GPT3 for Healthy Ageing?

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MATHEMA

WHO defines healthy ageing as:

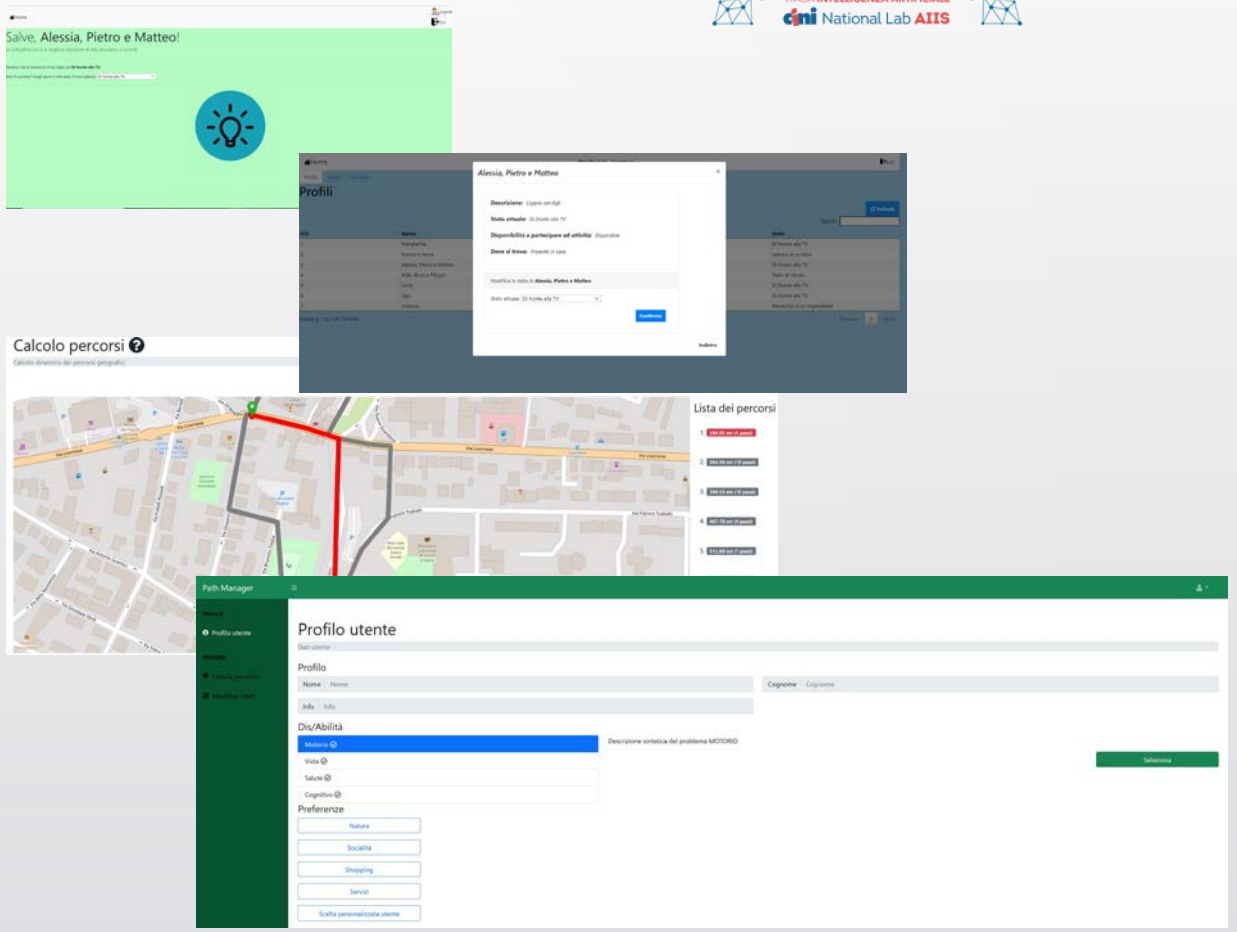
- *“the process of developing and maintaining the functional ability that enables wellbeing in older age.” Functional ability is about having the capabilities that enable all people to be and do what they have reason to value. This includes a person’s ability to:*
- *meet their basic needs;*
- *learn, grow and make decisions;*
- *be mobile;*
- *build and maintain relationships; and*
- *contribute to society.*
    - *https://www.who.int/news-room/questions-and-answers/item/healthy-ageing-and-functional-ability*

