gaps, and future prospects. Environment Development and Sustainability. 23. 10.1007/s10668-020-01179-x.

Generative AI for Nudging Sustainable Behaviour in Occupants

Parsa Safaee

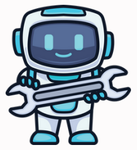
Tehran, Iran 1996

Education: MSc. Architectural Urban Design Engineering (AUDE)
Eindhoven University of Technology

Specializations:
Construction Technology,
Building Design & Technology,
Building Information Modeling & Management

Chair: Smart Architectural Technologies

Interests: AI Automated Agencies, Generative AI, Smart Cities. Sustainability, Healthcare, Entrepreneurship



MAI-HOME

Summer Course Intervention Mapping

Diploma

SAMEN DUURZAMER WONEN

Interreg Europe

Co-funded by the European Union

MAI-HOME SAAMO

MAI-HOME: Gen-AI for Nudging Sustainable Behaviour in Occupants

Ir. Parsa Safaee | EngD Candidate in Smart Buildings & Cities
Supervisor: Dr. MSc. Olivia Guerra-Santin
Company Advisor: Ms. Diana Zangari

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

A 2,500-Year-Old Gravity-Powered System in Shushtar, Iran

Early Hydraulic Automation For:

- Guiding river water
- Running watermills
- Watering farmlands
- Powering simple workshops
- Helping control floods

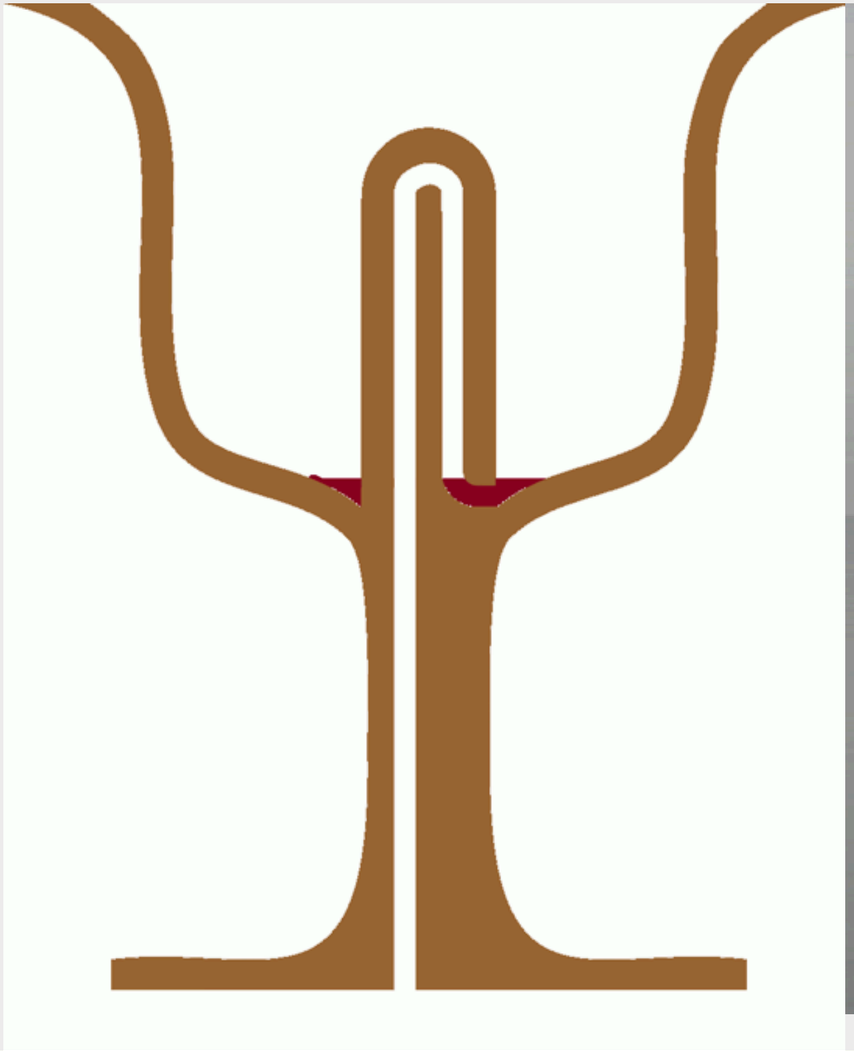
Vroege Hydraulische Automatie Voor:

- Het sturen van rivierwater
- Het aandrijven van watermolens
- Het irrigeren van landbouwgrond
- Het ondersteunen van eenvoudige werkplaatsen
- Het helpen beheersen van overstromingen

Shushtar Historical Hydraulic System - Iran

Early Example of Decision Support Systems

The Pythagorean cup looks like a normal cup, but if you fill it past a set line, a hidden siphon makes all the liquid drain out. It’s an ancient Greek invention linked to Pythagoras (around 570 BCE), created as a clever way to teach moderation and fairness at the table.



Automation is closer than it seems!

Zaanse Schans, Zaandam, Netherlands http://en.wikipedia.org/wiki/File:Zaanstad_Zaanse_Schans_22.jpg

Traditional Windmills Provide Automation For:

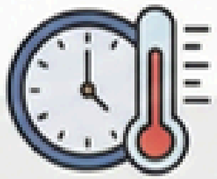
English
Pumping water from polders
Grinding grain
Sawing timber
Pressing oils and spices
Making dye, paper, or mustard

Nederlands
Water uit polders pompen
Graan malen
Hout zagen
Olie en specerijen persen
Verfstof, papier of mosterd maken

What Affects Your Home's Energy Use?

Your Home's Structure

- **Layout:** Open vs. closed impact airflow.
- **Windows:** Size and



Your Daily Habits

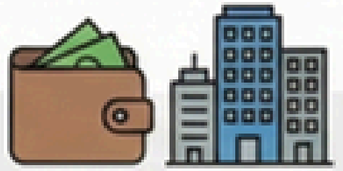
- **Your Energy Choices:** Unplugging devices.

Where You Live

- **Climate:** Heating or cooling needs.

Local Rules & Goals

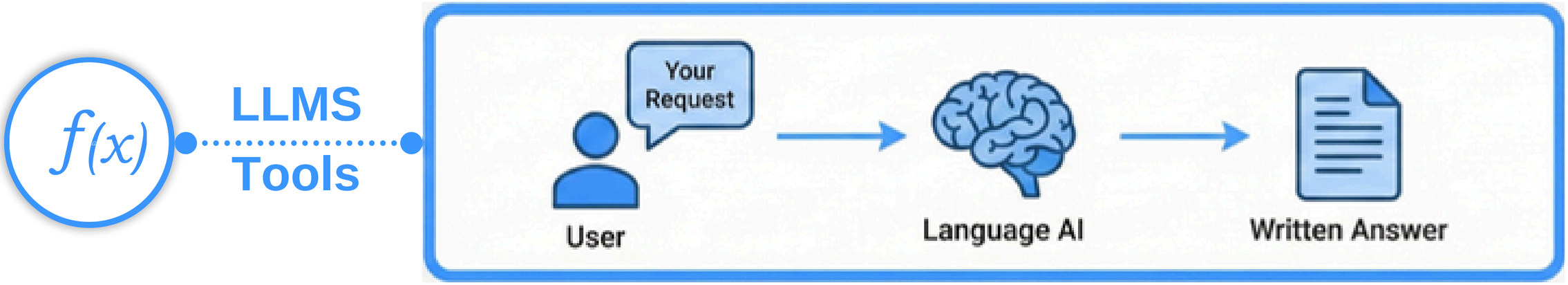
- **Renewable Goals:** Using clean energy.



