

A FOG COMPUTING PROTOTYPE

Course Project for Big Data Analytics — Winter 2019

Ali Alizadeh Mansouri Marco Sassano

April 15, 2019

Concordia University

TABLE OF CONTENTS

Introduction

Problem

INTRODUCTION

WHAT IS FOG COMPUTING?

Internet of Things (IoT)

- 50 billion devices (sensors, smart phones, smart cities, healthcare, smart vehicles, ...)
- 100s of terabytes towards petabytes per day
- limited computing resources

WHAT IS FOG COMPUTING?

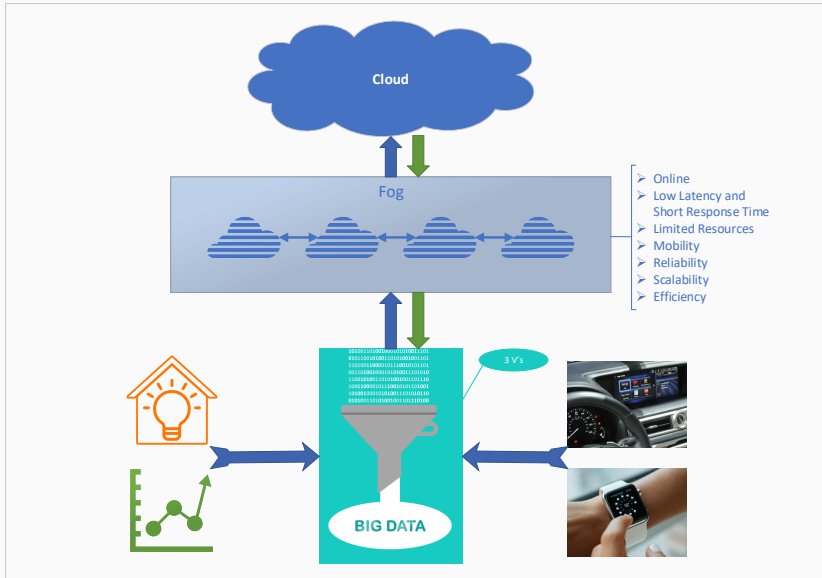
Internet of Things (IoT)

- 50 billion devices (sensors, smart phones, smart cities, healthcare, smart vehicles, ...)
- 100s of terabytes towards petabytes per day
- limited computing resources

Cloud computing

- Flexible economy
- Scalability
- Adaptation to varieties of computational demands
- Suffers from high latency

A FOG COMPUTING ENVIRONMENT



PROBLEM

Early detection of epilepsy seizures using EEG timeseries data

- Stream processing on the edge
- Clustering in the cloud

DATASET

- 500 individuals, each with 4097 data points for 23.5s
- $23 \times 500 = 11500$ records, each record contains 178 data points (columns) for 1 second
- Restructured to (time, value) tuples to be used as a stream
 $\Rightarrow 11500 \times 178 = 2\,047\,000$ tuples (windows of 178)
- 5 classes \rightarrow 2 classes (binary)

	Total	Positive	Negative
Training	7 000	1 392	5 608
Test	4 500	908	3 592
	11 500	2 300	9 200

METHODOLOGY

Goal Filter the stream for out-of-range tuples/anomalies

- light-weight on resources
- fast

Different statistical measures: variance, skewness, kurtosis

Selected measure

$$\sqrt{\sum_{i=2}^n (X_i - X_{i-1})^2}$$

CONCLUSION

- Tests with more than one sensor
- Introducing a publish-subscribe platform such as Apache Kafka, IBM Watson IoT Hub, etc. (e.g. using MQTT as the protocol)

Thank you!