Artificial Intelligence and Machine Learning Fundamentals

Activity 5: Predicting Population

You are working at the government office of Metropolis, trying to forecast the need for elementary school capacity. Your task is to figure out a 2025 and 2030 prediction for the number of children starting elementary school. Past data are as follows:

Year	No of Students	Year	No of Students
2001	147026	2010	139452
2002	144272	2011	139722
2003	140020	2012	135300
2004	143801	2013	137289
2005	146233	2014	136511
2006	144539	2015	132884
2007	141273	2016	125683
2008	135389	2017	127255
2009	142500	2018	124275

Plot tendencies on a two-dimensional chart. Use linear regression.
Our features are the years ranging from 2001 to 2018. For simplicity, we can indicate 2001 as year 1, and 2018 as year 18.

```
x = np.array(range(1, 19))
y = np.array([
147026,
144272,
140020,
143801,
146233,
144539,
141273,
135389,
142500,
139452,
139722,
135300,
137289,
136511,
```

```
132884,
125683,
127255,
124275
])
```

Use np.polyfit to determine the coefficients of the regression line.

```
[a, b] = np.polyfit(x, y, 1)
[-1142.0557275541753, 148817.5294117646]
```

Plot the results using matplotlib.pyplot to determine future tendencies.

```
import matplotlib.pyplot as plot
plot.scatter( x, y )
plot.plot( [0, 30], [b, 30*a+b] )
plot.show()
```