1. Who is Myndoor

Myndoor is an innovative startup born in 2021, in the field of mental awareness. At Myndoor, our mission is to empower individuals with a groundbreaking technology that detects levels of stress through advanced and patented technology based on semantic analysis. We are dedicated to revolutionizing mental well-being by providing an accessible and reliable tool for everyone to understand and manage their own mental state. By leveraging cutting-edge technology, we aim to enhance overall emotional health and enable individuals to make informed decisions towards leading happier, healthier lives.

2. Scientific context

Stress is the psychophysical response to a number of emotional, cognitive or social tasks perceived by the person as excessive. People often define themselves as "stressed", but it is not always easy to identify all the symptoms of stress and it can happen that the problem is underestimated until it reaches a chronic dimension with consequences on psychophysical health and on people's lives in general.

Recent studies have highlighted that stress is not an isolated symptom, but rather a complex amalgamation of interconnected factors, including anxiety, depression, and physical fatigue, as perceived by the patients themselves. Psychologists utilize questionnaires like the Perceived Stress Scale (PSS), Hamilton Depression Rating Scale (HDRS), and Hamilton Anxiety Rating Scale (HAM-A) as indicators to gauge the level of psychological stress and aid in the diagnostic process.

However, there are certain issues associated with this approach. Firstly, it remains uncertain whether a single questionnaire can adequately represent a significant sample size to determine an individual's psychological stress level. Secondly, there is no assurance that the correspondence between interviews, questionnaires, and stress indicators can serve as a reliable database for training a classification algorithm capable of distinguishing between stressed and non-stressed states.

The way people express themselves can reveal different information about their state of well-being in an indirect way. The research has highlighted some parameters of the way of communicating that would seem to be able to provide information regarding the level of stress of people. In particular, research conducted by Mehl and colleagues (2017) has shown that a condition of strong social stress determines an anomaly in the action of the genes that control inflammation, generating even serious chronic conditions. This research also identified a relationship between individual differences in natural language use and gene-expression profiles.
Starting from these assumptions, Myndoor team has carried out numerous studies aimed at identifying linguistic markers capable of identifying a condition of stress. To achieve this result, texts and diaries of a large sample of volunteers around the world were analyzed for 6 years and compared both with their physiological parameters (heart rate, blood pressure, cortisol level) and

with data collected from the administration of specific psychological questionnaires and test aimed to determine cognitive functions

The first correlations between emotional state and communications were reported in scientific articles, conferences and proceedings, before deciding to exploit them to create a commercial product. The results obtained were compared with psychologists and analyzed with the aid of artificial intelligence and Machine learning, to obtain a reproducible and predictive system.

3. Myndoor Technology

Myndoor has developed and continues to constantly improve a patented proprietary Artificial Intelligence model that allows the quantification of the stress level of a textual content. The proposed solution, while based on the state of the art and on the technological advancement carried out by the main players in the sector, has some peculiarities determined by the training of a Natural Language Processing algorithm based on a semantic engine.

The combination of a semantic database collected in more than 7 years, through what is called knowledge graph walking, makes the model in line with the technologies currently available for what concerns sentiment analysis and at the same time highly innovative because it allows the differentiation of information content of a sentence based on the semantic context.

The model can autonomously evaluate itself and take supervision from our team to identify which application cases can be improved, thus determining an active intervention on the model and a consequent re-training of the algorithm.

At this moment, the model has an accuracy (F1 score) attested of 83% with any kind of communication.

4. How Myndoor technology is distributed: API

A callable API addressed to those firms that provide corporate welfare/wellness services, insurances and consulting firms interested in innovation and technology. The API is easy to integrate in every back- end component and can be addressed to analyze both written and oral communication data (mail, tweets, journals, open questions, etc.) based on the client's needs. The privacy of data is guarantee by design and in accordance with GDPR specimens. Every data ins anonymous and encrypted and the API doesn't save any record of the data.

Companies operating in the field of psychological analysis and services in the Healthcare & wellness sector, which use semantic analysis tools to understand the emotional states of their users, can benefit enormously from the use of our technology.

How does it works

The innovative nature of our team's work extends beyond the advanced technological aspects of Deep and Machine Learning techniques. It stems from an exhaustive analysis of data provided by certified professionals, facilitating a profound understanding of the relationship between lexical and syntactic choices in the text (NLP – natural language processing)

To address the uncertainties stemming from the multitude of available questionnaires, we have devised an "ensemble" approach, aggregating questionnaire results to mitigate errors and inaccuracies inherent in individual scores.

