INAUGURAL RESEARCH CONFERENCE 2015 INTERNATIONAL CONFERENCE

Designing Agent based Wireless Sensor System for e-health monitoring of HIVAIDS

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OVERVIEW

- Introduction
- The Problem
- Expected Contribution
- Definition
- Related Work
- Conceptual Framework
- Conclusion and Recommendation

INTRODUCTION

- This research focuses on the application of multi-agents to manage data being transmitted by Wireless Sensor in a HIV/AIDS medical monitoring telemedicine network

- Agent technology encompasses use of wireless sensors; sensors are used to collect, analyze and track patient data

- Multi-agents are used to ensure proper data management, its effectiveness and security

- The research eliminates distance barriers and improves access to medical services

THE PROBLEM

- Challenges in accessing healthcare by Kenyans living in remote areas

- Big mismatch between service provision and geographical prevalence

- Poor program in the care and monitoring of people living with HIV AIDS

- Few specialists in disease related to HIV AIDS - Kenya has 0.1 physicians available to serve every 1,000 people, compared to 7.9 in the Euro zone

- Poor administration of medicines such as ARV'S

THE PROBLEM

- To explore on how a multi-agent system can be integrated with wireless sensor technology to eliminate distance barriers and improve access to medical services to distant rural communities

- To investigate how multi-agent wireless sensor technology can be used to reduce the spatial gap between the patient and the consultant

- To show how multi-agent systems can be used to manage information used by wireless sensor to offer diagnosis and realistic imaging of symptoms

- Evaluation of the system through actual monitoring of HIV AIDS Tests

EXPECTED CONTRIBUTION

- Prototype, this research came up with a prototype to help analyze the data

- This research contributes to the existing knowledge of agents use in the area of health

- Enriches research and use of telemedicine in Kenya's e-health sector.

- Application of wireless sensors and agent technologies as tools, to reduce the gap between rural areas and urban areas health facilities and specialist allocations

DEFINITIONS

- **Agent technology**, agents are a computer situated in some environment, and that is capable of autonomous action in an environment in order to meet its design objectives

- **Wireless sensors**, battery operated devices capable of wireless communication, data storage, sensing

- **Telemedicine**, use of communication equipment to link health care practitioners and patients at different locations.

- **Wearable systems for health monitoring** are wearable /implantable. They're capable of measuring significant physiological parameters like heart rate, blood pressure, body and skin temperature

RELATED WORK

- Agent based health monitoring of elderly people in indoor environments using wireless sensor networks [Vaidehi, Vardhini, 2013]

- Multiagent based integrated health monitoring system for the elderly at home [Lasheng,Beiji,2012]

- *Medical Path Agents* project, this project aimed at improving patient scheduling in hospitals