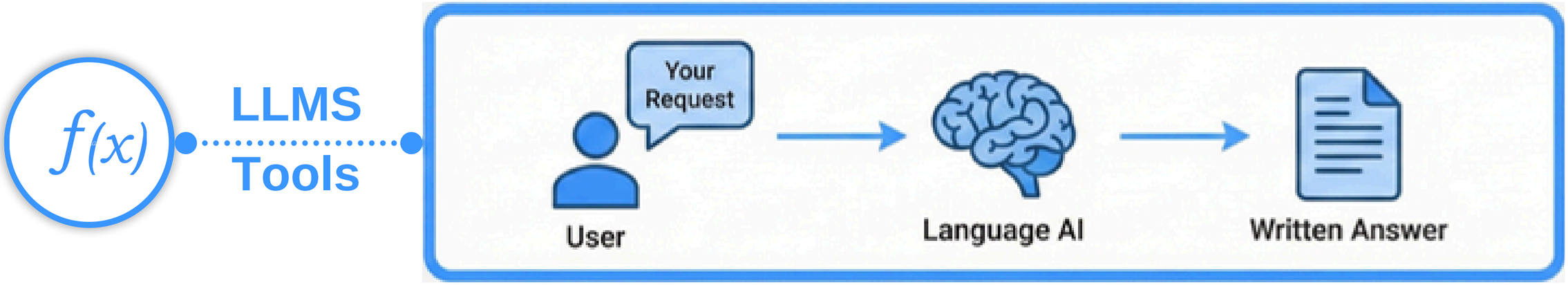
Costs & Community

- **Energy Prices:** Electricity and gas costs.

What are Large Language Models (LLMs)?



What are Large Language Models (LLMs)?



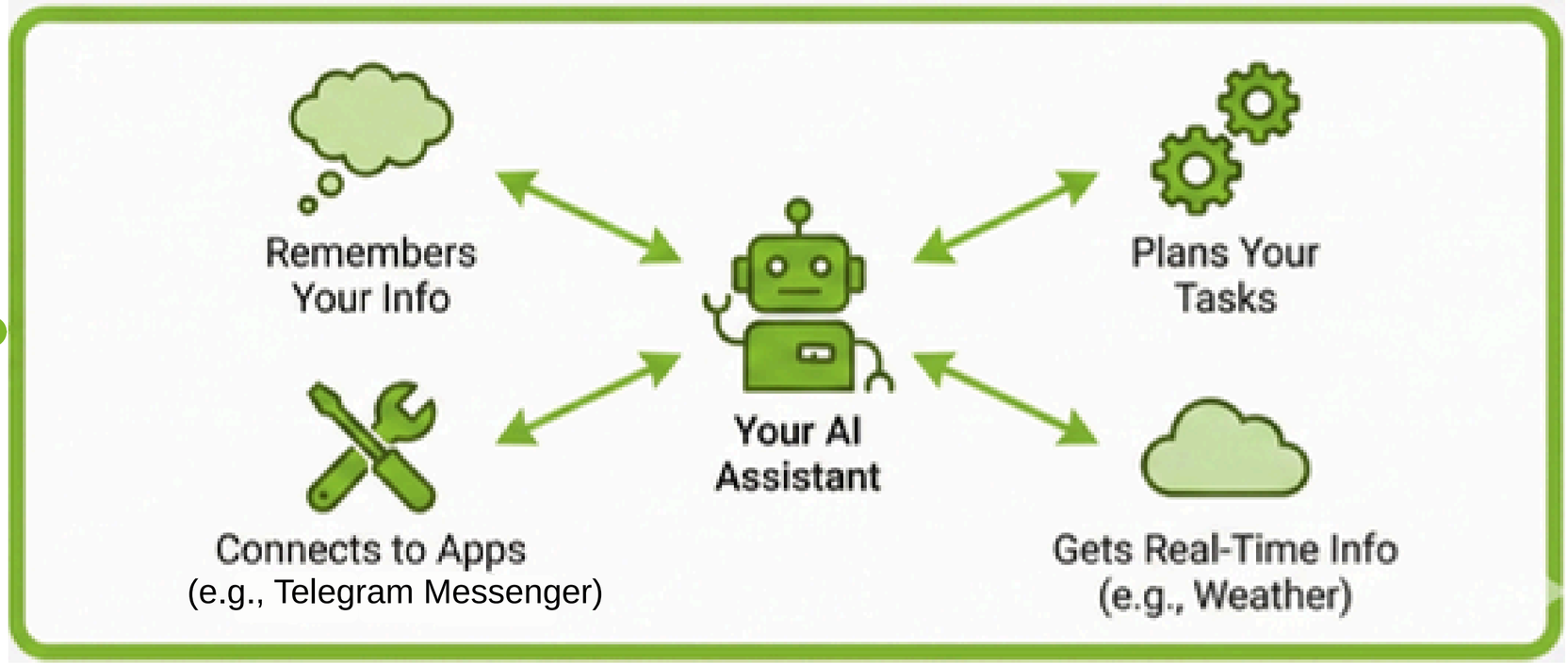
You might already know some of the most famous ones

OpenAI Grok Gemini Claude

LLMs AND Agentic Workflow

Agents

Automation



Behaviour is a pattern and it tends to repeat itself.

“The best predictor of future behavior is past behavior.”
— Albert Ellis, Walter Michel, and B.F. Skinner, and Mark

Occupant Insights

Questionnaire

Communication History

Live Nudges
AI chatbots guide better energy choices.

Easy Insights
Clear sustainability info for all.