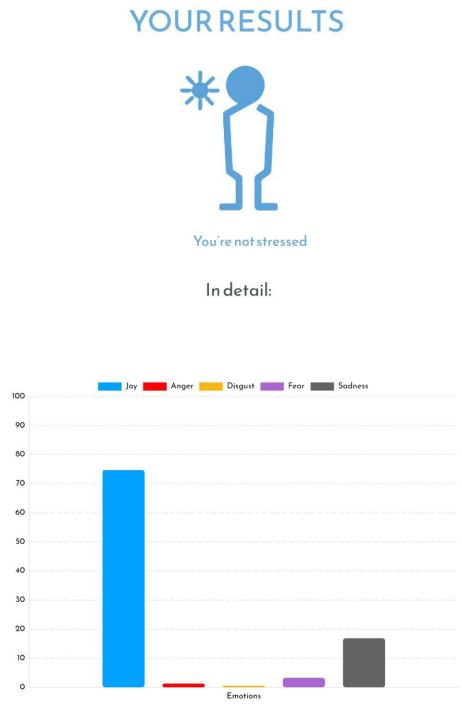
Furthermore, variations in the number of questions, diverse response scales used by patients, and discrepancies in completion times have necessitated the development of an initial Artificial Intelligence model.

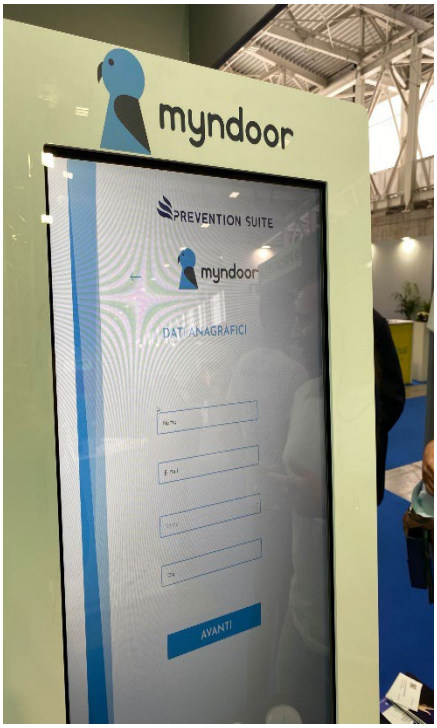
Our model is now capable of assessing the stress levels of an individual without refer to any questionnaire but only analysing the communication style.

5. Case studies:

PRIVATE COMPANY

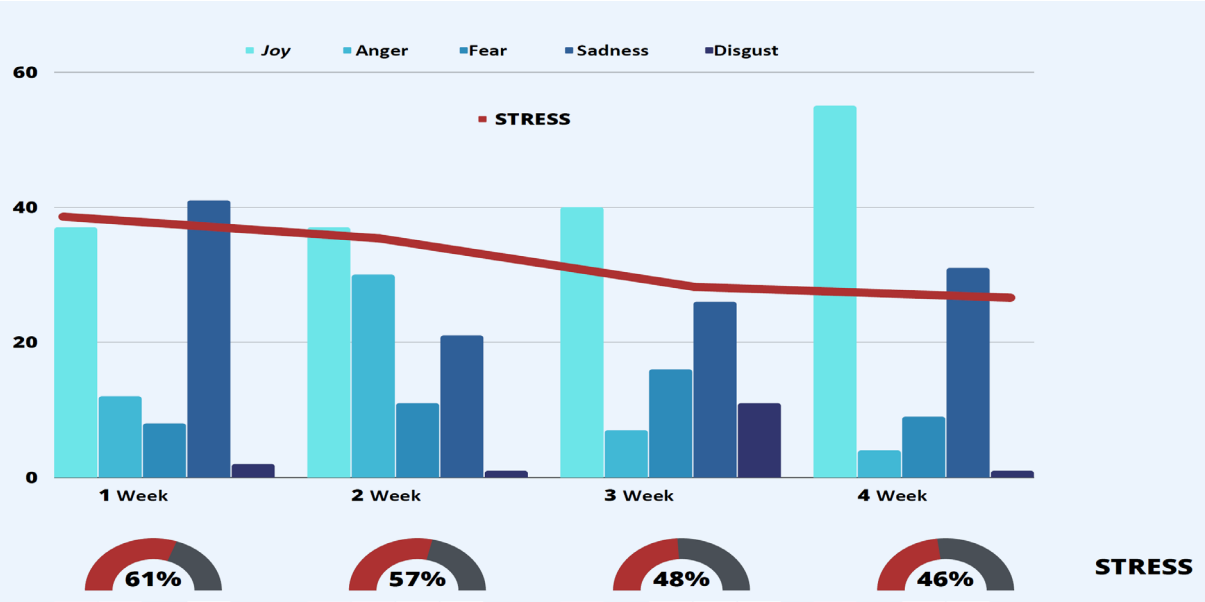
A company operating in the digital health and self assessment sector I suing the technology enabling the clients of some drug stores in Italy, to self evaluate their status by simply recording a short voice message in response of some question, posed by a totem installed in the grocery store. and then providing the result in real time.