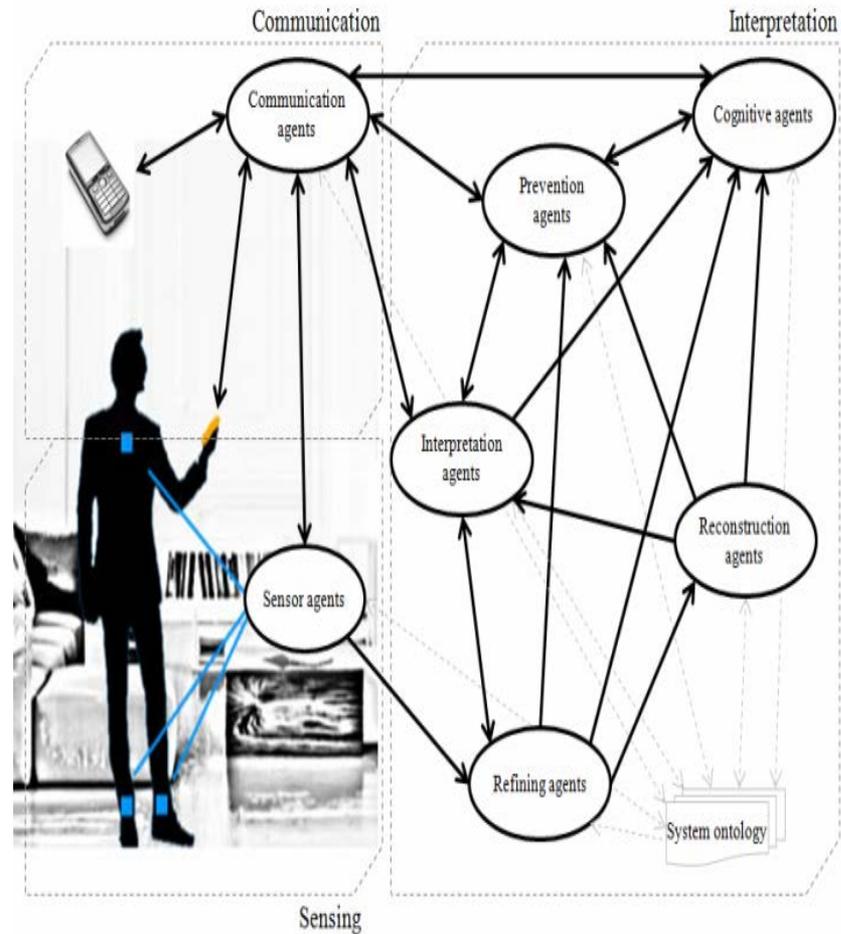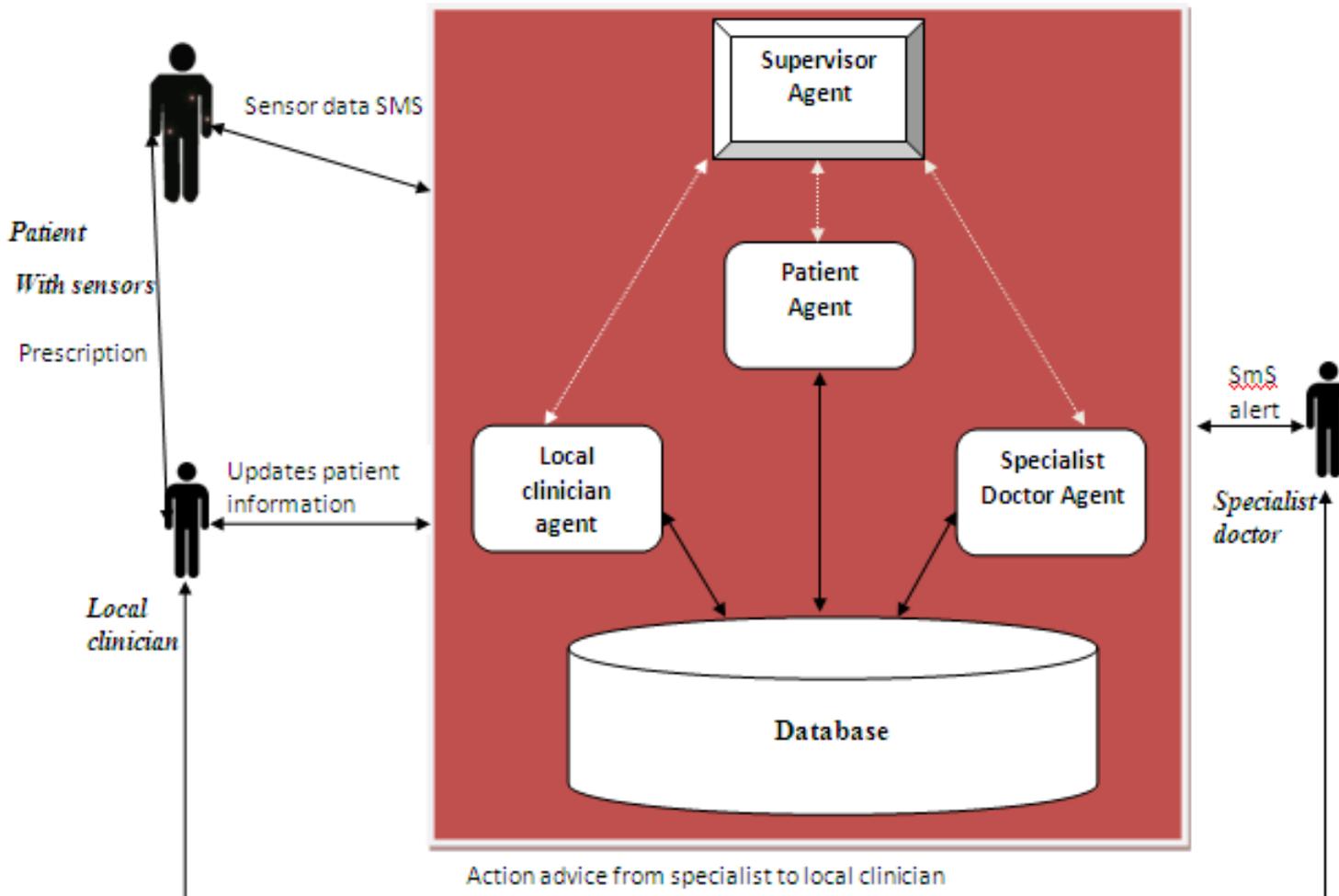- The ReMoteCare project a multiagent system that uses wireless sensor network to gather medical data in pre and in hospital emergency care, disaster response

Fig1.Agent based health monitoring of elderly

CONCEPTUAL FRAMEWORK

AGENT ROLES

Patient agent

The patient agent receives data values from a patient attached sensor through the GSM Agent, and relays this information to the specialist agent through the local clinician agent

GSM Communication Agent

This agent that receives data from the wireless sensor device attached to the patient. Its main Goal is to collect data from the Wireless sensor device

Local medical agent

This is an agent that plays the assistant role it, it sends data values to the specialist agent, it also receives action requests from the specialist agent

Specialist agent

The Specialist Agent receives,queries,diagnose and send prescription information to the local medical agent and patient agents

Supervisor agent

The Supervisor agent is responsible for the administration of the multi-agent system it can invoke and terminate other agents based on the requirement of specific functionalities by the patient or doctor agent, this agent initializes the agents

DIAGNOSIS AND PRESCRIPTION

Database showing inputs from the GSM Sensor and Action responses from the Specialist Agent.

CONCLUSION,CHALLENGES,RECOMENDATIONS

Conclusion

- This study has shown that multi-agent based system is a viable solution in assisting the monitoring and care of people living with HIV AIDS in remote areas with fewer Specialist Doctor

- This research has shown that Agent based monitoring of HIV AIDS has the potential to revolutionize healthcare by providing low-cost solutions and fast diagnosis and prescription for people living with HIVAIDS in the rural areas in comparison to the conventional methods

- In addition the Adoption of Medical Wireless Sensors and Telemedicine can cut down Logistical, Administrative costs and time that comes with offering Specialized Care to Rural Communities living in distant rural areas this is shown by the research

Recommendations and Future Work

- Further research is required to address the issues of patient–system interaction, sensors mobilization, data extraction and adaptation

- There is need to research implement and test different types of medical wireless sensors that can be used in the medical area

- Integration and securing of wireless sensor technologies in use for monitoring health services remains a challenge that can be pursued as part of future work