

Y A Z I



Infinite Innovation



Improving the Efficiency of LoRa IoT Devices that Communicate Directly with Satellites using Ambient Energy Management Systems and Artificial Intelligence Techniques

Presentation by: Yolanda Nxumalo



INTRODUCTION

- Aviation and aerospace engineering company focused on drone applications and developing software algorithms for satellite communication
- Founded by Yolanda Nxumalo, in 2019 with a BSc in Mechanical and Mechatronics engineering from UCT, and MEng candidate for Satellite Systems and Applications at CPUT
- Co-founder of the Digital and Drone Solution project

Objectives

Who We are?

Brief overview of the history of YaAzi

Introduction

To the three key technologies:

LoRaWAN

HESS

AI

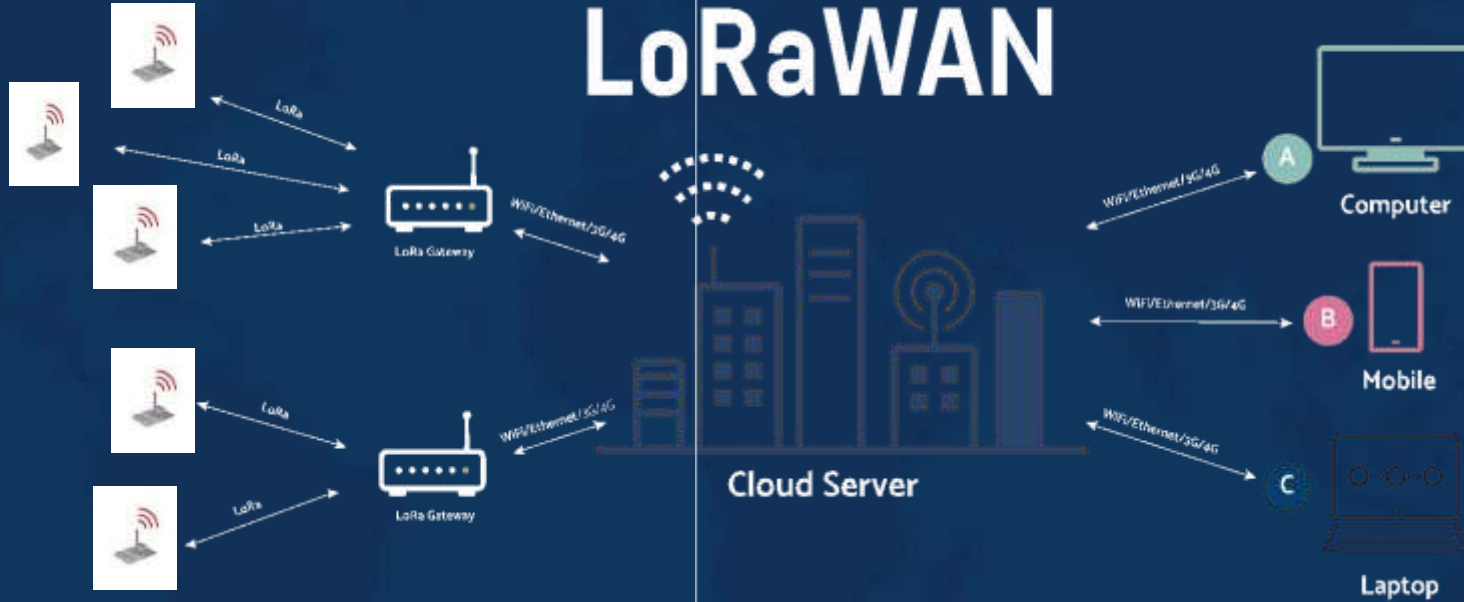
Overview

How the integrated technology works

Benefits

How the integrated technology will benefit industries

LoRaWAN



A

Spreading factor

B

Power consumption

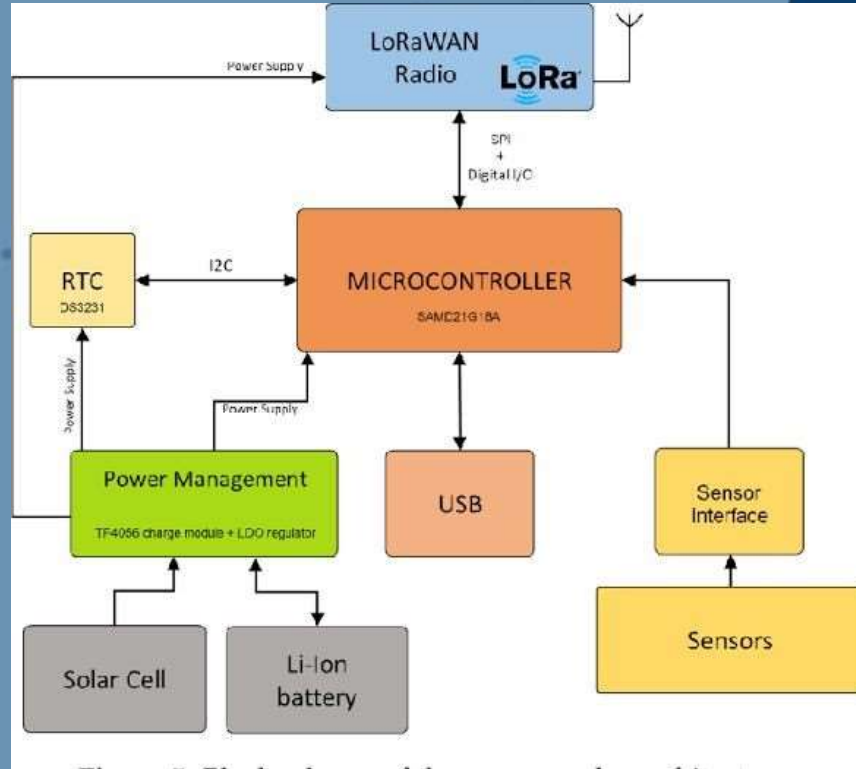
C

Channel occupancy rate

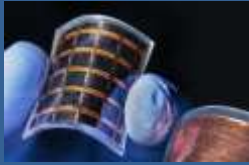
C

Distance between gateways

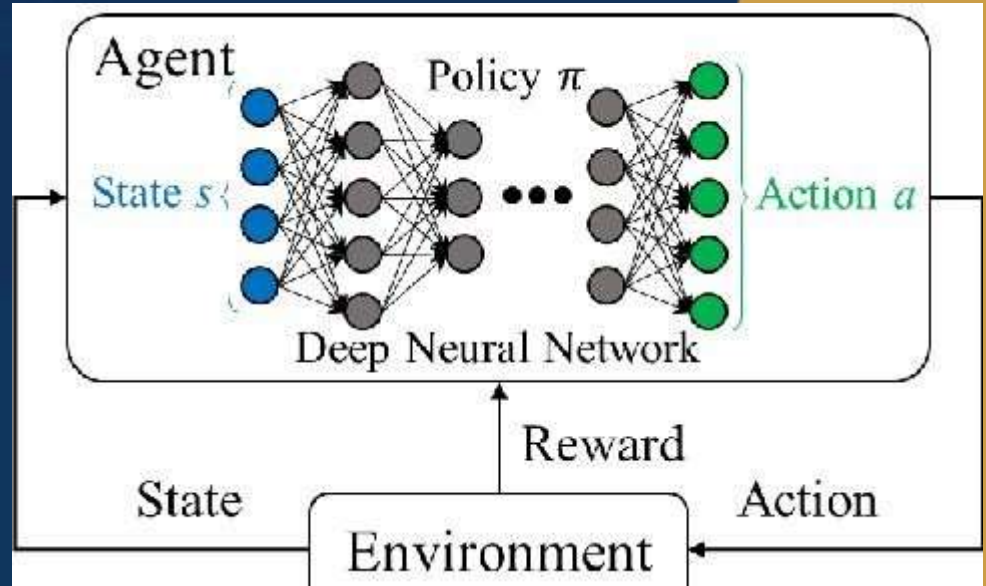
Ambient energy management



Hybrid Energy Storage System



AI: Deep Reinforcement Learning



Integrated system

- LoRa IoT node sends signal directly to low earth orbiting satellites that has a LoRa gateway and cloud server boarded on the satellite
- Data sent to Swarm ground station cloud server or AI powered application server for data analysis and advanced data analytics

