Remote Health Monitoring For Early Detection Of Self Harm Behavior Using SDR Technology

## Abstract:

## The use of remote patient monitoring (RPM) to measure vital signs and gather patient-specific data on patients has become widely accepted in clinics. RPM can be performed with non-invasive digital technologies without obstructing a patient's regular routine. This may increase the effectiveness of providing healthcare in urgent clinical settings. The goal of the RPM initiative is to offer patients and clinicians with freely accessible and easily obtainable health data. Patients' vital signs can be tracked remotely from their homes, generating information that can be used to guide clinical judgments. With remote patient monitoring, it is possible to collect vital signs, body movement, respiratory rate, and even heart rate. A healthcare professional can develop a treatment plan while working from any location by sending them all of this information.

## Typically, the initial step in harming oneself is an effort to relieve the tension that has been building up due to distressing thoughts and sensations. The underlying causes are not being treated, despite the fact that this can offer a kid or young person some comfort from the mental suffering they are going through. Soon after, you can experience feelings of shame and remorse, which could lead to the cycle continuing. Wearable sensors and radio frequencies will be employed in this project to identify early self-harm behaviour. To show how successful SDRF technology is, the outcomes of wearable technology and radio frequencies are also contrasted. A range of machine learning models, including Decision Tree, Random Forest, and XG Boost and XG CAT will be taken into consideration in order to identify the optimum solution to the issue and comprehend the link between the dependent and independent variables. The Internet of Things (IoT) will also be connected from beginning to finish, eliminating the need for users to perform manual analysis. The system assists in retrieving patient vital signs including heart rate, pulse rate, breathing rate, and small motions to make this project cutting edge in terms of addressing acute self-harm behaviour of the subject under consideration.

## Problem Statement:

Since the Covid pandemic in 2019, the healthcare landscape has irreversibly transformed. The fledgling telehealth sector has grown into a vast behemoth that is expected to grow by leaps and bounds in the years ahead. Not only that, but the increasing importance of technology in today's society has altered how healthcare is delivered and practices are managed.

We are in a completely different era of healthcare, from the operating table to the administrative desk, to going out of the physical area of the clinic with remote patient monitoring equipment.

Remote patient monitoring, in particular, is a novel tool and option that has grown increasingly vital in our environment. So much so that, to augment healthcare clinics, a slew of remote patient monitoring firms is springing up around the world today.

## Applications:

With the advancement of new technology, remote patient monitoring has become an important aspect of telemedicine, and its advantages are apparent. Humans can now live longer, healthier, and better lives than ever before because to medical revolutions like these. The best part is that having RPM gadgets at home can help you stay healthy and make better lifestyle decisions without having to leave your house.

RPM allows patients to have a better quality of life by allowing them to know when their medication is due. It also assists individuals in making lifestyle decisions based on the results of their vital signs.

Most importantly, remote patient monitoring helps to maintain a smooth workflow by eliminating waiting room delays and missed appointments. Doctors can offer advice to patients on their future steps whenever they have the time.

**Considered Activities:**

Self-Harm Activities:

* Using sharp objects on them like knives and scissors
* Burning
* Hairpulling
* Slapping Themselves / Punching (either one's self or objects)
* Scratching

As Per Mental Health America

* Skin cutting (70-90%).
* Head banging or hitting (21%-44%).
* Burning (15%-35%).

Normal Considered Activities:

* Book Reading
* Eating
* Writing
* Phone/Laptop Using
* Sitting/Sleeping/Standing

**Causes:**

* Distract themselves from negative feelings.
* Express emotions they might be embarrassed to show.
* Develop a sense of control over their lives.
* Process the way they are feeling.
* Punish themselves for things they think they have done wrong.