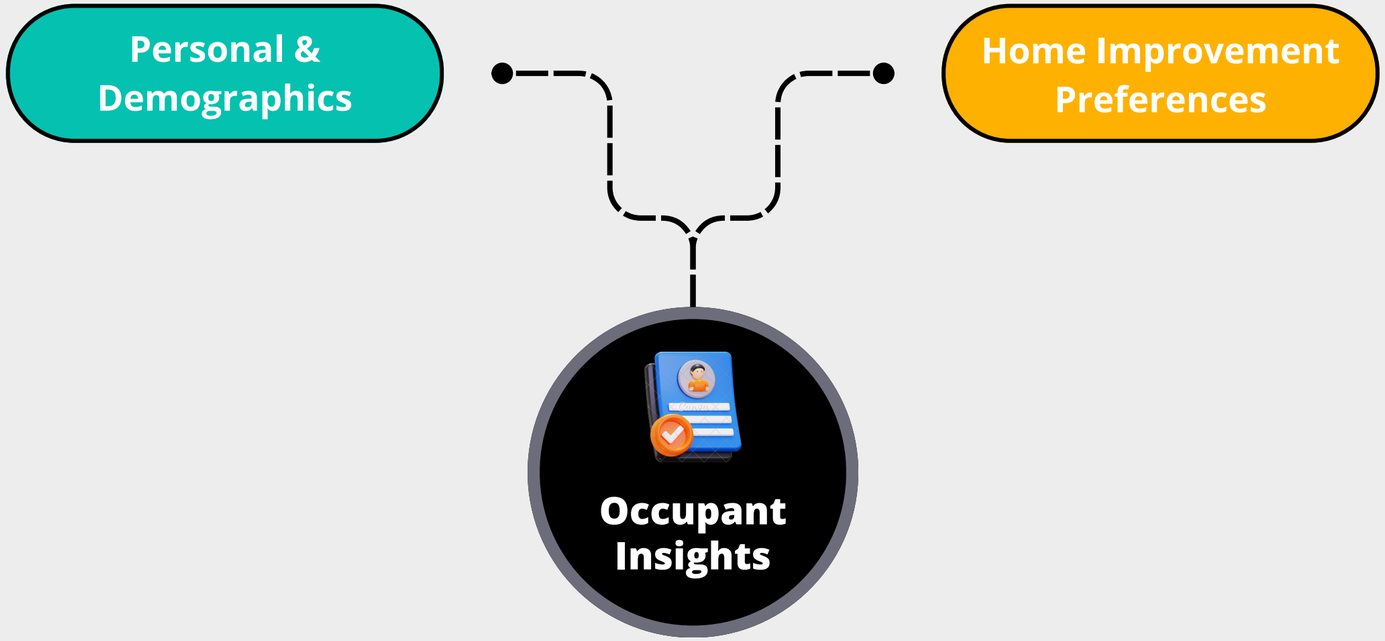
Smart Tips
LLMs analyze habits to give personalized energy advice.

Always Improving
Learns from feedback to adapt.

How Do We Learn About You?

Personal & Demographics

How Do We Learn About You?



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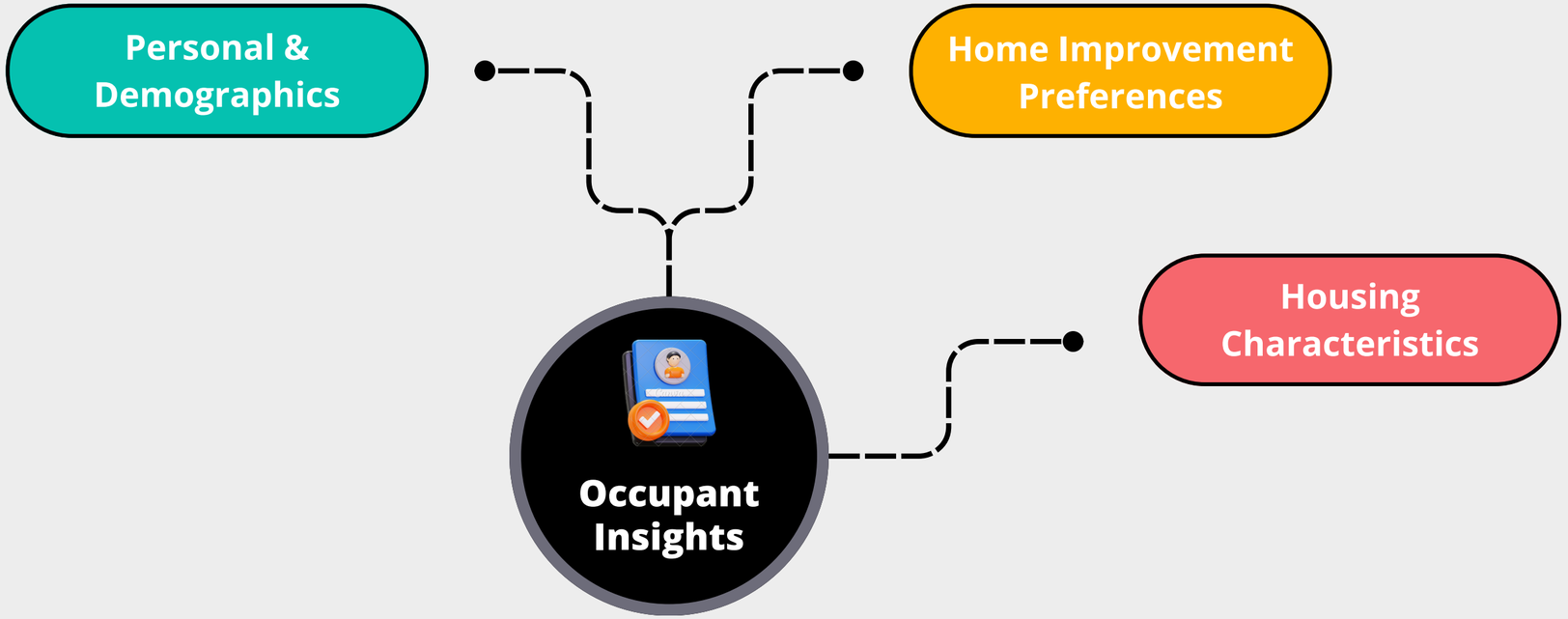

