Time stamp based video labeling from single camera

In [1]:

```
cd ../
```

```
C:\Users\luisr\Desktop\Repositories\Data Science Projects\Hackaton COR IV - Centro de Operações do RJ\INCUBAÇÃO
\Cameras
```

Load videos control dataset

In [55]:

```
import numpy as np, pandas as pd

# Load data

video_control_path = 'Dados/Controle de vídeos/videos_control_19-04.csv'
control = pd.read_csv(video_control_path)

# data preprocessing
control['timestamp'] = pd.to_datetime(control['timestamp'])
control = control.set_index('timestamp', drop=True).sort_index()
```

Define video timestamp labels and parameters

In [65]:

```
# set parameters

start = '2023-02-07'
end = '2023-03-02'

query = {
    'code': [1475],
    'folder_structure': [
        'polygons/{type}/{polygon}/{code}',
        '{source}/{type}/{event}/{code}',
    ]
}

time_label = {
    '2023-02-07 19:25:00': 'alagamento', # start 07/02
    '2023-02-08 00:35:00': 'bolsão', # start 08/02
    '2023-02-08 01:15:00': 'lâmina',
    '2023-02-08 01:52:30': 'poça',
    '2023-02-08 02:32:30': 'normalidade',
    '2023-02-11 20:50:00': 'alagamento', # start 11/02
    '2023-02-11 20:51:00': 'normalidade', # end 11/02
    '2023-03-02 00:00:00': 'normalidade', # after end of 2023-03-01 ?
}
```

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In [66]:

```
# take video dataset

df = control.copy()

# query video dataset

for key in query:
    df = df[df[key].isin(query[key])]

# cut video dataset

df = df[(df.index >= start) & (df.index <= end)]

# label videos by category timestamps

time_label = pd.Series(time_label).sort_index()

n_labels = len(time_label)
stamps = time_label.index

labels = pd.Series(np.nan, df.index)

for i in range(n_labels - 1):
    t1, t2 = stamps[i], stamps[i + 1]
    msk_t = (df.index >= t1) & (df.index <= t2)
    labels[msk_t] = time_label.loc[t1]

df['tag'] = labels

# display result label count

display(df.head()[['blob_name', 'code', 'tag']])
display(df['tag'].value_counts().to_frame('Video tag count'))
```

	blob_name	code	tag
timestamp			
2023-02-07 19:25:00	polygons/flood-unlabeled/1/1475/CODE1475 2023-...	1475	alagamento
2023-02-07 19:30:00	polygons/flood-unlabeled/1/1475/CODE1475 2023-...	1475	alagamento
2023-02-07 19:35:00	polygons/flood-unlabeled/1/1475/CODE1475 2023-...	1475	alagamento
2023-02-07 19:40:00	polygons/flood-unlabeled/1/1475/CODE1475 2023-...	1475	alagamento
2023-02-07 19:50:00	polygons/flood-unlabeled/1/1475/CODE1475 2023-...	1475	alagamento

	Video tag count
tag	
normalidade	120
alagamento	28
poça	8
lâmina	6
bolsão	3

Check result's unique dates

In [67]:

```
print(np.unique(df.index.date))
```

```
[datetime.date(2023, 2, 7) datetime.date(2023, 2, 8)
 datetime.date(2023, 2, 11) datetime.date(2023, 2, 28)
 datetime.date(2023, 3, 1)]
```

Save labeled dataset as csv

In [68]:

```
df.reset_index().to_csv('Dados/Rotulos/1475_2023-02-07.csv', index=False)
```

Exploratory data analysis

In [3]:

```
cd ../
```

```
C:\Users\luisr\Desktop\Repositories\Data Science Projects\Hackaton COR IV - Centro de Operações do RJ\INCUBAÇÃO
\Cameras
```

In [1]:

```
import numpy as np, pandas as pd
```

```
c:\Users\luisr\anaconda3\lib\site-packages\pandas\core\computation\expressions.py:20: UserWarning: Pandas requir
es version '2.7.3' or newer of 'numexpr' (version '2.7.1' currently installed).
  from pandas.core.computation.check import NUMEXPR_INSTALLED
```

Reload labeled videos dataset

In [4]:

```
videos = pd.read_csv('Dados/Rotulos/1475_2023-02-07.csv')

videos['timestamp'] = pd.to_datetime(videos['timestamp'])
videos = videos.set_index('timestamp', drop=True).sort_index()

videos.head()
```

