Data Science Foundation

Lesson #4 - Working with missing data

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Agenda

- Case study: Titanic
- Missing data
- Cleaning data
- Pivot tables
- Applying functions over DataFrame

Update the repository

```
git clone https://github.com/ivanovitchm/EEC2006.git
```

Or ....

```
git pull
```

Case Study: Titanic

	pclass	survived	name	sex	age	sibsp	parch	ticket	fare	cabin	embarked	boat	body	home.dest
0	1	1	Allen, Miss. Elisabeth Walton	female	29.0000	0	0	24160	211.3375	B5	S	2		St Louis, MO
1	1	1	Allison, Master. Hudson Trevor	male	0.9167	1	2	113781	151.5500	C22 C26	S	11		Montreal, PQ / Chesterville, ON
2	1	0	Allison, Miss. Helen Loraine	female	2	1	2	113781	151.5500	C22 C26	S			Montreal, PQ / Chesterville, ON
3	1	0	Allison, Mr. Hudson Joshua Creighton	male	30.0000	1	2	113781	151.5500	C22 C26	S		135	Montreal, PQ / Chesterville, ON
4	1	0	Allison, Mrs. Hudson J C (Bessie Waldo Daniels)	female	25	1	2	113781	151.5500	C22 C26	S			Montreal, PQ / Chesterville,

Finding the missing data

```
sex = titanic_survival["sex"]
sex_is_null = pandas.isnull(sex)
sex_null_true = sex[sex_is_null]
```

What is the Big Deal with missing data?

```
mean_age = sum(titanic_survival["age"]) / len(titanic_survival["age"])
```

Easier ways to do math

```
correct_mean_age = titanic_survival["age"].mean()
```

Dropping missing values

```
drop_na_rows = titanic_survival.dropna(axis=0)
```

Pivoting tables

	pclass	survived	name	sex	age	sibsp	parch	ticket	fare	cabin	embarked	boat	body	home.dest
0	1	1	Allen, Miss. Elisabeth Walton	female	29.0000	0	0	24160	211.3375	B5	S	2		St Louis, MO
1	1	1	Allison, Master. Hudson Trevor	male	0.9167	1	2	113781	151.5500	C22 C26	S	11		Montreal, PQ / Chesterville, ON
2	1	0	Allison, Miss. Helen Loraine	female	2	1	2	113781	151.5500	C22 C26	S			Montreal, PQ / Chesterville, ON

```
passenger_class_fares = titanic_survival.pivot_table(index="pclass", values="fare", aggfunc=np.mean)
```

ILOC vs LOC

	pclass	survived	name	sex	age
14	1.0	1.0	Barkworth, Mr. Algernon Henry Wilson	male	80.0
61	1.0	1.0	Cavendish, Mrs. Tyrell William (Julia Florence...	female	76.0
1235	3.0	0.0	Svensson, Mr. Johan	male	74.0
135	1.0	0.0	Goldschmidt, Mr. George B	male	71.0
9	1.0	0.0	Artagaveytia, Mr. Ramon	male	71.0

```
first_five_rows = new_titanic_survival.iloc[0:5]
```