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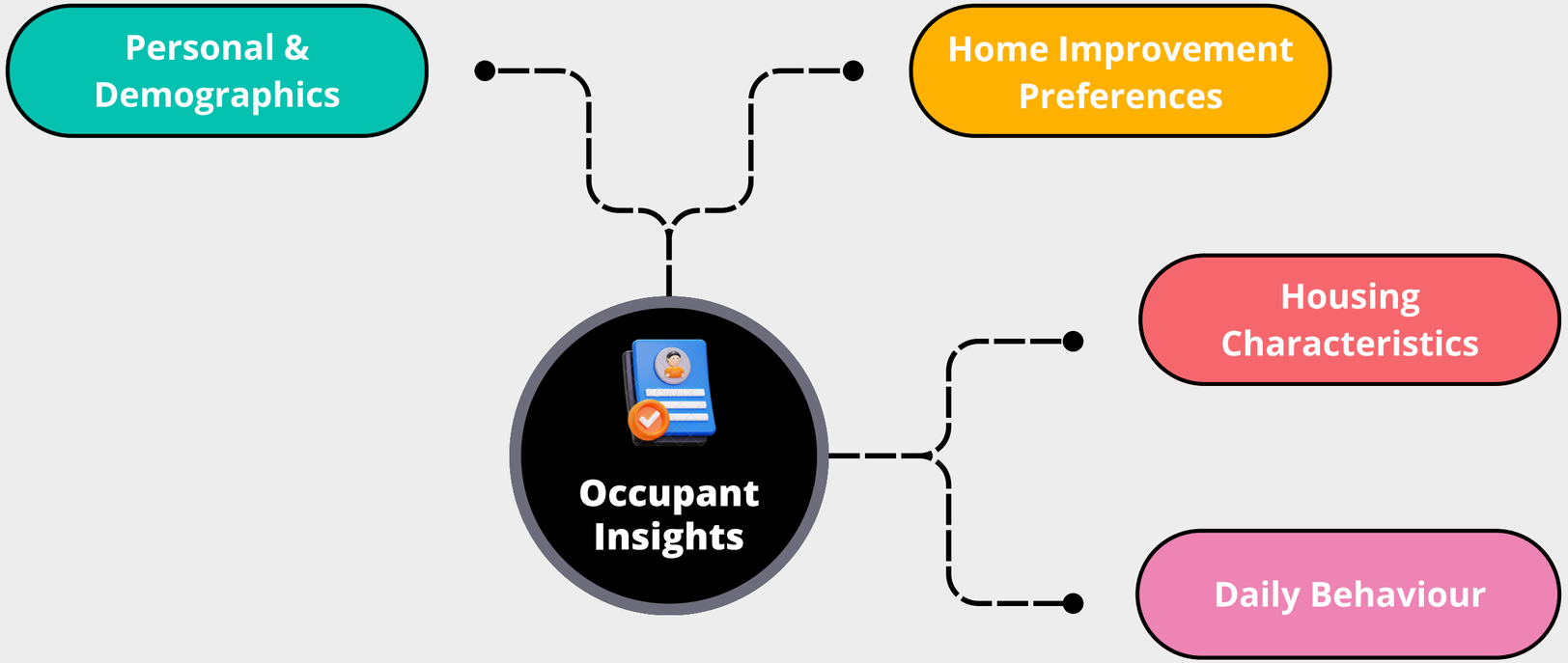

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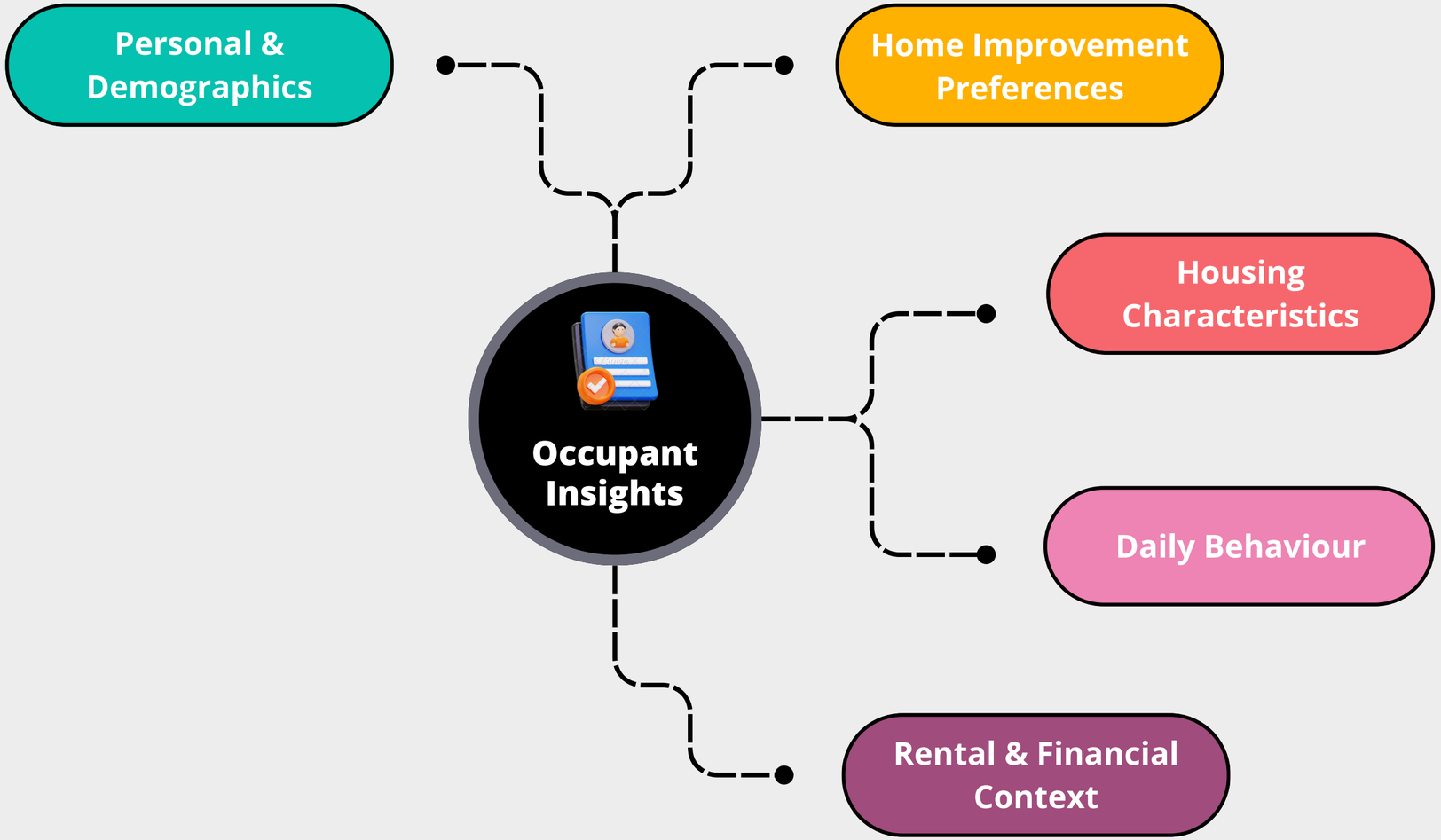

