



# Lecture 14: Visualization

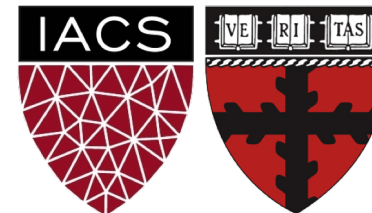
A vehicle for EDA and communication

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**Harvard IACS**

CS109A

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As the matplotlib thickens ...

# ANNOUNCEMENTS

- **Homework 3** is **due Oct 7 (Wed) @ 11:59pm**
- Didn't submit **Milestone 1**? Want to change project selection?  
E-mail the helpline at [cs109a2020@gmail.com](mailto:cs109a2020@gmail.com)
- After lecture, please update your Zoom to the latest version (5.3.1).

# Learning Objectives

- Understand why visualization/plotting is important
- Learn aspects that tend to make visualizes **effective** and **ineffective**
- Feel comfortable designing plots that best convey your message
- Gain experience in producing plots with Python

Extra Goal

be more cognizant of broader design choices  
(e.g., typography, spacing, colors)

# Agenda

- EDA Refresher
- Effective Visualization
  - Graphical Integrity
  - Scope
  - Displays
  - Sensible Design
- Communication
  - Motivation
  - Key Considerations

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Assume you know a given dataset is credible, complete with the info you want, and has no missing values.

Why do further EDA?

## Purposes of EDA:

- Maximize insight into a dataset
- Uncover underlying structure
- Detect outliers
- Test underlying assumptions
- Develop parsimonious models

