Accelerometer is a device used to measure the acceleration or vibrations of a motion. The data provided by an accelerometer is three-dimensional and can be used in data-driven applications for solving problems like fall detection and health monitoring.

Libraries

In [1]:
```
import plotly.express as px
import pandas as pd
import plotly.graph_objects as go
```

Dataset

In [2]:
```
data = pd.read_csv("accdata.csv")
print(data.head())
```

```
         Date      Time   accel_x   accel_y   accel_z
0  2022-09-03  23:35:16 -1.838747  3.543418  9.126697
1  2022-09-03  23:35:31  1.110910  1.810017  9.634268
2  2022-09-03  23:35:47  8.829816  0.833182  4.663905
3  2022-09-03  23:36:52 -0.852336 -0.124498  9.787497
4  2022-09-03  23:37:44 -0.900220 -0.095768  9.835381
```

EDA

In [3]:
```
fig = px.line(data, x="Date",
              y=["accel_x", "accel_y", "accel_z"],
              title="Acceleration data over time")
fig.show()
```

In [4]:
```
data["hour"] = pd.to_datetime(data["Time"]).dt.hour
data["day_of_week"] = pd.to_datetime(data["Date"]).dt.day_name()
agg_data = data.pivot_table(index="hour", columns="day_of_week",
                            values=["accel_x", "accel_y", "accel_z"],
                            aggfunc="mean")

# Create a heatmap
fig = go.Figure(go.Heatmap(x=agg_data.columns.levels[1],
                           y=agg_data.index,
                           z=agg_data.values,
                           xgap=1, ygap=1,
                           colorscale="RdBu",
                           colorbar=dict(title="Average Acceleration")))
fig.update_layout(title="Average Acceleration by Hour of Day and Day of Week")
fig.show()
```

```
C:\Users\Bryan\AppData\Local\Temp\ipykernel_5448\2413924679.py:1: UserWarning:

Could not infer format, so each element will be parsed individually, falling back to
`dateutil`. To ensure parsing is consistent and as-expected, please specify a format.
```

In [5]:
```
data['accel_mag'] = (data['accel_x'] ** 2 + data['accel_y'] ** 2 + data['accel_z'] **
```

In [6]:
```
fig = px.scatter(data, x='Time',
                 y='accel_mag',
                 title='Magnitude of Acceleration over time')
fig.show()
```

In [7]:
```
fig = px.scatter_3d(data, x='accel_x',
                    y='accel_y',
                    z='accel_z',
                    title='Acceleration in 3D space')
fig.show()
```

In [8]:
```
fig = px.histogram(data,
                   x='accel_mag',
                   nbins=50, title='Acceleration magnitude histogram')
fig.show()
```