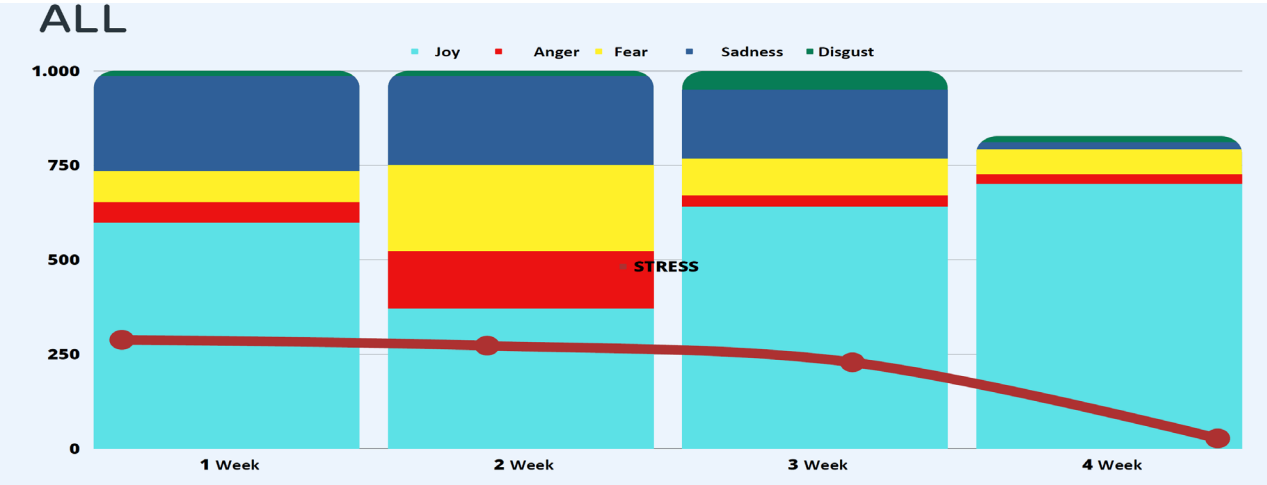


EUROPEAN CORPORATE WELLNESS COMPANY

European Corporate wellness company is using the technology to analyze the *open questions* they normally pose to their user. During the normal routine of their programs they help corporate employees get a self evaluation of their wellbeing and find solution to improve their mental wellbeing and fitness to the work environment. Using our technology to detect stress and Psychological malaise based on the way the user answer to they question, they are able to provide the user with a previse trends of psychological state along the journey (information available only to the user) providing a better support.



Furthermore, the company is able to provide anonymous aggregated data to the client, in order to enable a better understanding of the overall situation of their workforce, alongside with the demonstration of the improving condition of their users thanks to their journeys.



6. Future roadmap

In the near future we will develop integrations for major messaging software such as Outlook, Slack, wordpress. We are also working on putting the API on the AWS – Amazon Web Service - marketplace.

7. GDPR :

Myndoor services utilize serverless and event-driven technologies, leveraging the power of AWS's cloud-native infrastructure to ensure scalability for handling virtually unlimited data volumes. The platform adheres to GDPR regulations in its entirety.

The API is designed to seamlessly integrate with any backend component, ensuring easy integration without any complications. The privacy of data is given utmost importance and is guaranteed by design, adhering 100% to the principles outlined in GDPR (General Data Protection Regulation) guidelines. All data processed by the API is anonymized and encrypted to safeguard personal information. It's important to note that the API does not retain any records of the data, further enhancing the privacy and security of user information.