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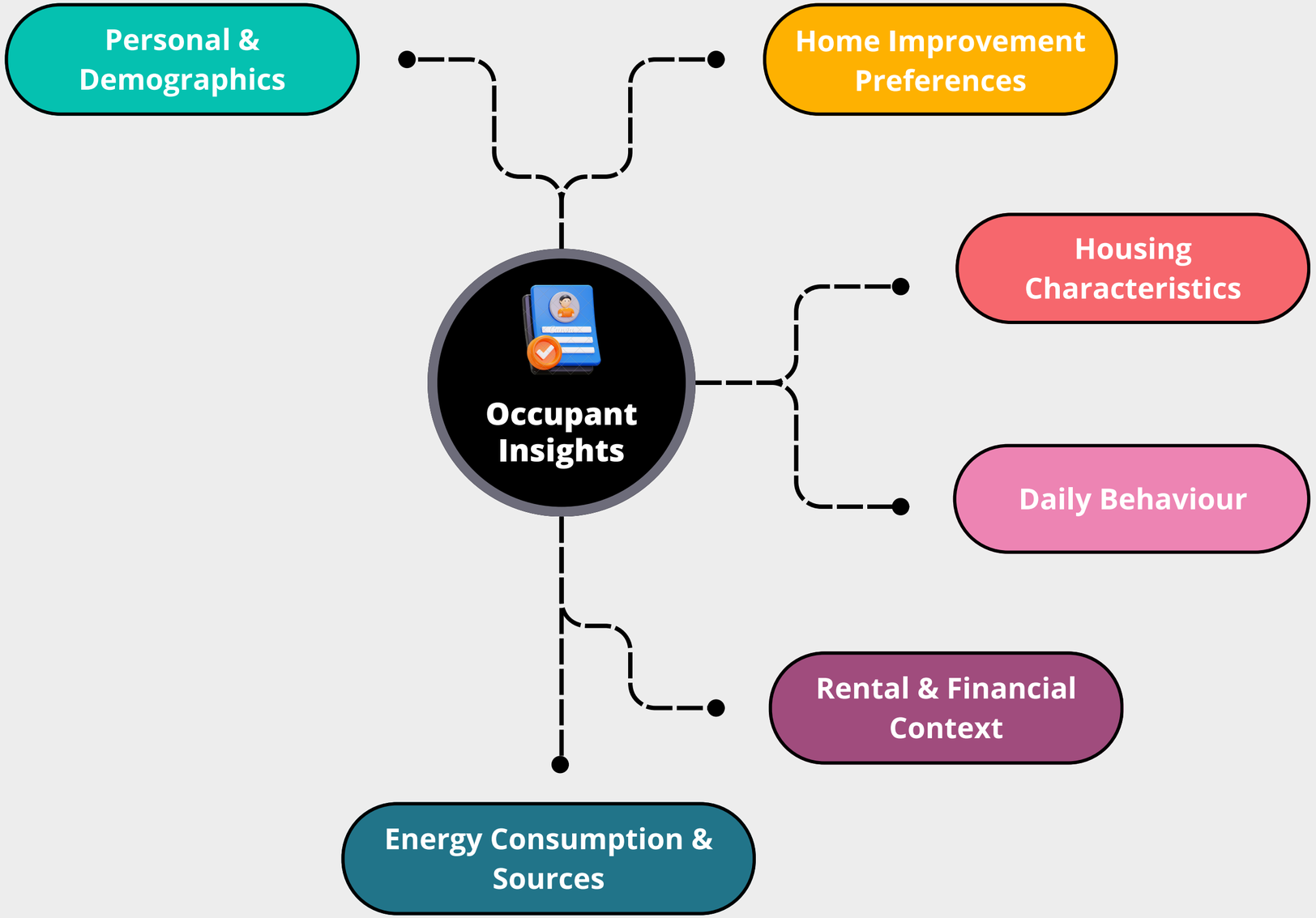

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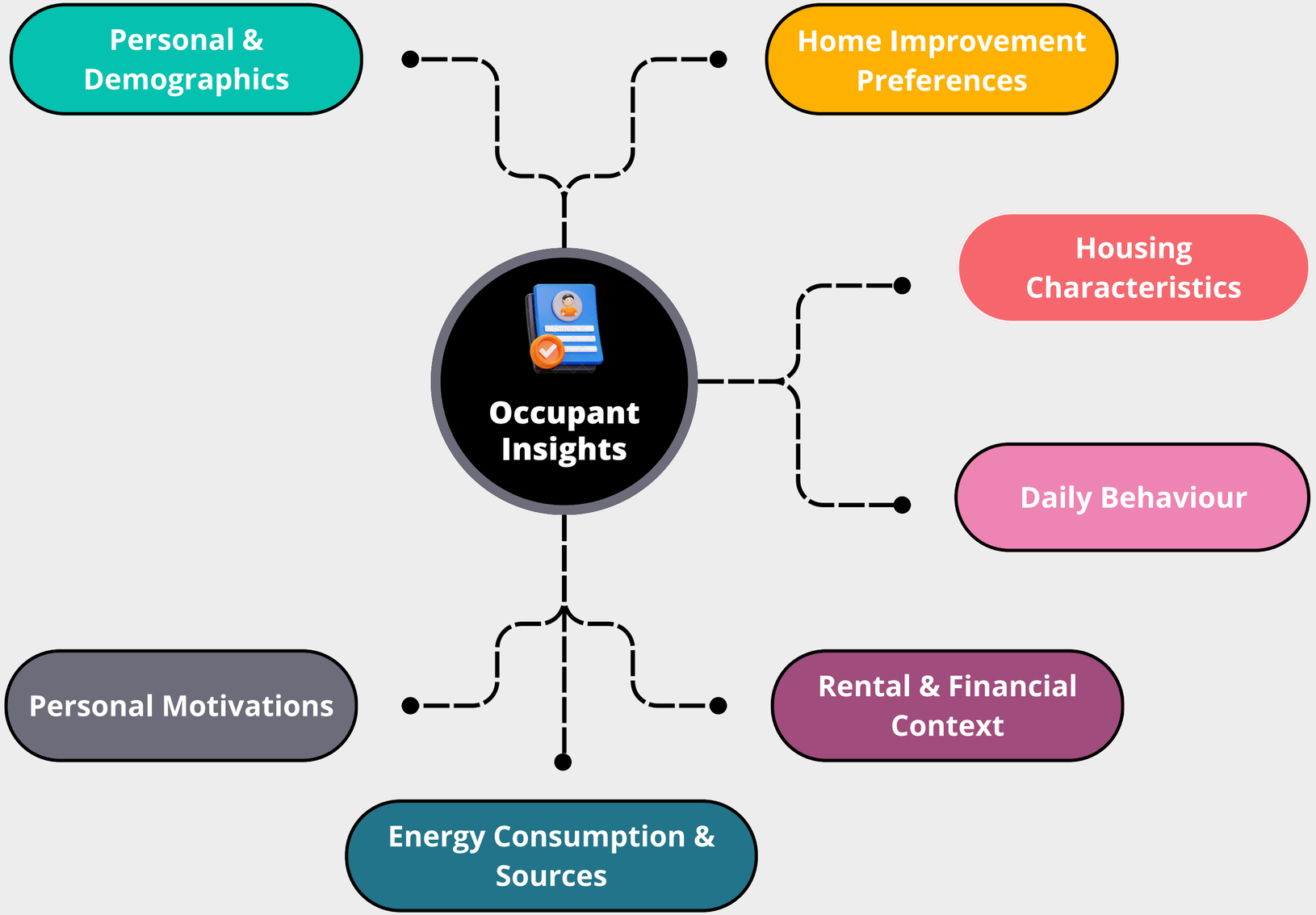

