

**Category**

Best Digital Health Solution

**General Information****Company Name \***

Aptar Digital Health

**Number of employees \***

51-200

**Turnover and/or Funding**

N/A

words remaining :

499

**Product/Solution Name \***

Migraine Buddy's Weather and Trigger Advanced Reports

**Corporate Name \***

Aptar Digital Health

**Date of Approval \***

2021-07-01

**Indications \***

Migraine

words remaining :

499

**Therapeutic Areas \***

Neurology / CNS

words remaining :

497

\*Kindly clearly label your files with company name and asset name.

**Background information and need for drug / device**

**(please be as specific as possible in your description; limit 500 words)**

Migraine Buddy is a mobile application developed by Aptar Digital Health, a global leader in digital health, and part of AptarGroup, Inc. Migraine Buddy was first launched in 2014 and aims to empower patients suffering from headaches and migraine through data-driven insights. Migraine Buddy

quickly gained traction among migraine sufferers due to its user-friendly design and comprehensive tracking capabilities. The app's success attracted significant attention, leading to partnerships with headache specialists such as Dr. Richard B. Lipton, MD (Albert Einstein College of Medicine) and research institutions. Migraine Buddy was funded by the Singapore National Research Foundation as well as its users and investors who had a strong interest in better understanding the human brain. These funds have been crucial in the development of the latest innovative feature to Migraine Buddy, the Weather and Trigger Advanced Reports.

Over the past 10 years, Migraine Buddy has become the number one mobile application for tracking headaches and migraines. Recommended by the world's leading neurologists, it enables migraine sufferers to learn and better communicate about their headaches. Our community of 4 million users across 132 countries contributes to migraine awareness and research. Migraine affects 1 in 7 people worldwide, with only 60% having access to treatment.

Migraines are a prevalent neurological disorder affecting approximately 1 billion people globally. Characterized by intense, debilitating headaches often accompanied by symptoms such as nausea, vomiting and sensitivity to light and sound, migraines significantly impact the quality of life. This gap highlights the need for more sophisticated tools to help sufferers manage their condition, leading to the development of solutions like Migraine Buddy's Trigger Advanced Reports. The disease's exact cause is unknown, and identifying personal triggers remains challenging, partly due to the variability of patterns from patients.

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212

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**History of the development of the solution/product \***  
**(please be as specific as possible in your description; 500 words)**

The development of Migraine Buddy's Weather and Trigger Advanced Reports is rooted in rigorous data collection and analysis from tens of millions of migraine attacks. Initially, Migraine Buddy allowed users to log their migraine attacks and associated factors manually. Over time, the app's database has grown, providing a richer source of information to help in identifying patterns and potential triggers.

The development of the Weather Advanced Report involved integrating meteorological data with user-reported migraine events. This integration required significant intellectual property development, including algorithms to correlate weather patterns such as barometric pressure changes, temperature fluctuations, humidity levels and UV exposure, as well as the ever-increasing considerations around pollen and pollution with migraine occurrences.

Similarly, the Trigger Advanced Report was developed by analyzing user data on various potential triggers, ranging from dietary factors to stress levels. We collaborated with neurologists and data scientists such as Dr. Ali Erzatti and Dr. Andrea Portt to validate these correlations, ensuring the clinical relevance of the Trigger Advanced Report.

The human brain shows individual variations which are not fully explained by medical knowledge and evolve over time. Hence the need to develop a dynamic data analysis model to reflect the patient's reality. Unlike traditional migraine research models - which were based on either small samples or

average observations at the population level - the reports generated by Migraine Buddy are based on a personal, ongoing analysis of individual data entered by patients. The development of these advanced reports was supported by data analysis and work on sample sizes never seen before in migraine studies and based on data from tens of millions of migraine sufferers from all over the world. The research team conducted retrospective studies using the anonymized data collected from millions of users to test models' predictive power versus the ground truth provided by the data. These studies helped identify statistically significant correlations between weather changes and migraine occurrences, as well as between specific triggers and migraine onset.

Clinical collaborations with headache specialists and research institutions further validated these findings with a continuous flow of refinement coming.

An example was presented with Dr. Peter Goadsby of King's College, London, with the possible inclusion of intraday sensitivity of migraines to refine the trigger finding algorithm:

[https://scholar.google.com/scholar?hl=en&as\\_sdt=0,5&cluster=5544567599149735368](https://scholar.google.com/scholar?hl=en&as_sdt=0,5&cluster=5544567599149735368).

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128

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### **Why this drug or device is innovative, the broad implications for future research, and/or how it will improve the human condition \***

#### **Innovative Aspects of the Solution**

The Weather and Trigger Advanced Reports represent a significant innovation in migraine management:

- Enable easy access to tens of millions of data points from a wide range of demographically diverse panel: Unlike traditional methods that rely on anecdotal evidence or manual tracking, these reports leverage massive amounts of data from worldwide crowdsourced patterns observed in 10 languages and advanced analytics to provide personalized and continuously evolving insights.

- Cross-reference data to prevent future migraine attacks: The integration of real-time meteorological data with user-reported migraine incidents allows for precise identification of weather-related triggers. This capability enables users to anticipate potential migraine attacks based on forecasted weather conditions, empowering them to take preventive measures and observe a low correlation with weather and reduce their stress and anxiety.

- Read and summarize complex data to make them accessible and personalized to all: The innovation of Trigger Advanced Report lies in its ability to synthesize a wide range of user-reported factors and identify triggers specific to each individual. It has always used Natural Language Processing (NLP) to process data from individual users and suspected trigger countries, and now leverages Large Language Models (LLMs) - a form of generative Artificial Intelligence (AI) - to further refine understanding of trigger relationships. By leveraging AI, Trigger Advanced Reports can discern patterns that may not be immediately obvious to the user, providing an additional, personalized level of information in today's migraine management solutions.

#### **Broad Implications for Future Research**

The methodologies developed for these reports have broader implications for research into other chronic conditions. Combining large-scale user data with real-time external data sources can be applied to other diseases influenced by environmental factors, such as asthma or arthritis. This opens new avenues for personalized medicine, where treatments and preventive measures can be tailored to individual patient profiles based on data-driven insights.

#### How It Will Improve the Human Condition

By providing migraine sufferers with innovative solutions to better understand and manage their condition, Migraine Buddy's Weather and Trigger Advanced Reports have the potential to significantly improve their quality of life. Users can reduce the frequency and severity of their migraine attacks by avoiding identified triggers and preparing for adverse weather conditions. This proactive approach to migraine management can lead to fewer missed workdays, reduced healthcare costs and an overall improvement in the migraine sufferer's well-being. This feature represents a shift towards more personalized and precise healthcare, where data-driven insights empower patients to take control of their health.

words remaining :

87

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#### **Please provide appropriate references (PubMed, Abstract, Website) \***

1. [https://migrainebuddy.com/weather\\_and\\_migraine\\_report/](https://migrainebuddy.com/weather_and_migraine_report/)
2. <https://migrainebuddy.com/advanced-report-triggers-migraine/>
3. <https://www.prnewswire.com/news-releases/healint-announces-a-collaboration-with-university-of-toronto-canada-to-study-the-role-of-pollution-on-migraine-301735891.html>
4. Healint - handling GPS for weather at SCALE: <https://youtu.be/gxlrHdRaFzM>
5. <https://www.weather-migraine.com/>

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