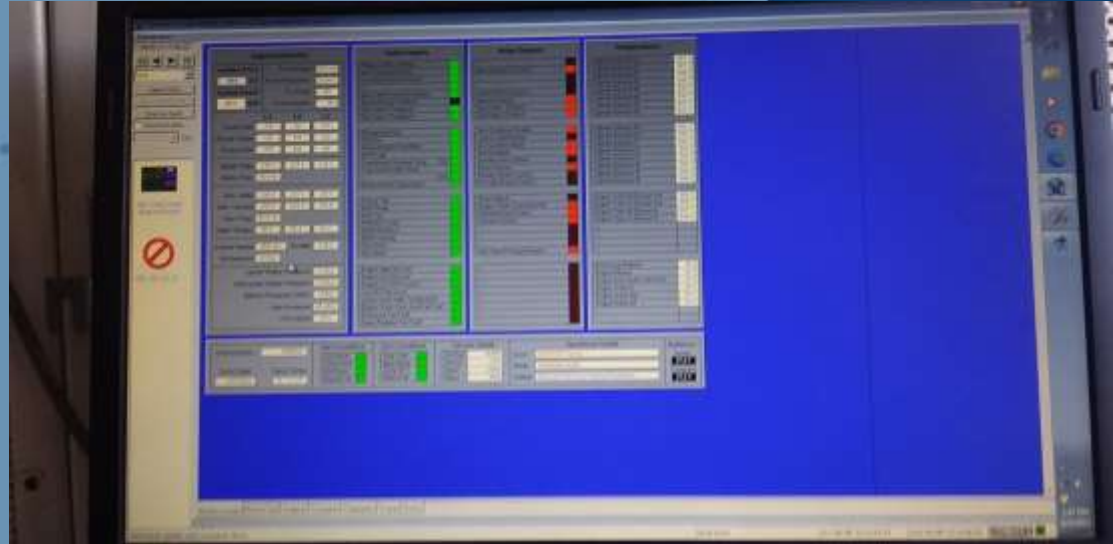
Energy industry



Power efficiency



Advanced data management and analysis



Digital healthcare

DADS aparito UNIVERSITY OF CAPE TOWN
UNIVERSITY OF CAPE TOWN
UNIVERSITEIT VAN KAAPSTAD

South African
Medical Association
Enabling Systems for the Health of the Nation

SCALING OUT FOR IMPACT 2020

OVERVIEW AND LESSONS LEARNED
#ScalingOut4Impact #SOFI2020

Science & Innovation
Department of Science and Technology
REPUBLIC OF SOUTH AFRICA

ZIA
Technology Innovation Agency

LIMINAL

Newton
Fund

Innovate
UK

BLACK BUSINESS

Medical adherence



Atom5™ is a disease and language agnostic technology platform that can remotely provide clinical assessments at scale

Smartphone



Customized assessments via the Smartphone, a mix active/passive data collection support continuous data capture outside of the clinic

Video/Voice Capture

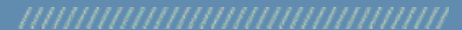


Unique video/voice capture technology with pattern recognition goes above and beyond traditional assessments

Wearables/Device



Integration with clinically validated wearables enable a wider range of passive data capture capabilities, producing unique digital endpoints



Improved patient outcomes

← My diary

Please write in your own words anything you would like your medical team to be aware of

Please provide date and time if important to note

Pick a Date and Time

submit

Contents lists available at ScienceDirect

Epilepsy & Behavior

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A qualitative study exploring caregivers' experiences, perspectives, and expectations for precision medicine in epilepsy in South Africa

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ABSTRACT

Purpose: Successful implementation of innovative Precision Medicine initiatives in the management of children with complex epilepsy is largely dependent on the caregivers' engagement with the technology as well as its accessibility and acceptability. We investigated the feasibility of implementing these initiatives in the South African setting by gathering information on the caregivers' experiences, perspectives, and expectations for Precision Management of Epilepsy (PME) initiatives.

Methods: We prospectively recruited 12 participants from a cohort of 40 caregivers of children with complex epilepsy recruited for a PME study attending Red Cross War Memorial Children's Hospital (RCMCHC) in Cape Town, South Africa. Four-to-five semi-structured interviews were conducted using a pragmatic qualitative approach and themes were extracted using a thematic framework approach.

Results: All participants had ideas about the cause of epilepsy, but many did not think that epilepsy is a medical condition. There were several difficulties in adhering to medical treatment which was sometimes combined with traditional remedies and practices. Understanding of Precision Medicine in the context of research was limited and although participants were unclear about benefits, most were optimistic about the future. mHealth devices introduced new feelings and challenges for many participants. The four themes which emerged were: (1) Cause of epilepsy, uncertainty and conflicting views; (2) Need for healing; (3) PME mHealth devices; and (4) Feasibility of implementation of PME initiatives.

Conclusion: For Precision Medicine to be widely accepted and beneficial, low-income understand the cause of epilepsy, difficulties in adherence to treatment, and personal experiences need to be addressed. © 2021 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

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ULL-LENGTH ORIGINAL RESEARCH

Demonstrating the feasibility of digital health to support pediatric patients in South Africa

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Abstract

Objective: Resources for management of epilepsy in Africa are extremely limited reinforcing the need to develop innovative strategies for optimizing care. Studies have shown that the prevalence of epilepsy in low- and middle-income countries is substantially greater than in more resourced countries. The objective of this report was to demonstrate that mobile Health (mHealth) technologies have the potential to improve the management of epilepsy in Africa.

Methods: The feasibility of technology-based home monitoring was investigated in an observational study of 40 children with refractory epilepsy or epilepsy associated with intellectual disability and/or behavior difficulties in South Africa. Technology-based home monitoring was implemented for six months. Physical activity, sleep, and heart rate were continuously monitored with a wearable device. Caregivers completed regular mobile Patient Reported Outcomes (mPROs) and reported seizures and adverse events using a dedicated app. Feasibility was assessed and descriptively measured for recruitment, retention, and engagement of the participants.

Results: The mHealth technology was able to capture important information that gives an impression of the overall experience of the children and their caregivers. Thirty-seven participants (94.9%) reported at least one clinical event. Seventy-nine percent of caregivers reported seizure events in their children, which were the primary event anticipated. Median engagement with the wearable device and monthly mPROs was 30.8% and 57.1%, respectively. However, most participants (87%) had to be given smartphones for them to have Bluetooth capabilities and access to the study app. Tolerability to the device was impacted by the difficult living circumstances of caregivers that induced fear of loss or theft.

Significance: The study showed how the use of remote patient monitoring in the form of mHealth can benefit epilepsy patients, despite highly variable engagement with the technology. The combination of mPROs and wearable devices generated informative datasets that will allow clinicians but also the children and their caregivers to better understand and manage the disease.

Environmental monitoring



Traction



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