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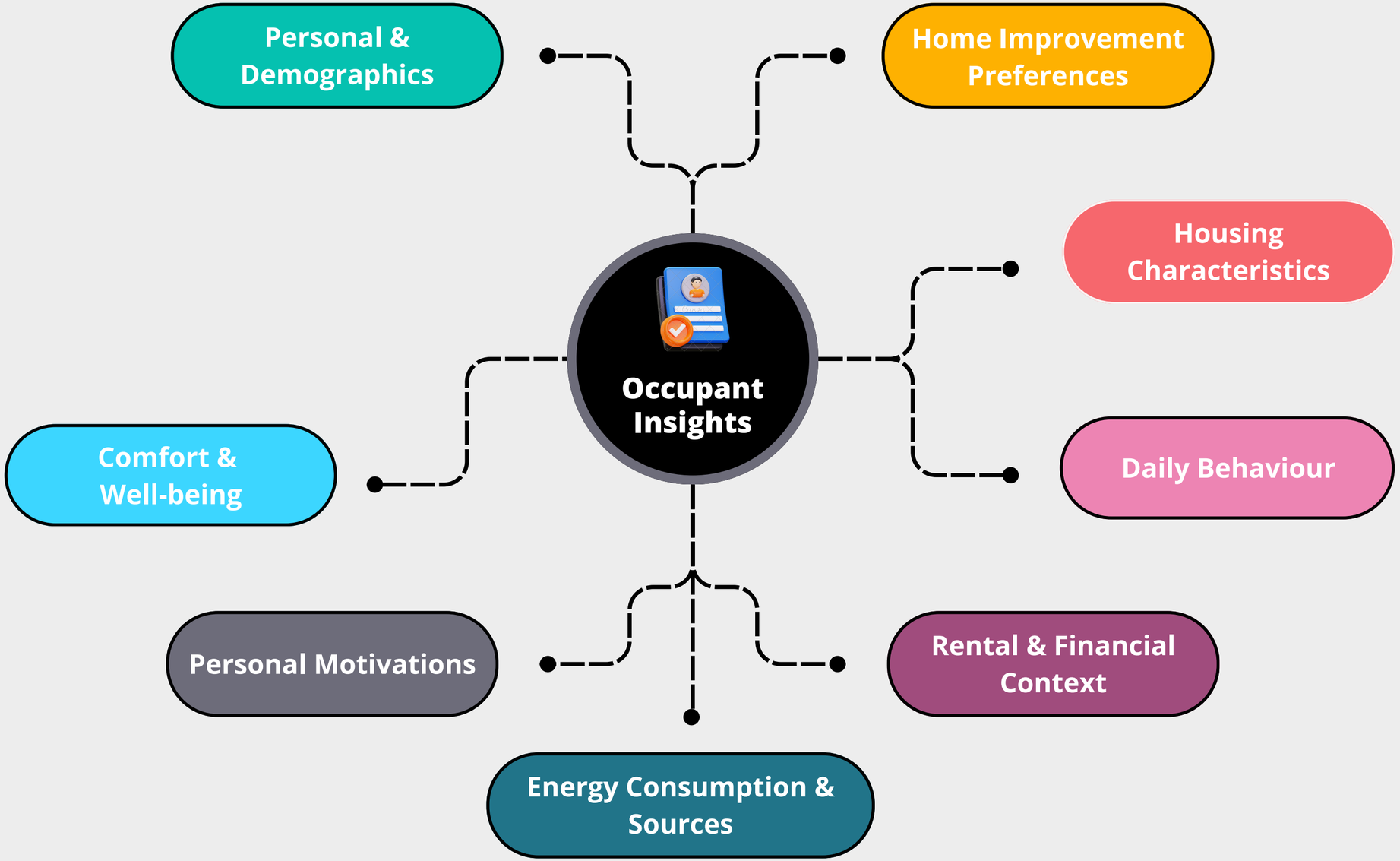

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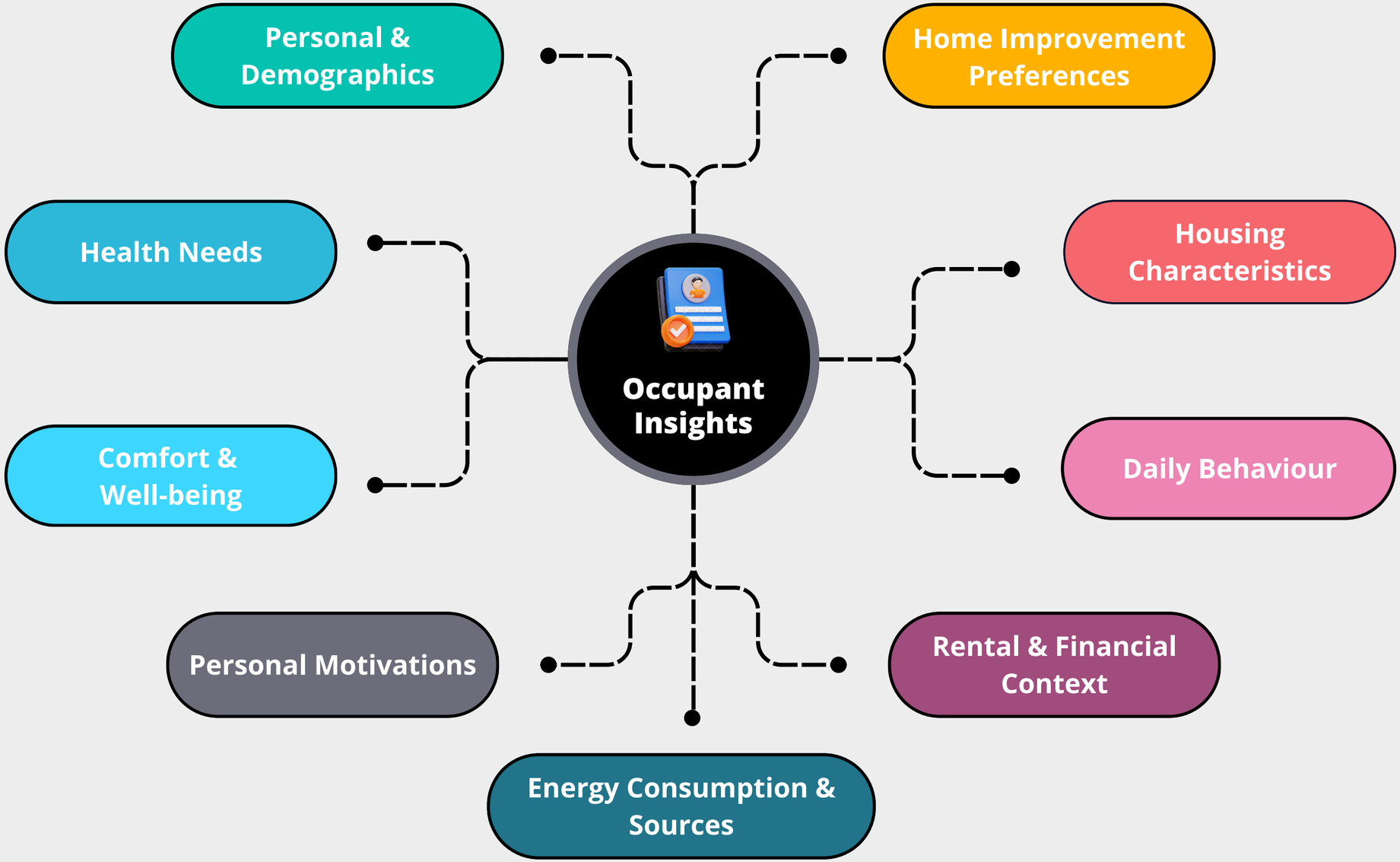
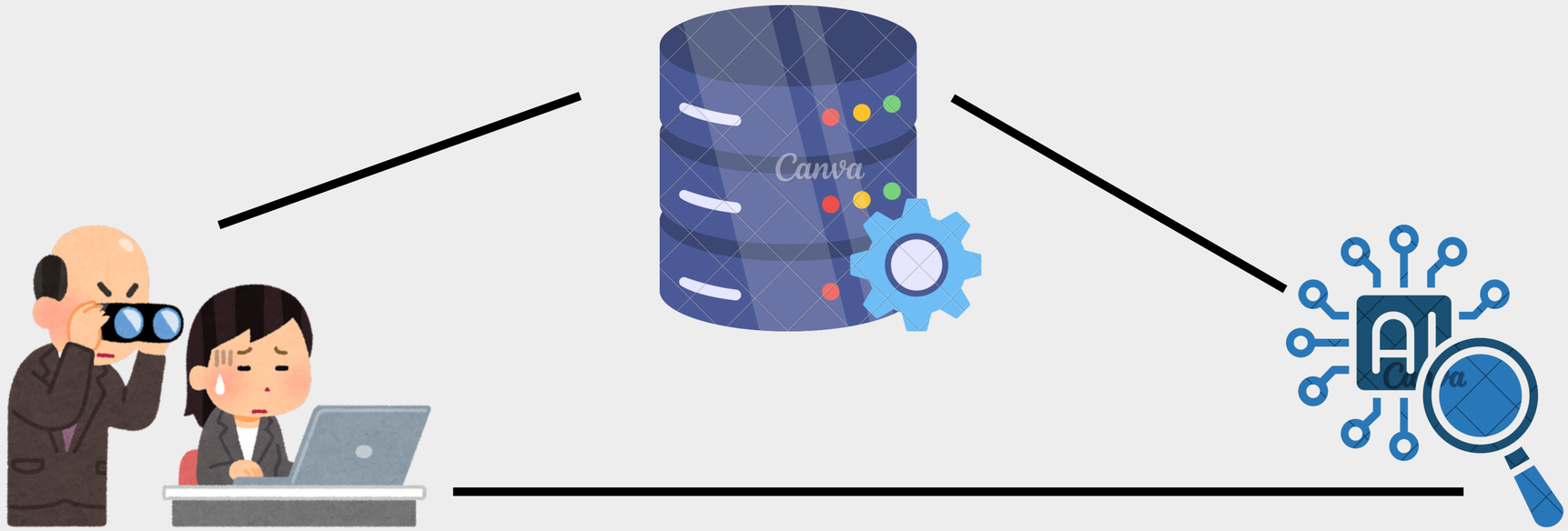


