Visualization of datasets using augmented reality and detection of anomalies

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October 12, 2018

Overview

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Problem Statement / Definition

- **Domain:** Augmented Reality, Machine Learning
- **What:** Anomaly detection in large datasets
- **How:** One-class SVM for anomaly detection
- **Data:** Operational sensor dataset

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Motivation

- IoT devices may not be in working condition
- Final result may vary if an IoT device fails
- Loss of money and time if project fails only because of failure of an IoT device

We want to build a project that alleviates these issues by better detecting and analyzing the anomalies

What are we doing?

- Implement an ML-based solution for detection of anomalies and then use AR tool to scan the IoT device and also show the anomalies detected.

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- **Idea:** Our initial focus is to detect anomalies in IoT data. We then want to try scanning sensors and thereby output the health of the IoT device.

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Literature Survey

- Anomaly detection with event data in the Internet of Things :- Multidimensional scaling algorithm used to detect anomalies
- Improving Big Data Visual Analytics :- Several algorithms to visualize data
- When augmented reality meets big data :- How AR can be used to visualize huge data sets
- Information Visualization and Visual Data Mining :- Several algorithms to visualize data
- Fog-Empowered Anomaly detection in IoT using Hyperellipsoidal clustering :- Hyperellipsoidal clustering to detect anomalies
- Detecting malicious anomalies in IoT :- Performance of ensemble learners on incomplete IoT intrusion datasets, represented by point anomalies

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Advantages

- A non-technical person can still identify the health of an IoT device irrespective of his knowledge in IoT devices
- While ML and AI can help to make sense of data, it still requires an analyst

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Disadvantages

- AR requires lot of computational power
- Lot of historic operational data is required

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Methodology

2 phases of our project:

- Detection of anomalies
- Visualization using AR

For demo we want to make a mobile app

Detection of Anomalies

- Anomaly detection is done using historic operational data
- One-class SVM is used for anomaly detection

Visualization using AR

- Every device has an unique code
- The health condition of any particular device is identified by scanning that device using AR tools

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Hardware Requirements

- Mobile phone with camera
- Sensors

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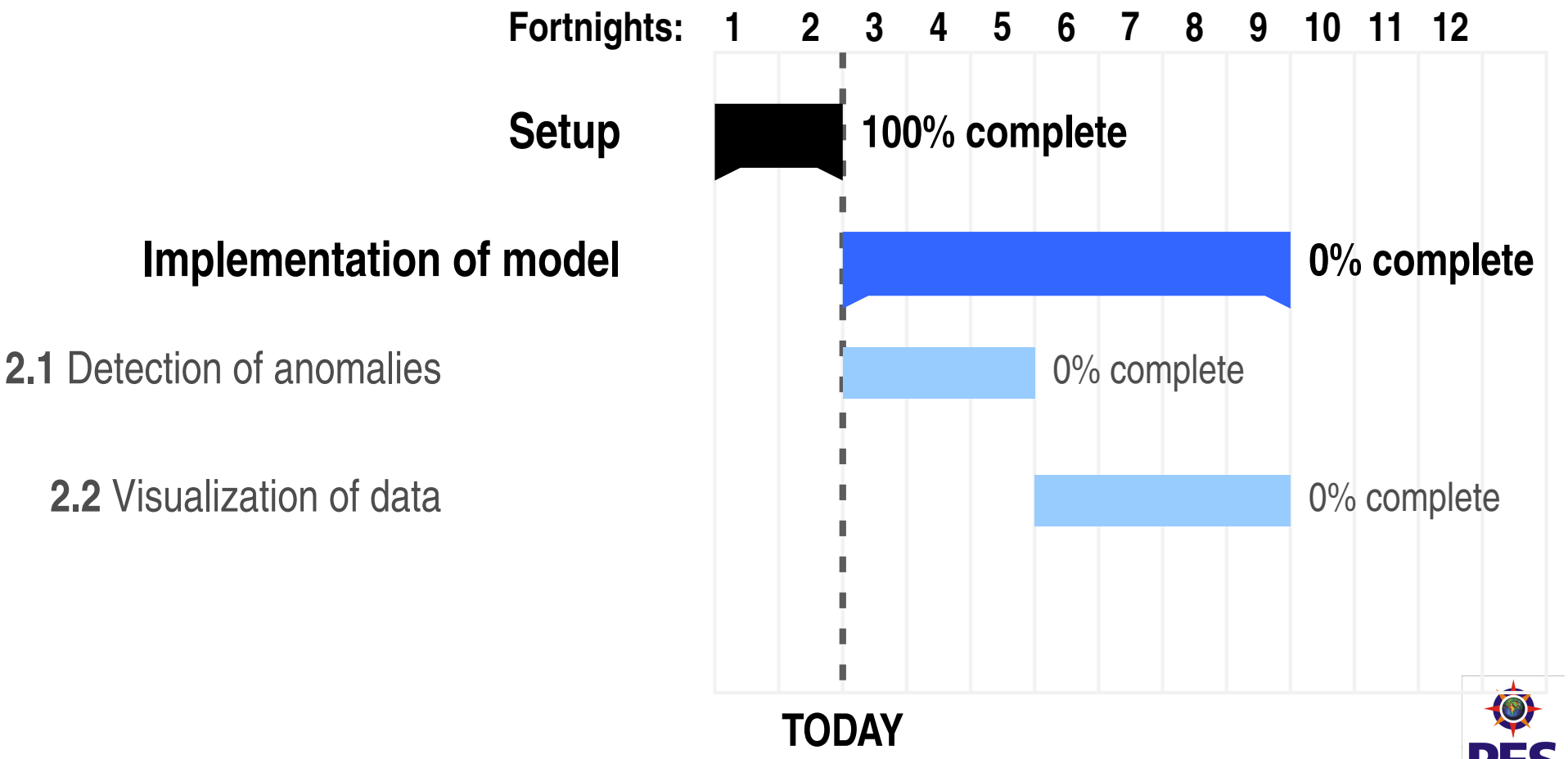
Software Requirements