Intelligence for inclusion of people

- The contribution describes a specific application of AI for the well-being of the elderly, which is part of a more general and long research of support and inclusion of people through the creation of intelligent environments.
- For example, in the past the participation to
  - the European AAL FOOD project, (Framework for Optimizing the prOcess of FeeDing, funded within the European AAL program, http://www.aal-europe.eu/projects/food/), from 2012 to 2015. The presence of academic partners, such as the University of Parma, industrial partners, such as INDESIT, and social partners, such as the Department Of Social Services, Local Council Brasov, made it possible to consider different aspects of the necessary processing capacity.
  - In the present, the ongoing national Ermes Project: "Urban ecosystem for an active and healthy ageing", co-funded by the Italian Ministry of Health, which started in February 2023.

AI for Well-Being

- In this new environment, all the techniques that are referred to as Artificial Intelligence can make a contribution of undoubted value for the creation of support systems for people in their daily activities, in the variability of her conditions and her abilities.
- Examples:
  - Activity: interpersonal communication
    - Our app takes into account not only the static and dynamic profile of the user, but also the conditions of the people around him, in a dimension of relationships between people, with the use of Machine Learning tools.
  - Activity: pedestrian mobility,
    - A specific approach of Reinforcement Learning has been used to optimize routes according to people's abilities and preferences, coherently with the physical environment.



The approach

- During all these consecutive developments of support services in different context, it has emerged the current remarkable development of information technologies. This leads us to evaluate two solutions regarding the application to current problems:
- proceed with the development of new technologies,
- consider an intensive use of the technologies currently available, optimized for the purpose.

- A note:
  - Often the analysis of the resources offered by the available products, commercial or free, is limited only to the most advertised characteristics, while the robustness, reliability and updating characteristics that these products can guarantee are ignored.

GPT-3

- Currently the problem reoccurs for applications of Generative Artificial Intelligence, in particular GPT-3 which apparently (this is the first misunderstanding) produces a language that cannot be differentiated from a language produced by human beings, for both conversation and text.