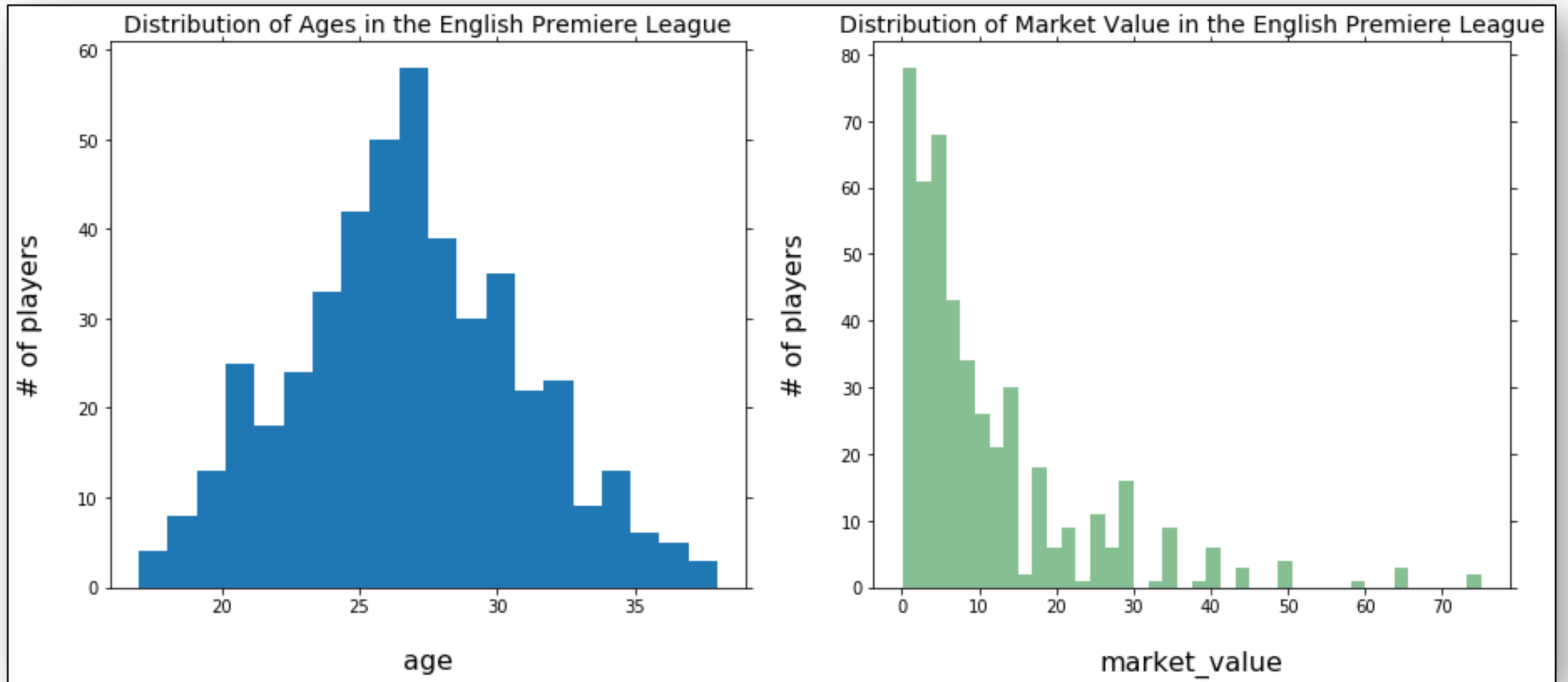


# EDA Refresher: English Premier League

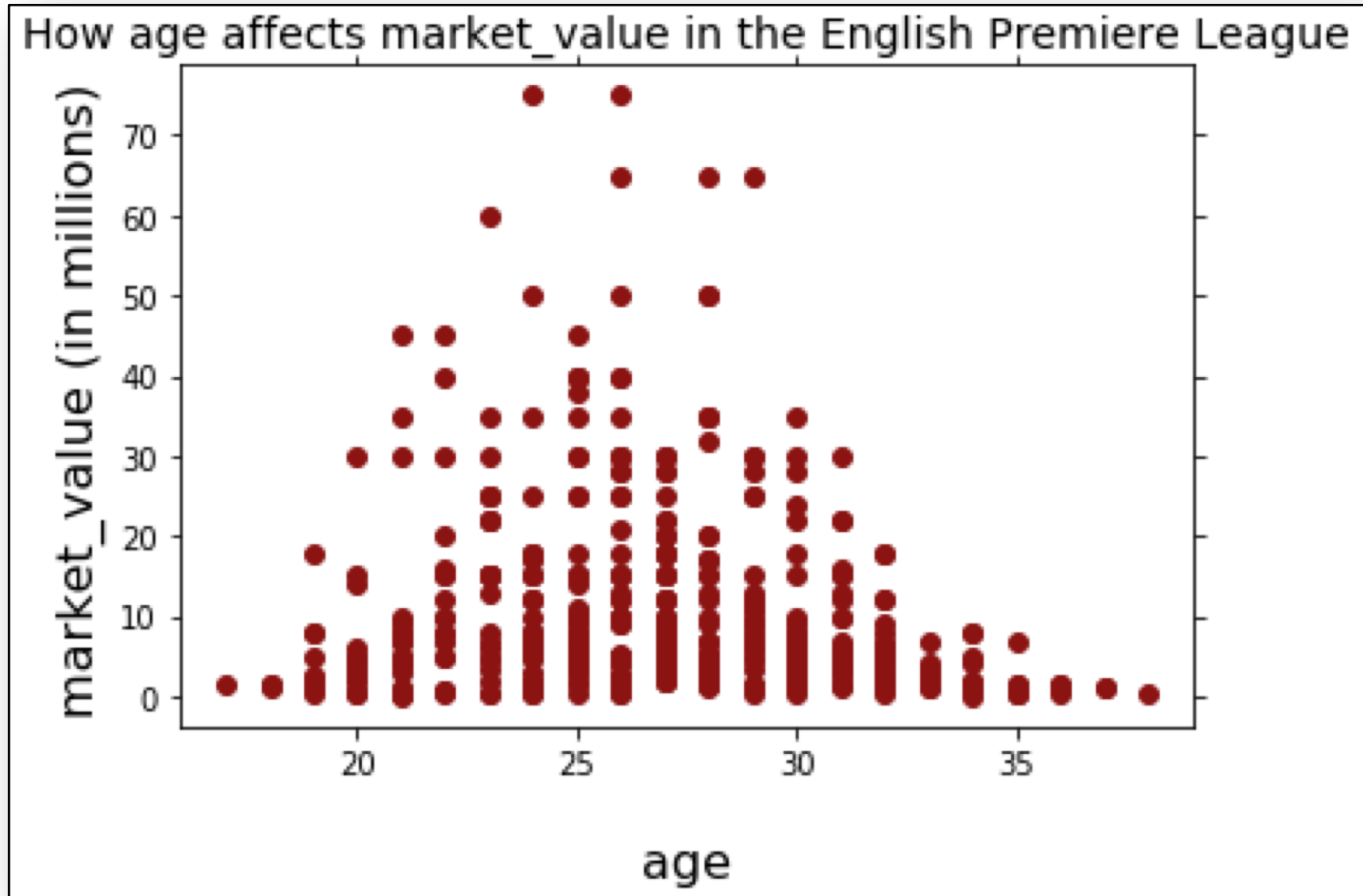
name	club	age	position	market value
Alexis Sanchez	Arsenal	28	LW	65
Mesut Ozil	Arsenal	28	AM	50
Petr Cech	Arsenal	35	GK	7
Theo Walcott	Arsenal	28	RW	20
Laurent Koscielny	Arsenal	31	CB	22

from [www.transfermarkt.us](http://www.transfermarkt.us)