Filtering data

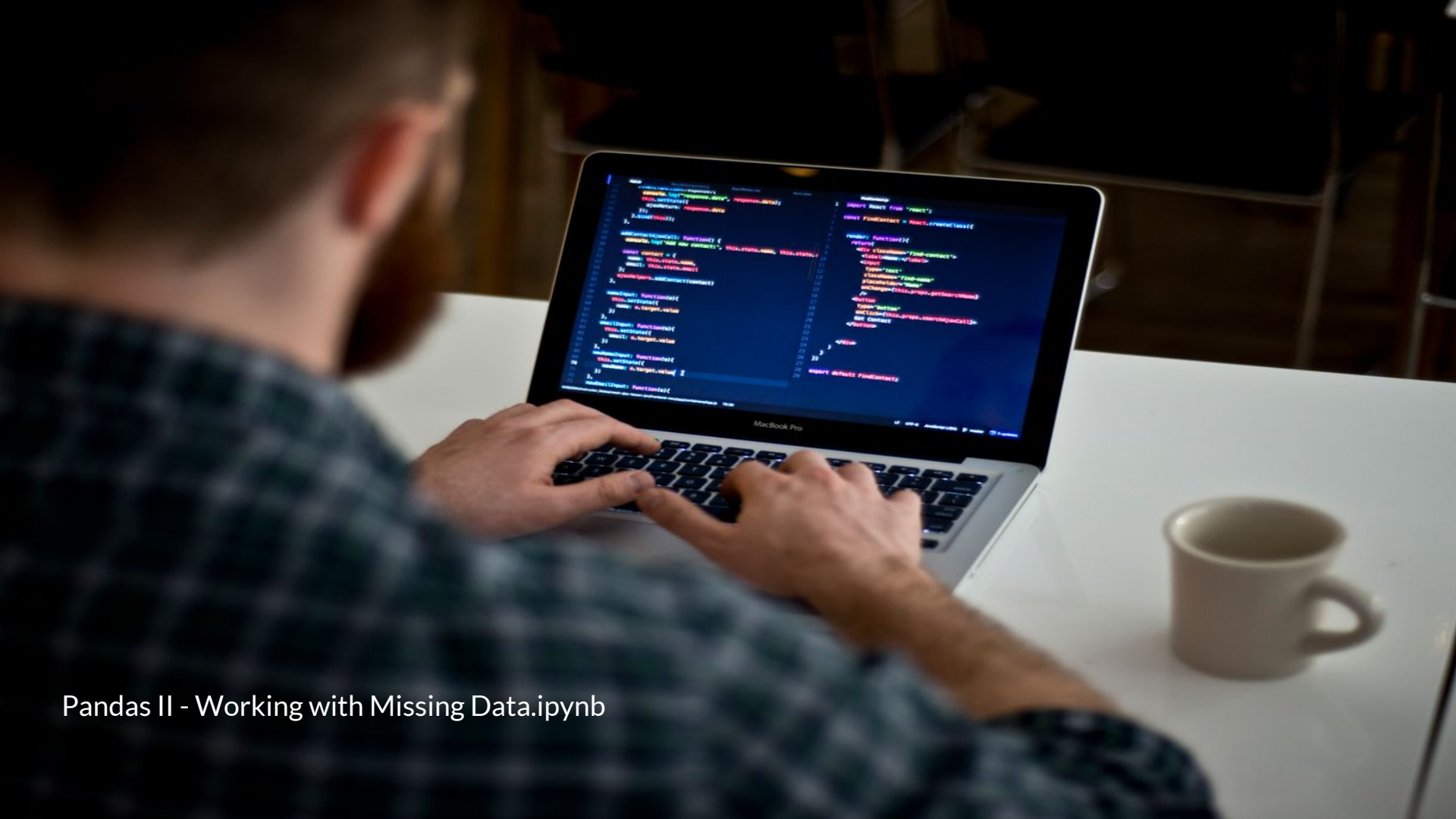
```
first_row_first_column = new_titanic_survival.iloc[0,0]
all_rows_first_three_columns = new_titanic_survival.iloc[:,0:3]
row_index_83_age = new_titanic_survival.loc[83,"age"]
row_index_766_pclass = new_titanic_survival.loc[766,"pclass"]
```

Applying functions over Dataframe

```
# This function returns the hundredth item from a series
def hundredth_row(column):
    # Extract the hundredth item
    hundredth_item = column.iloc[99]
    return hundredth_item
# Return the hundredth item from each column
hundredth_row_var = titanic_survival.apply(hundredth_row)
```

Applying function over rows

```
def which_class(row):
    pclass = row['pclass']
    if pd.isnull(pclass):
        return "Unknown"
    elif pclass == 1:
        return "First Class"
    elif pclass == 2:
        return "Second Class"
    else:
        return "Third Class"
classes = titanic_survivors.apply(which_class, axis=1)
```


Pandas II - Working with Missing Data.ipynb