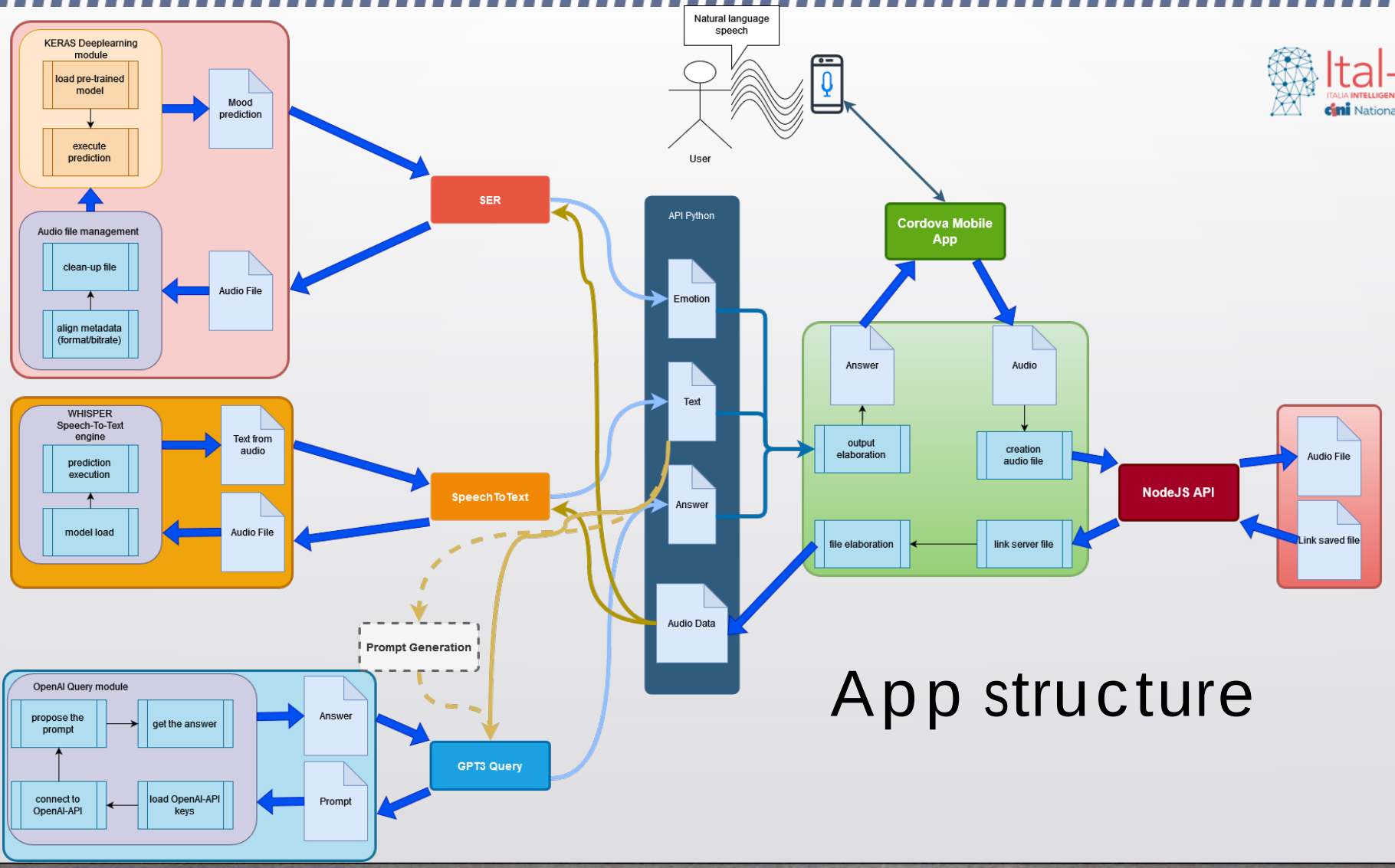
Analysis

- Our analysis on the possibility of using these tools for support services for elderly started from the identification of the present limits.
- In literature, we have selected two works, where the authors insert a careful list of critical, but also favorable aspects of this powerful and controversial tool.
- Both contributions highlight the fact that there are considerable limitations; especially if you think you can use the system as a tool to obtain a conversation system (does not replace a conversation with another human being).

- R. Dale, "GPT-3: What's it good for?", Natural Language Engineering (2021) 113-118. doi:10.1017/S1351324920000601.
- D. Korngiebel, S. Mooney,. "Considering the possibilities and pitfalls of Generative Pre-trained Transformer 3 (GPT-3) in healthcare delivery". npj Digital Medicine. (2021) doi:10.1038/s41746-021-00464-x.

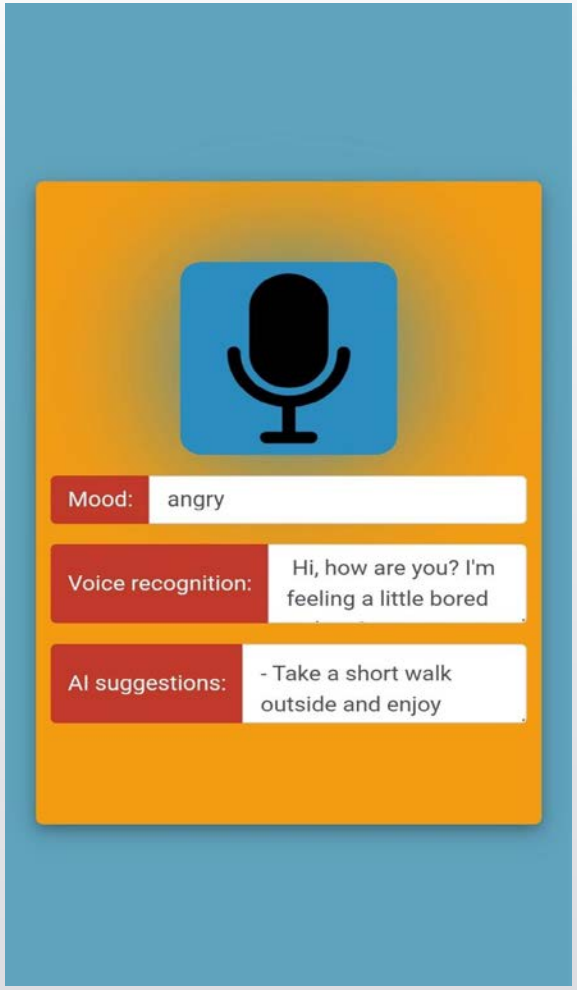
Feasible applications: examples from literature

