

Drishti: A sense-plan-act extension to open mHealth framework using FHIR.

Bell Eapen | Norm Archer | Kamran Sartipi | Yufei Yuan

Information Systems

DeGroote School of Business

McMaster University

Problem:

- ▶ Disparate mHealth Apps
- ▶ Apps do not communicate with each other
- ▶ Clinicians inundated with data
- ▶ Communication between clinicians and developers.
- ▶ Testing and approvals
- ▶ Privacy and security



Behavioral
Intervention
Technology

Open mHealth

BIT Model

FHIR

BIT Model

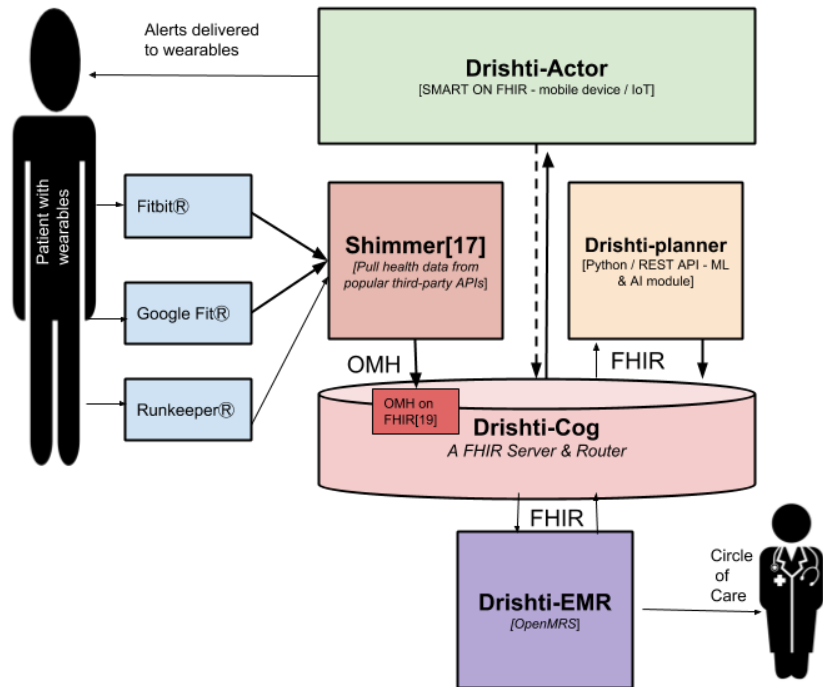
- ▶ **Profilers (Sensors):** Physiological parameters such as blood sugar and blood pressure, symptoms and side effects.
- ▶ **Planners:** Plans complex interventions from data provided by various sensors.
- ▶ **Actors:** Alerts and messages.
- ▶ Sharing with circle of care.
- ▶ Big data applications



FHIR

- ▶ Created by HL7
- ▶ Draft standard for interoperability
- ▶ Defines packages called *Resources*
- ▶ RESTful interface using xml or json
- ▶ 80/20 rule
- ▶ Extensible
- ▶ Drishti uses Observation and CarePlan resources.

Framework



- Profiler, Planner and Actor
- Open mHealth shimmer as profiler
- Planner and actor stubs
- A FHIR server as the repository
- Integration with EMR

OpenMRS EMR

mouse Male 18 year(s) (01 Jan 2000) Edit Show Contact Info

NOSES

RECENT VISITS

FAMILY

CONDITIONS

ALLERGIES

DRISHTI

hGraph Care Plan Help

Gender: M | Steps: 0 |

Smoking

Alcohol

Blood Pressure

Glucose

Happiness

Exercise

Sleep

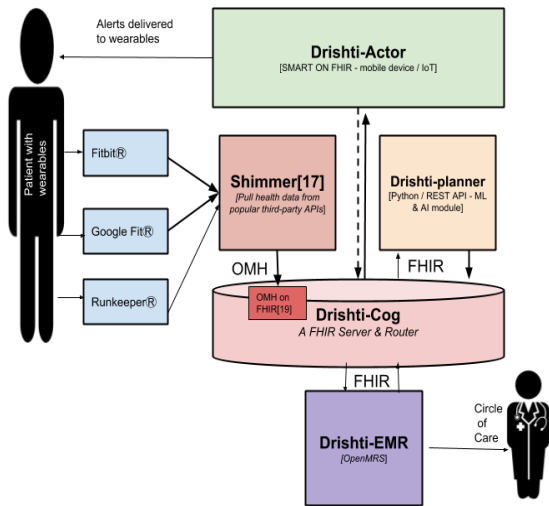
Total Cholesterol

Waist Circumference Pain

General Actions

- Start Visit
- Add Past Visit
- Merge Visits
- Chart Search
- Schedule Appointment
- Request Appointment
- Mark Patient Dead
- Delete Patient

- ▶ Open Source EMR for developing countries
- ▶ Modular and supports open web apps
- ▶ Fast Healthcare Interoperability Resources (FHIR)
- ▶ hGraph for visualization



Implementation

- ▶ Drishti-cog: HAPI FHIR SERVER
- ▶ Drishti-Planner: Python flask App
- ▶ Drishti-Actor: Vue App
- ▶ Drishti-EMR: OpenMRS
- ▶ Repository: <https://github.com/E-Health/drishti>
- ▶ Docker: *docker-compose -f docker-compose-prebuilt.yml up*

Use Case

Depression

Drug monitoring

Activity tracking

Alerts

Planning

Delivery

EMR View



Research Contributions

- ▶ Problem relevance
- ▶ Design Theory
- ▶ Design artifact
- ▶ Research communication

How can you help us improve?

- ▶ **Join our open-source project:**
<https://github.com/E-Health/drishti>
- ▶ **Create shimmers for Open mHealth project:**
<https://github.com/openmhealth/shimmer>

*Thank
you*

<https://github.com/E-Health/drishti>