Unity Software to create 3-dimensional simulations

Overview

Time line of completion of project from Sept 2018-April 2019(Gantt Charts).



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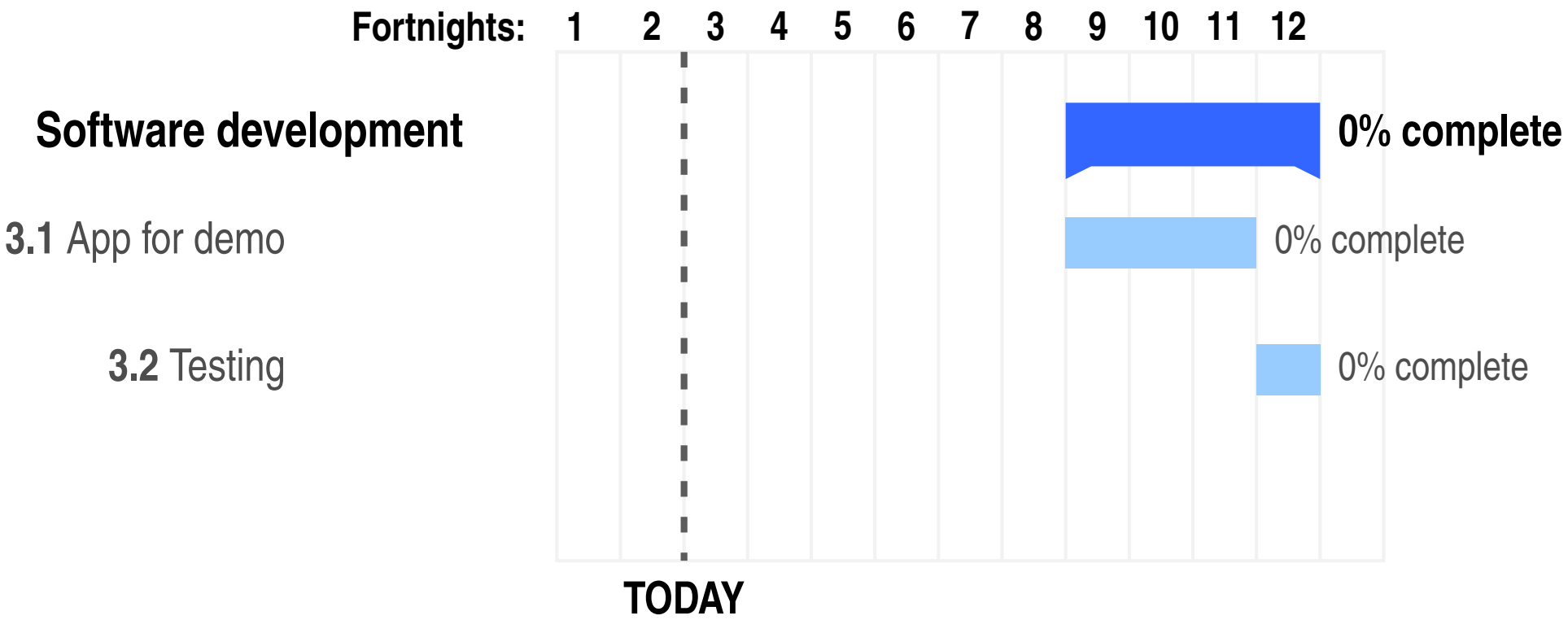

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