- navigate complex electronic health record (EHR) systems, automate documentation with human review, prepare orders, or automate other routine tasks
- online dialogue support for patients or assisting patients with setting up equipment in preparation for a telehealth visit
- assist with triaging noncritical patients presenting in the emergency department: a good use of the technology, from both a patient experience perspective and a resource allocation perspective.
    - *the focus on collecting accurate data from patients in a user-friendly way, improving the patient experience (by making it easier to provide information) and enhancing patient care (by freeing up clinicians to spend more time in meaningful clinical encounters rather than routine data collection).*



App structure

App snapshots



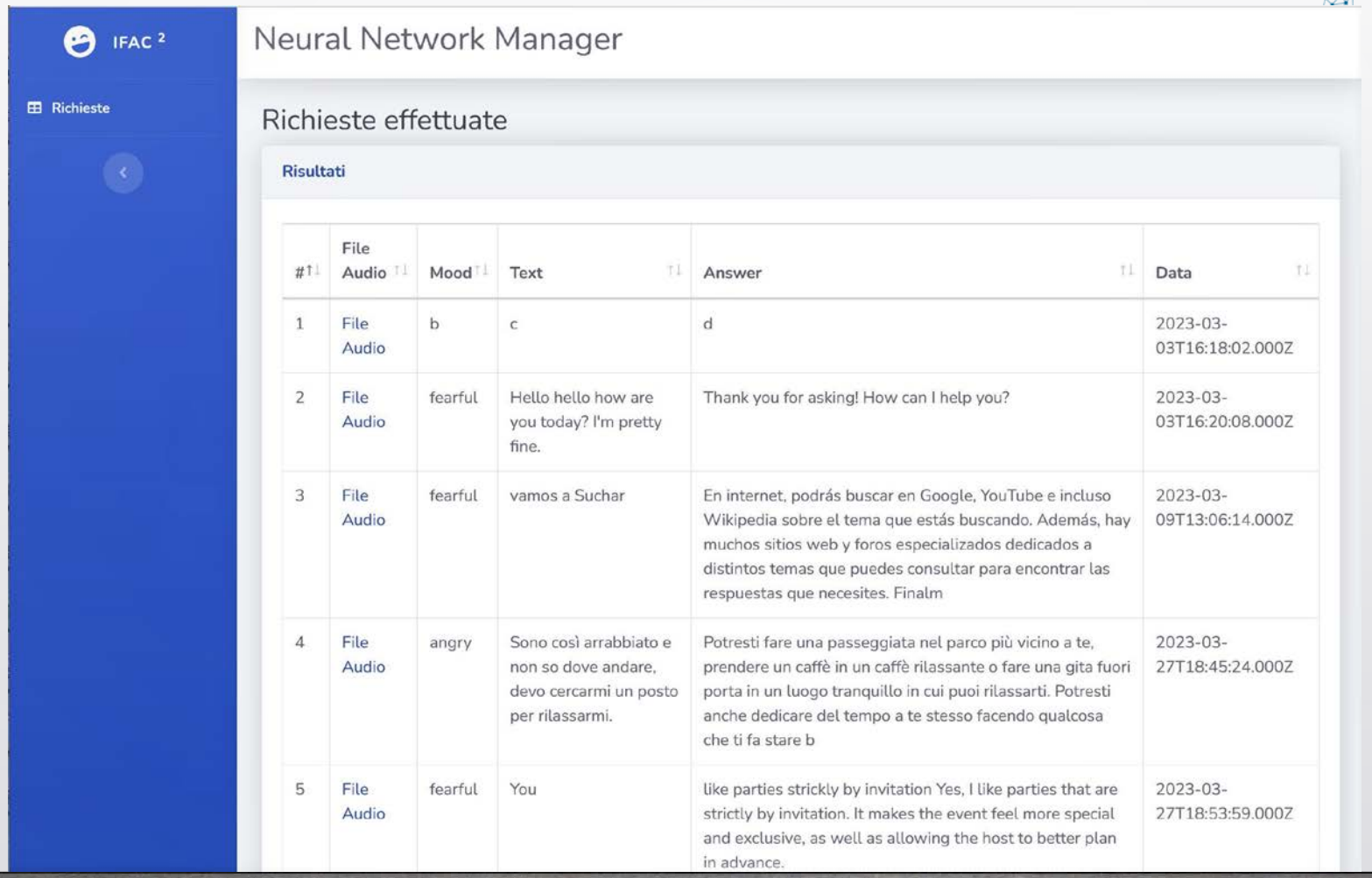
App description

- Regardless of the personal data management problems, on which we are working in parallel , it is very important to consider how the request is more specified with the addition of the mood and the user static profile.
- It is more as a pre-screening of the situation, than as a definitive answer. Even for a test session, the interaction can take place not directly with the subject, but with those who take care of the subject, such as caregivers.

App evaluation

- Since the system is still under development, a complete evaluation has not been completed. A first expert evaluation has been carried out with the help of GPT-3 experts.
- In order to proceed with this step, an appropriate interface is under development in order to distinguish between caregiver interface and elderly interface.

Evaluation interface



#	File Audio	Mood	Text	Answer	Data
1	File Audio	b	c	d	2023-03-03T16:18:02.000Z
2	File Audio	fearful	Hello hello how are you today? I'm pretty fine.	Thank you for asking! How can I help you?	2023-03-03T16:20:08.000Z