5,700+ suggestions, filtered to what fits you.

AI en Mensen Samenwerken



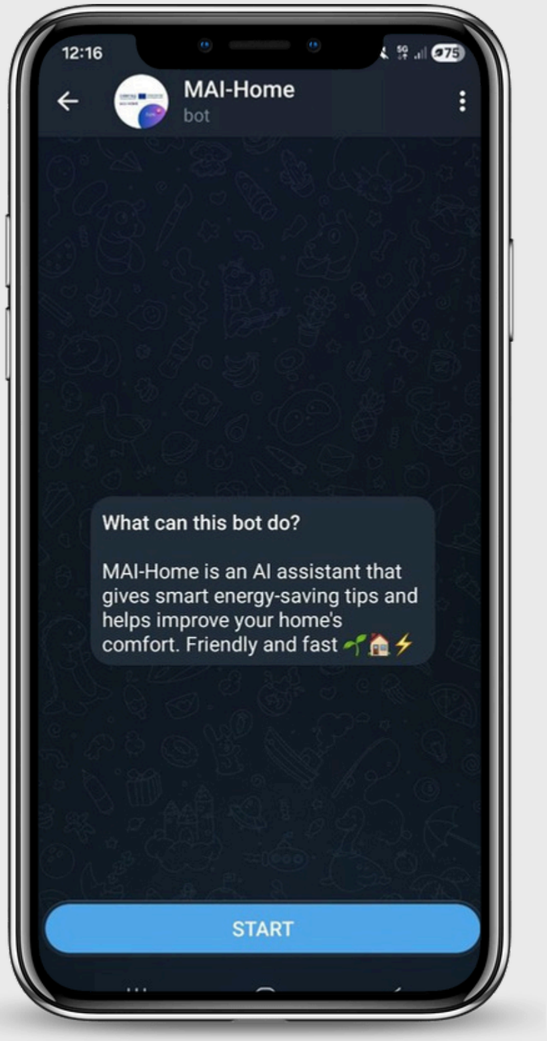
Experts as Judges (by Expertise):

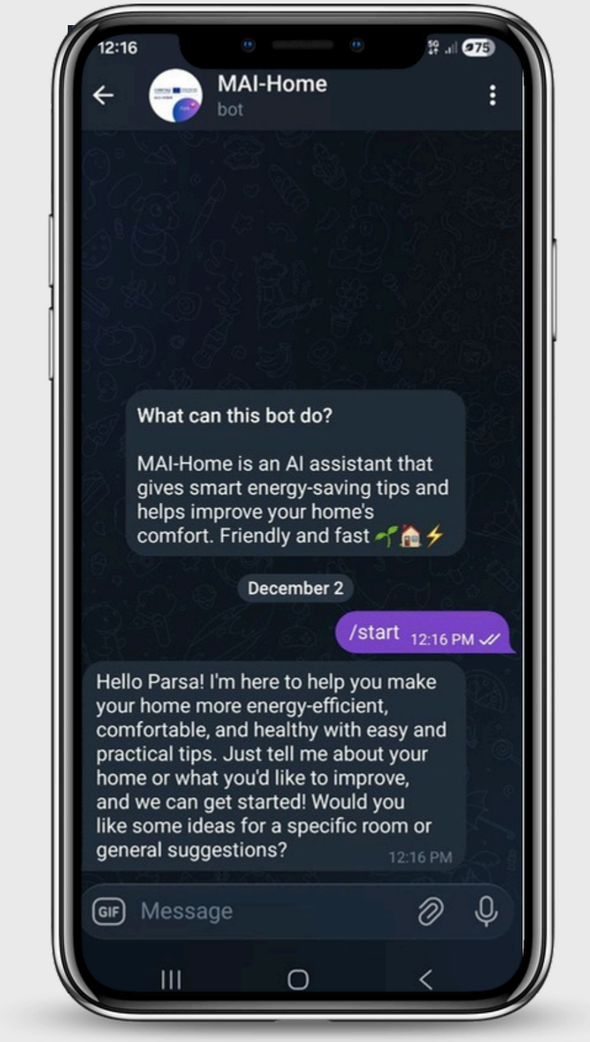
- **Sustainability & Energy**
- **User Behaviour & Occupant Interaction**
- **Architecture & Building Design**
- **Building Physics & Indoor Environmental Quality**
- **Urbanism & Spatial Planning**
- **Building & Construction Technology**
- **Hazard Management & Safety Systems**

