Live-Project

Animal behaviour Prediction

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Milestone-1

Research of the given problem statement

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Animal Behaviour prediction project - Milestone_1:

1. Suggest the probable business impact of each independent feature.
    a. **Predict rumination time for encountering early disease and cattle life span.**

2. Suggest ways in which the organization can benefit as a result of analysing the data
    a. **Early detection and treatment of sick cattle**
    b. **Increased lifespan of cattle**
    c. **Individual cattle health management**

3. Suggest missing features that can help with the analysis based on business logic
    a. **Analysing Existing Documentation:**
    Analysing historical records can provide valuable insights with respect to the missing features. As a result, business analysts can identify any gaps or inconsistencies in the requirements and ensure that they are addressed in the new project.

    b. **Conducting User Surveys:**
    User surveys are an efficient means of collecting feedback from a wide range of stakeholders, including end-users, customers, and other project participants.

4. What is the best way to collect data for the suggested features?
    a. **Observation using sensors/videos**
    b. **Historical data**
    c. **Forms and questionnaires**
    d. **Documents and records**
    e. **Survey**

Milestone-2

Data Analytics Phase: Drawing Insights from the data
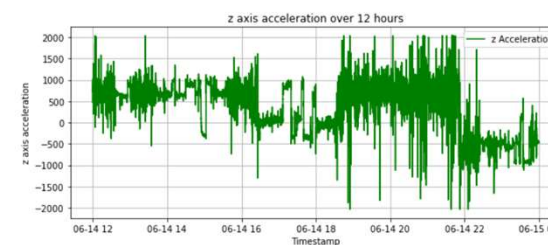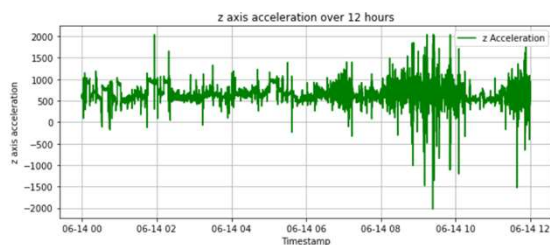
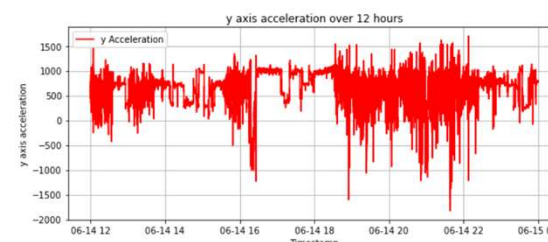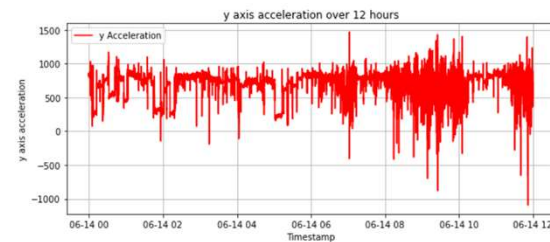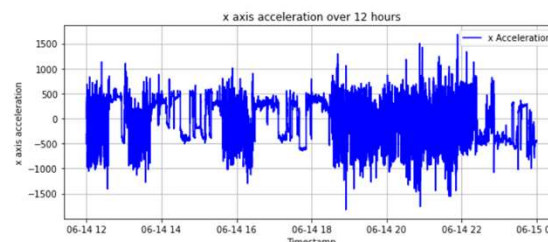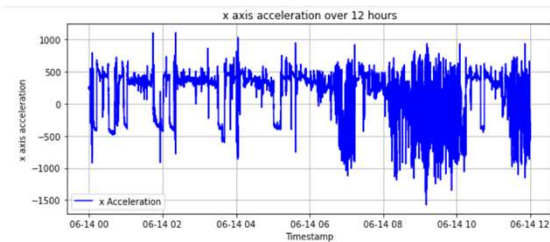# Acceleration vs Timestamp graph (24 hrs time interval):
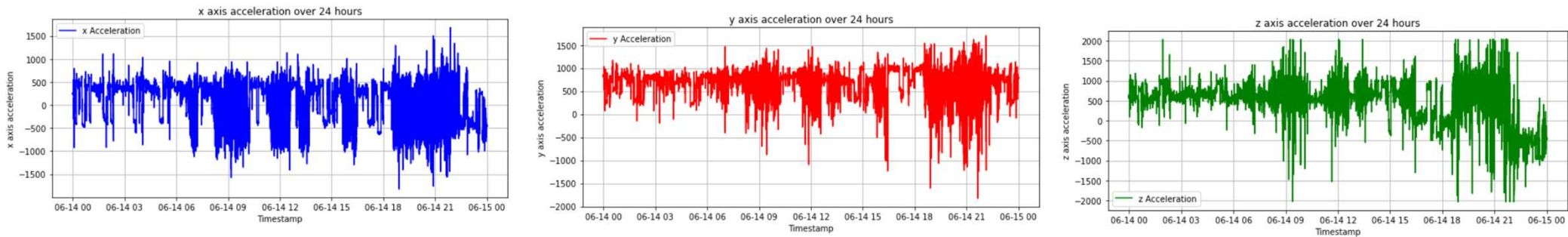
Hypothesis:

1. For all the 3 axes the acceleration recorded from 18:00:00-22:00:00 hrs (for more than 60s) give indication that the cattle might be ruminating.

(ruminating behavior is instances where it persisted for more than 60 s)

Acceleration vs Timestamp graph (12 hrs time interval):

Hypothesis:

1. Sudden ups in positive direction seen in the acceleration might be indication of cattle standing up (transition) - rising from a lying state to a standing state

2. Sudden dips in negative direction seen in the acceleration might be indication of cattle lying down (transition) - changing from a standing state to a lying state

# Acceleration vs Timestamp graph (6 hrs time interval):
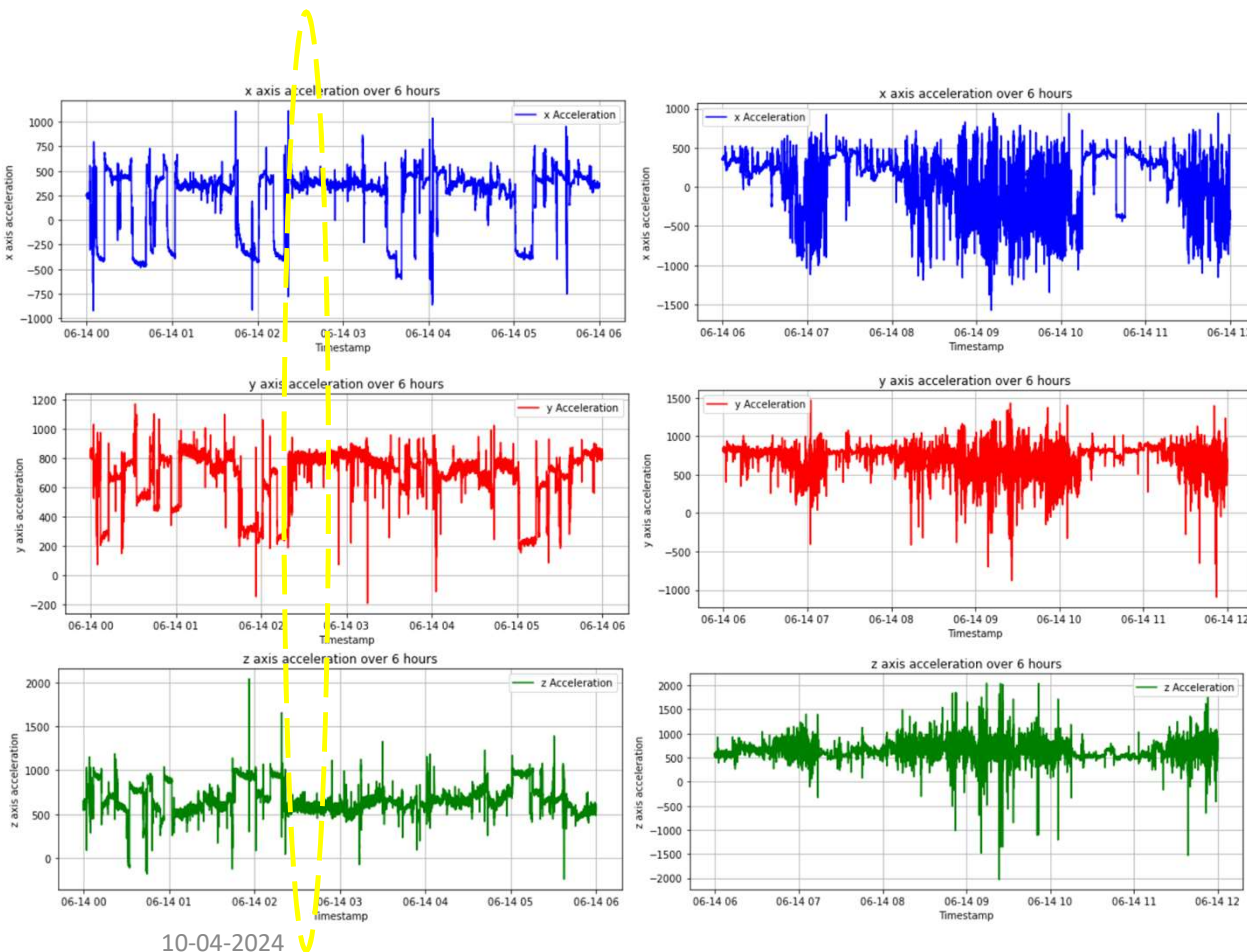
Hypothesis:

1. Uniform acceleration recorded (as indicated in yellow dotted line) could be an indication of the cattle resting
2. Acceleration movement recorded around at 07:00:00 indicates that the cattle is feeding.