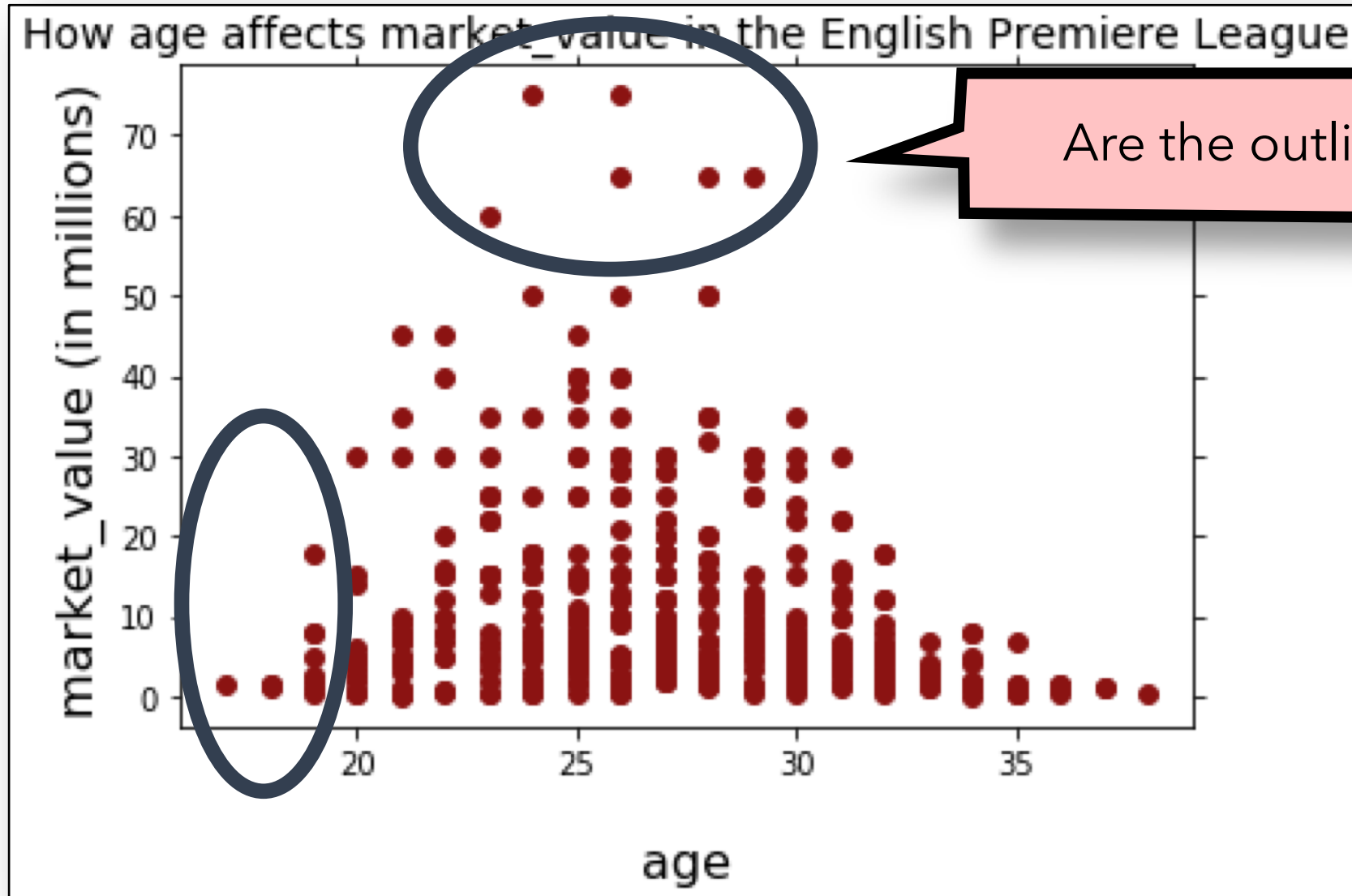
# EDA Refresher: English Premier League



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# EDA Refresher: English Premier League

```
league_df.loc[league_df['age']<20][['name', 'club', 'age', 'position', \
'market_value']].sort_values(by="age")
```

	name	club	age	position	market_value
233	Ben Woodburn	Liverpool	17	LW	1.50
231	Trent Alexander-Arnold	Liverpool	18	RB	1.50
350	Josh Tymon	Stoke+City	18	LB	1.00
435	Jonathan Leko	West+Brom	18	RW	1.50
147	Tom Davies	Everton	19	CM	8.00
155	Ademola Lookman	Everton	19	LW	5.00
239	Dominic Solanke	Liverpool	19	CF	2.00
270	Marcus Rashford	Manchester+United	19	CF	18.00
281	Axel Tuanzebe	Manchester+United	19	CB	1.00
282	Timothy Fosu-Mensah	Manchester+United	19	DM	2.50
375	Tammy Abraham	Swansea	19	CF	8.00
436	Sam Field	West+Brom	19	CM	0.25

# EDA Refresher: English Premier League

```
league_df.loc[league_df['market_value']>=60][['name', 'club', \
'age', 'position', 'market_value']].sort_values(by="age")
```

	name	club	age	position	market_value
377	Harry Kane	Tottenham	23	CF	60.0
263	Paul Pogba	Manchester+United	24	CM	75.0
92	Eden Hazard	Chelsea	26	LW	75.0
240	Kevin De Bruyne	Manchester+City	26	AM	65.0
0	Alexis Sanchez	Arsenal	28	LW	65.0
241	Sergio Aguero	Manchester+City	29	CF	65.0

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league_df.loc[league_df['market_value']>=60][['name', 'club', \
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## **DISCLAIMER.**

Some of these examples involve political data. In no way should this be taken as a signal of my support or endorsement in any beliefs; the point is merely to convey good and bad choices when it comes to effective visualization.



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