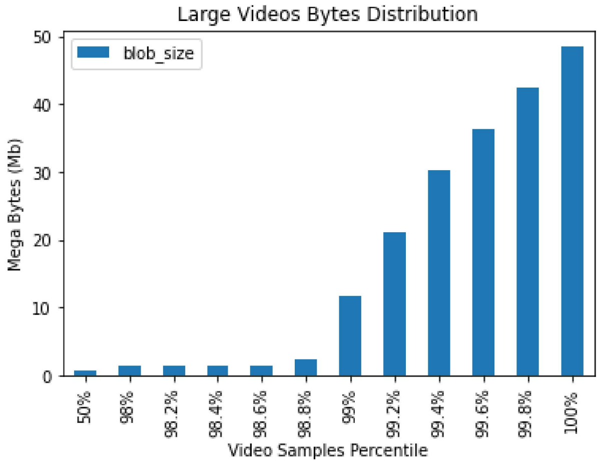
Out[4]:

	blob_name	blob_size	bucket_name	file_name	code	n_folders	folder_structure	tag
timestamp								
2023-02-07 19:25:00	polygons/flood-unlabeled/1/1475/CODE1475 2023-...	206926	flood-video-collection	CODE1475 2023-02-07 19:25:00.mp4	1475	5	polygons/{type}/{polygon}/{code}	alagamento
2023-02-07 19:30:00	polygons/flood-unlabeled/1/1475/CODE1475 2023-...	261337	flood-video-collection	CODE1475 2023-02-07 19:30:00.mp4	1475	5	polygons/{type}/{polygon}/{code}	alagamento
2023-02-07 19:35:00	polygons/flood-unlabeled/1/1475/CODE1475 2023-...	234652	flood-video-collection	CODE1475 2023-02-07 19:35:00.mp4	1475	5	polygons/{type}/{polygon}/{code}	alagamento
2023-02-07 19:40:00	polygons/flood-unlabeled/1/1475/CODE1475 2023-...	287397	flood-video-collection	CODE1475 2023-02-07 19:40:00.mp4	1475	5	polygons/{type}/{polygon}/{code}	alagamento
2023-02-07 19:50:00	polygons/flood-unlabeled/1/1475/CODE1475 2023-...	211736	flood-video-collection	CODE1475 2023-02-07 19:50:00.mp4	1475	5	polygons/{type}/{polygon}/{code}	alagamento

Large videos size distribution

In [5]:

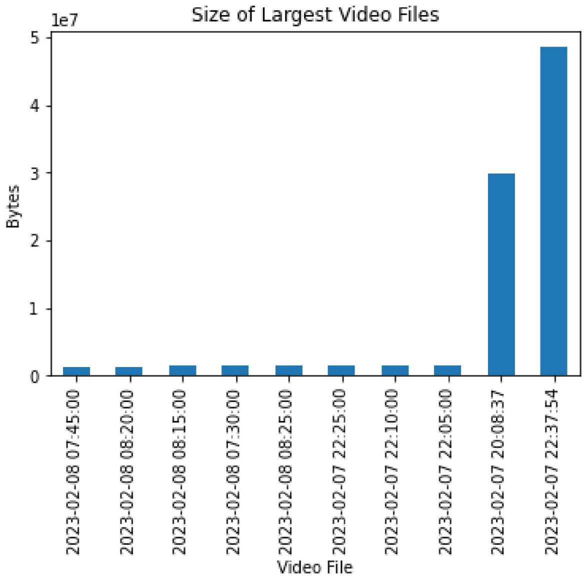
```
bytes_factor = 1e6
bins = np.arange(0.98, 1, 0.002)

ax = (videos['blob_size'] / bytes_factor).describe(bins).to_frame().iloc[4:-1].plot.bar(
    title='Large Videos Bytes Distribution', xlabel='Video Samples Percentile', ylabel='Mega Bytes (Mb)'
)
```



Largest videos bytes

In [6]:

```
ax = videos['blob_size'].sort_values(ascending=True).tail(10).plot.bar(
    ylabel='Bytes', xlabel='Video File', title='Size of Largest Video Files'
)
```


Size of Largest Video Files
1e7
Bytes
2023-02-08 07:45:00
2023-02-08 08:20:00
2023-02-08 08:15:00
2023-02-08 07:30:00
2023-02-08 08:25:00
2023-02-07 22:25:00
2023-02-07 22:10:00
2023-02-07 22:05:00
2023-02-07 20:08:37
2023-02-07 22:37:54
Video File