10-04-2024

Hypothesis:
1. Yellow dotted lines indicate that the acceleration captured for huge time interval could be indication of cattle ruminating.
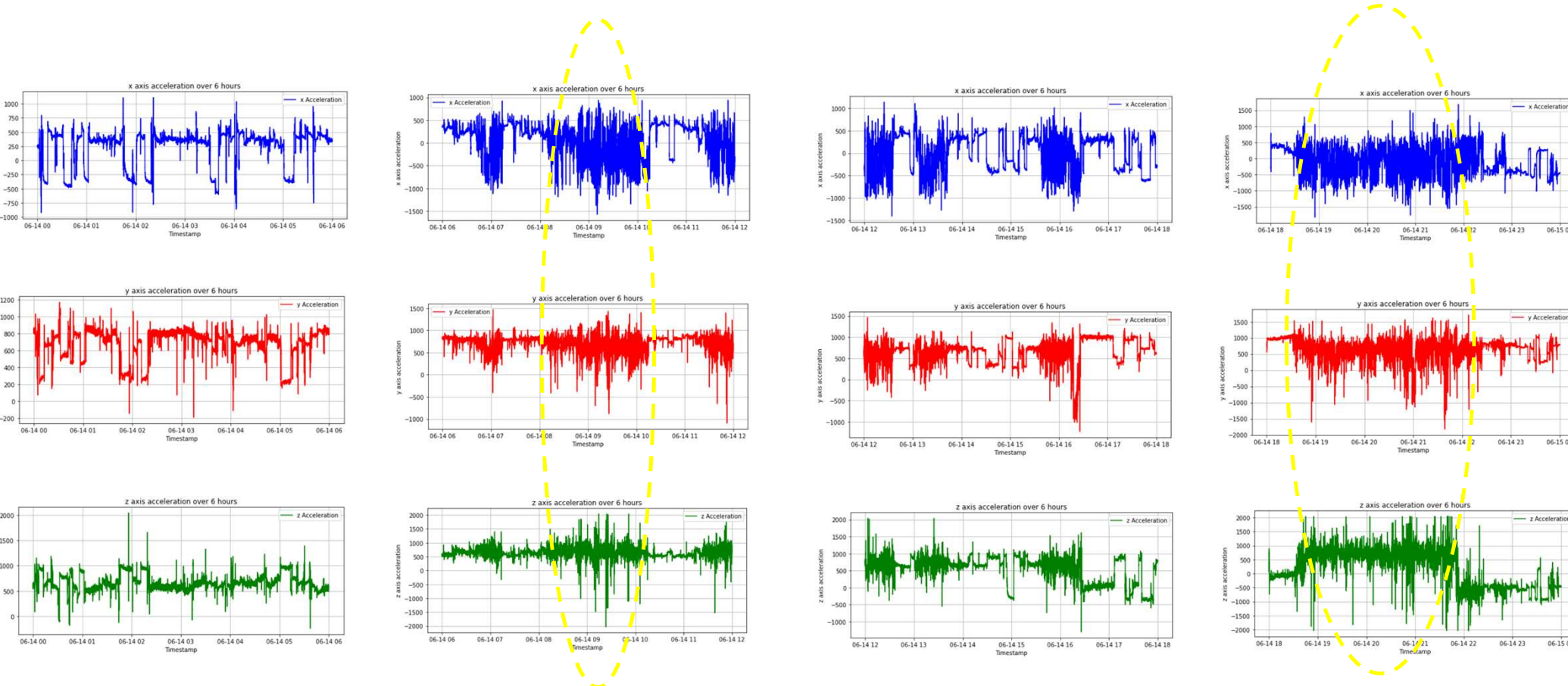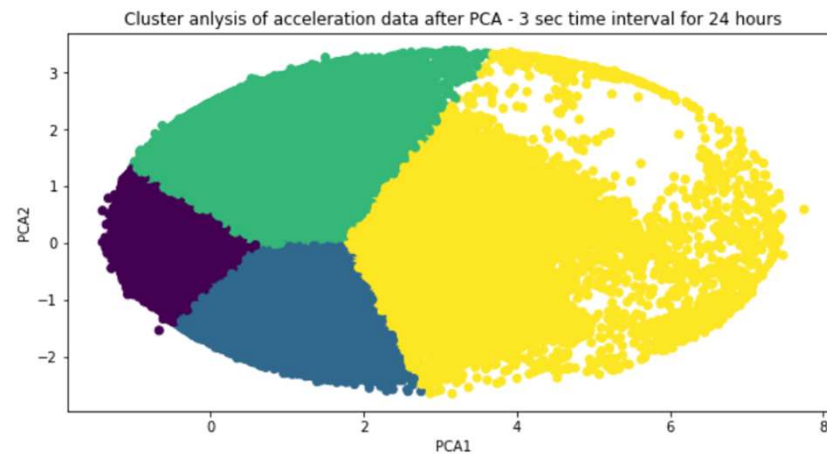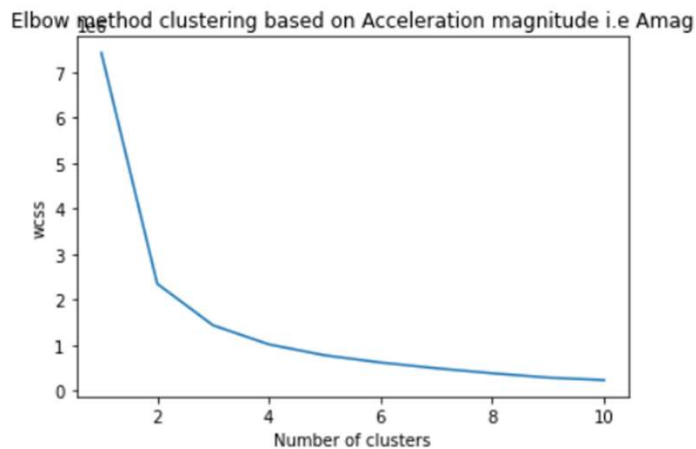
Milestone-3

Feature Engineering – PCA and K-Means clustering

Cluster Analysis of acceleration data:

➢After reducing the dimensions using PCA technique and using k-means clustering method, the following categories were obtained.