Top LLMs as Judges:

- **XAI: Grok 4**
- **Anthropic: Claude Opus 4.1**
- **Google: Gemini 2.5 Pro**

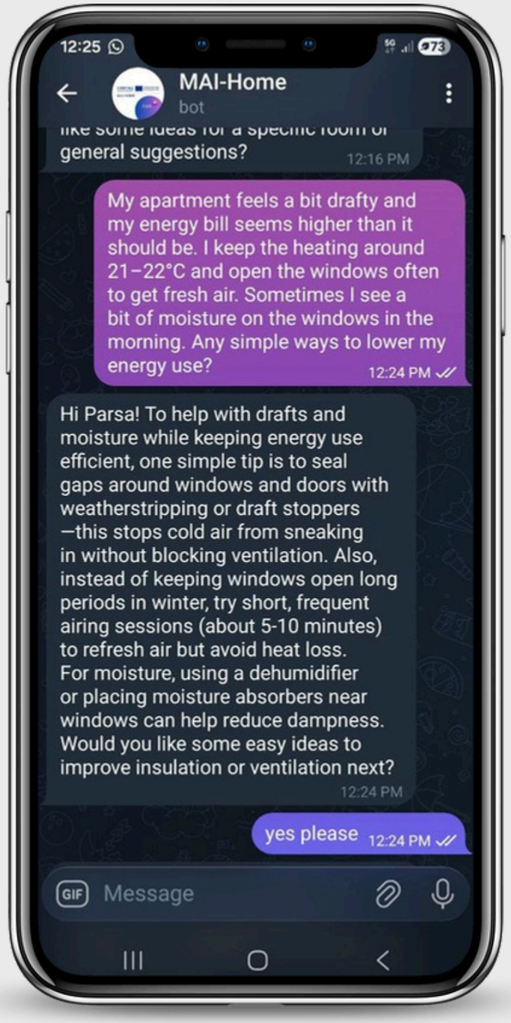
Available on Telegram! @MAI_HOME_BOT

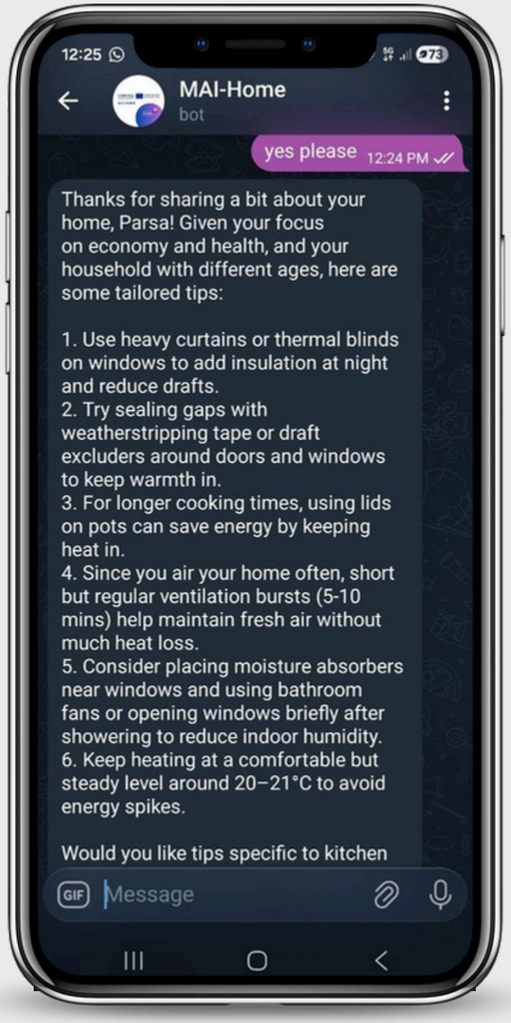




What’s the best way to use it?

- **Gives basic home/usage context.**
- **No personal details.**
- **States the issue clearly.**

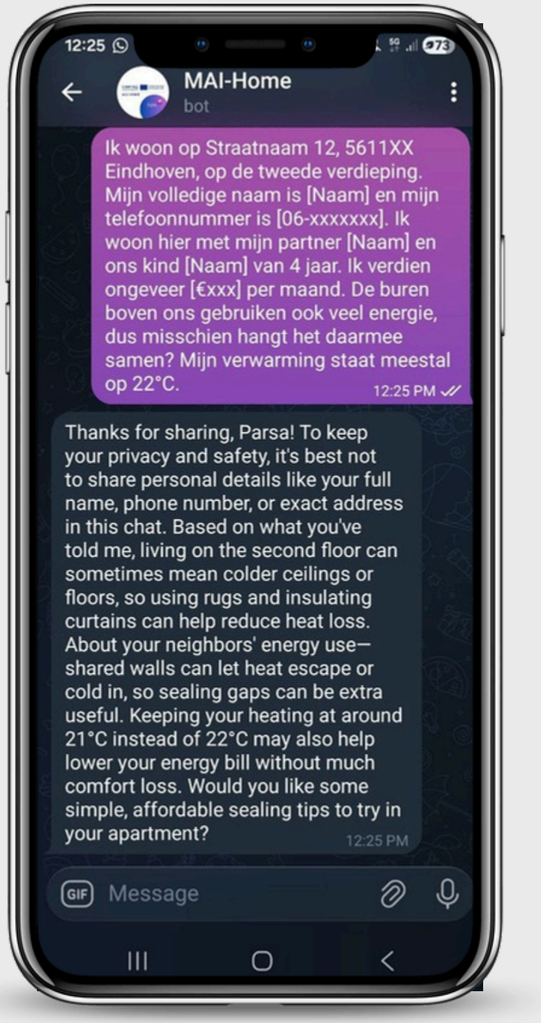




What’s the worst way to use it?

Wrong Use

- **Too vague with no home details.**
- **Includes unnecessary personal info.**
- **Mentions issues unrelated to energy.**



Try it in your own language or with voice!

Why LLM Technology?

Unlocking new potential through intelligent automation and global adaptability.

Scalable Tools

Effortlessly handles growing demands and complex workflows without compromising speed.

Personalized Services

Delivers unique, context-aware experiences tailored to every individual user.

Global Reach

Breaks language barriers instantly, enabling native communication across cultures.

Continuous Evolution

Systems that constantly learn from industry data to stay ahead of the curve.

Privacy & Data Protection

No Personal Identifiable Information

Our questionnaire does not collect any personal identifiable information (PII).

Your Privacy is Protected

We will not share your personal information with housing associations. They will not know who you are or what you do.

Anonymous Insights

Housing associations will only know what challenges exist in the community, enabling them to provide better support.

Please Do Not Share

Do not share personal identifiable information such as your address, full name, or financial details.

MAI-Home Mid-Term Meeting
22 May – Heerlen

Thank you for your attention!

Any questions?

“Please feel free to ask it in Dutch if you're more comfortable.”

Let’s do a short game together.