3	File Audio	fearful	vamos a Suchar	En internet, podrás buscar en Google, YouTube e incluso Wikipedia sobre el tema que estás buscando. Además, hay muchos sitios web y foros especializados dedicados a distintos temas que puedes consultar para encontrar las respuestas que necesites. Finalm	2023-03-09T13:06:14.000Z
4	File Audio	angry	Sono così arrabbiato e non so dove andare, devo cercarmi un posto per rilassarmi.	Potresti fare una passeggiata nel parco più vicino a te, prendere un caffè in un caffè rilassante o fare una gita fuori porta in un luogo tranquillo in cui puoi rilassarti. Potresti anche dedicare del tempo a te stesso facendo qualcosa che ti fa stare b	2023-03-27T18:45:24.000Z
5	File Audio	fearful	You	like parties strickly by invitation Yes, I like parties that are strictly by invitation. It makes the event feel more special and exclusive, as well as allowing the host to better plan in advance.	2023-03-27T18:53:59.000Z

Future developments

- In order to improve the results produced by the algorithm, ad hoc solutions will be applied during the training and preparation of the model.
- Among the options that can be implemented, there is both the possibility of performing fine-tuning operations on the data (in order to increase the level of knowledge of the model about a specific topic), and of using other query methods, always taking advantage of the OpenAi as a basis for inference.
- The selection of the right tools and their application will necessarily go through a phase of testing/analysis of the results

Conclusions

- The application of Artificial Intelligence can be useful both for health, but more generally for the well-being of people.
- Among these, a particularly challenging reference is represented by elderly people whose profile presents greater dynamism over time and a diversity between individual and individual.
- The possibility of building support systems in daily activities with the help of Artificial Intelligence represents a reality rather than a challenge.

Thanks for your attention

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