➢Optimal used k = 4

Elbow method clustering based on Acceleration magnitude i.e Amag

Cluster anlysis of acceleration data after PCA - 3 sec time interval for 24 hours

X-Acceleration vs timestamp with 3 sec interval:

- Clusters observed on x-acceleration for 24 hrs:

Cluster anlysis of x-acceleration data (PCA - 3 sec time interval for 24 hours)
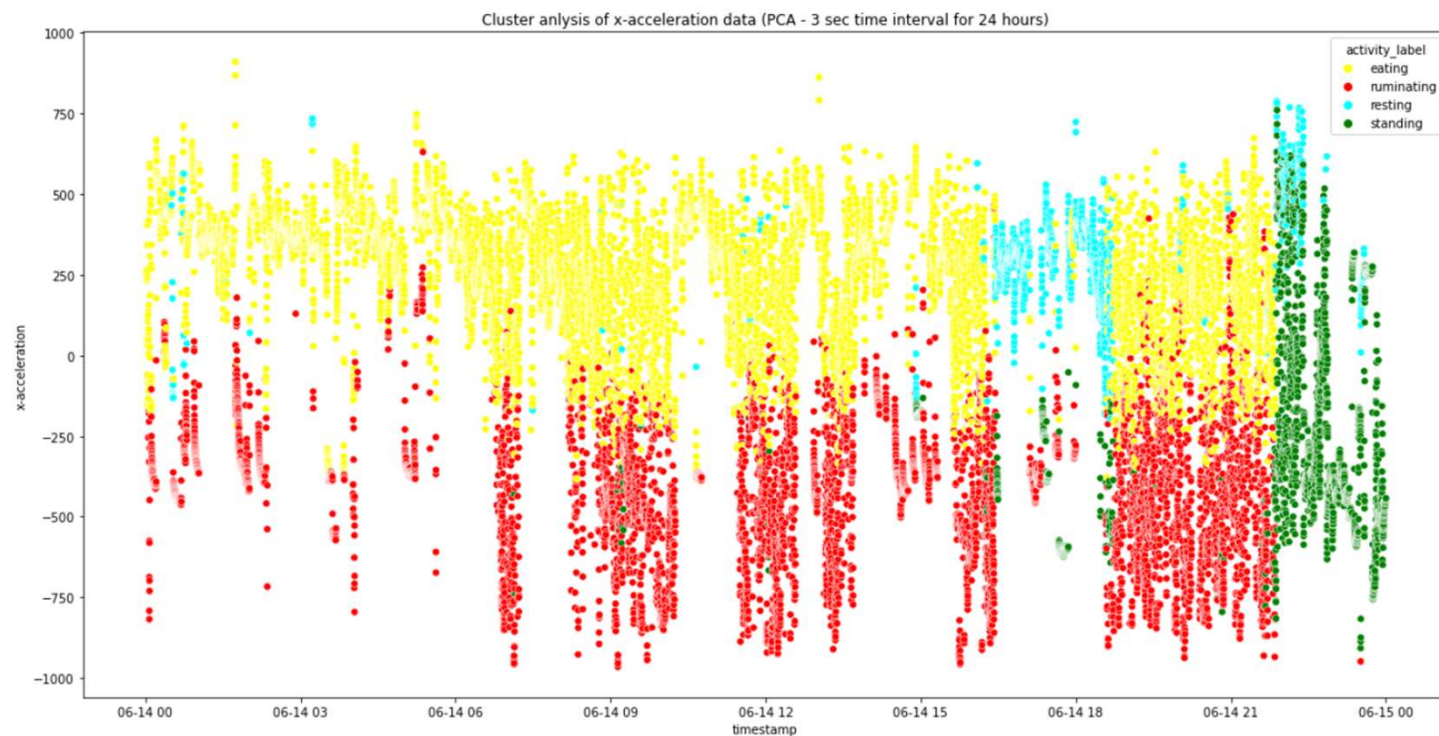
Y-Acceleration vs timestamp with 3 sec interval:

- Clusters observed on y-acceleration for 24 hrs:

Cluster anlysis of y-acceleration data (PCA - 3 sec time interval for 24 hours)
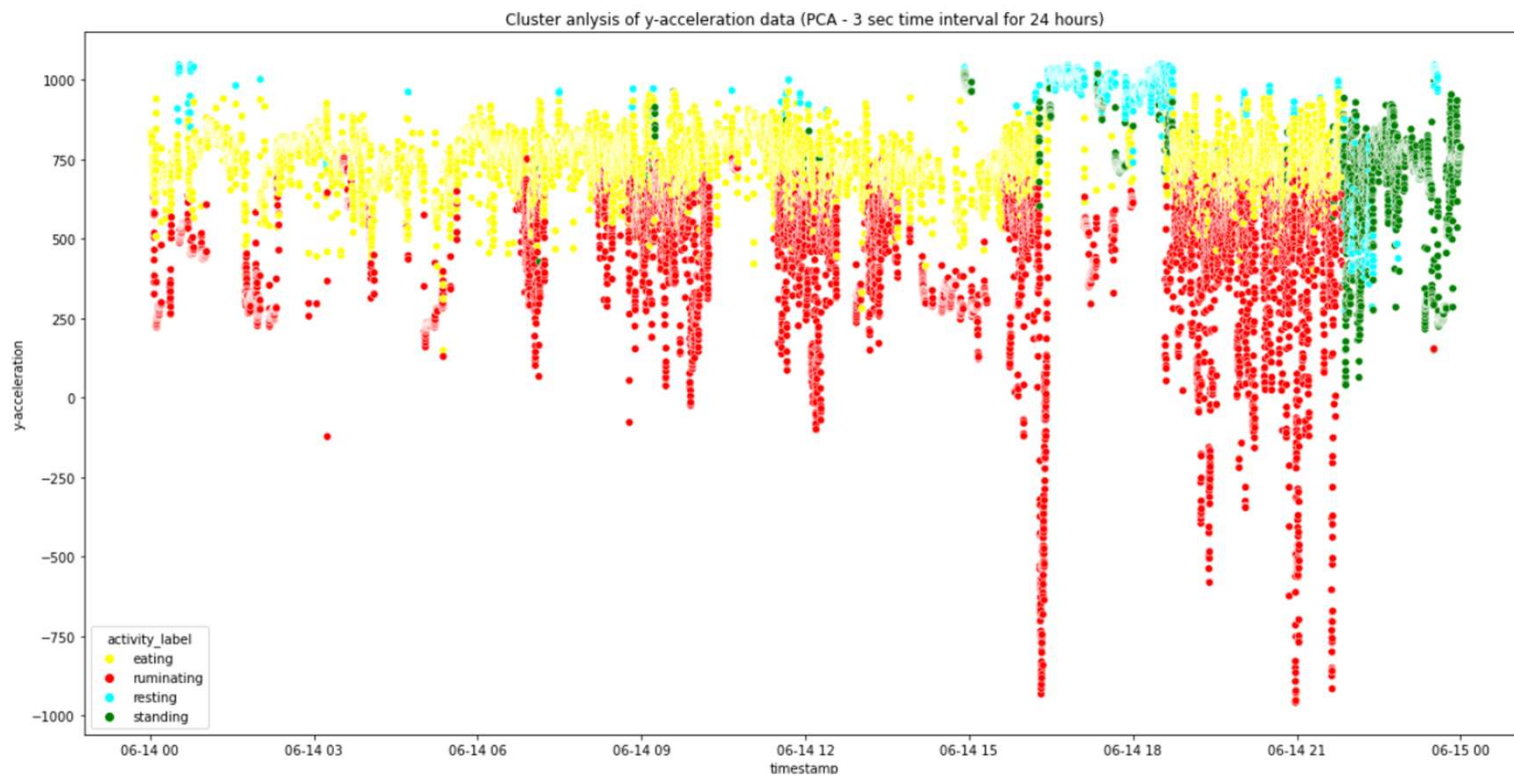
Z-Acceleration vs timestamp with 3 sec interval:

- Clusters observed on z-acceleration for 24 hrs:

Cluster anlysis of z-acceleration data (PCA - 3 sec time interval for 24 hours)
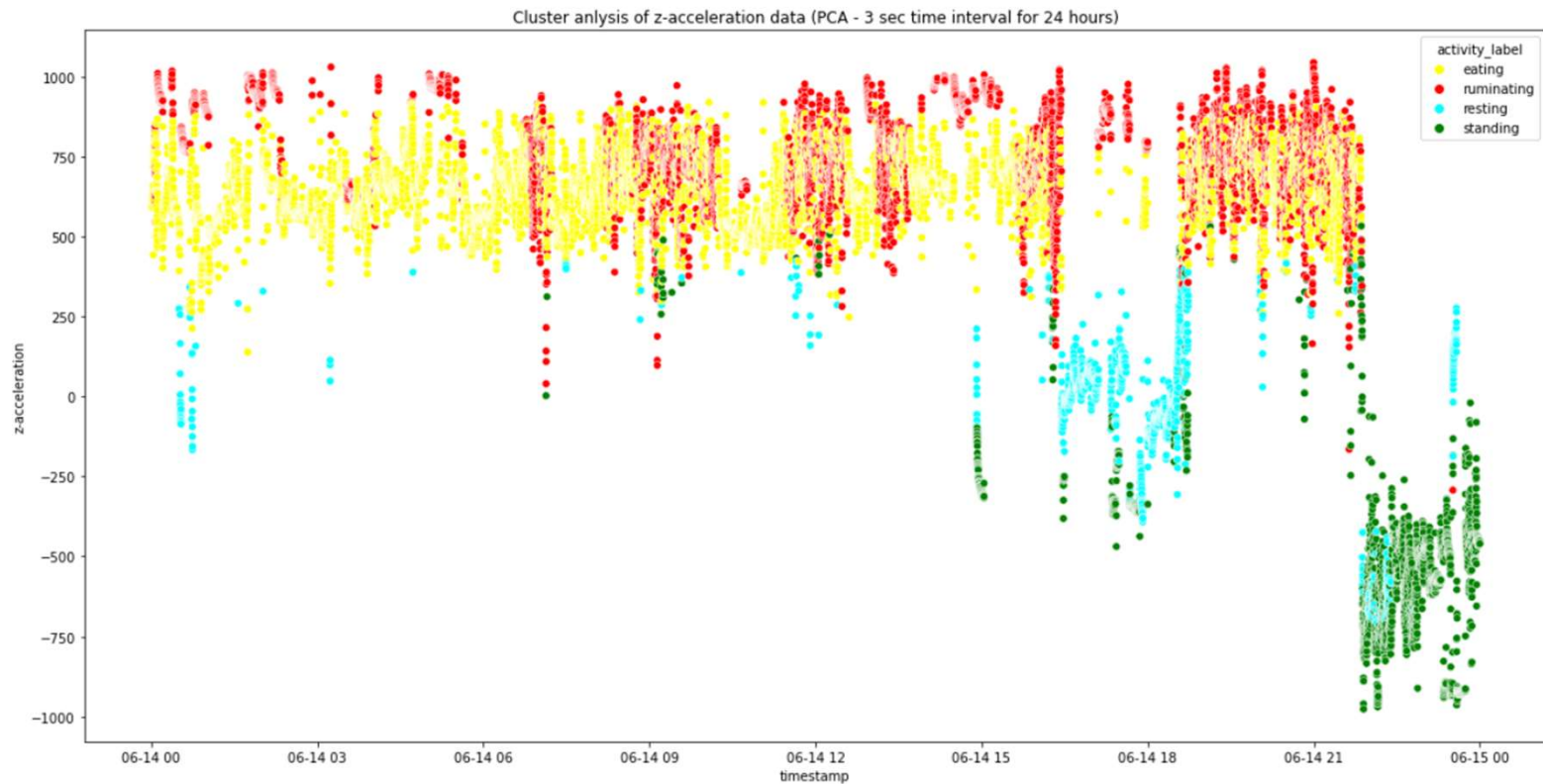
Milestone-4

Model building & evaluation

Model building and evaluation stage:

- Models used :
1. KNN classification model
2. Random Forest classification model
3. SVM classification model