



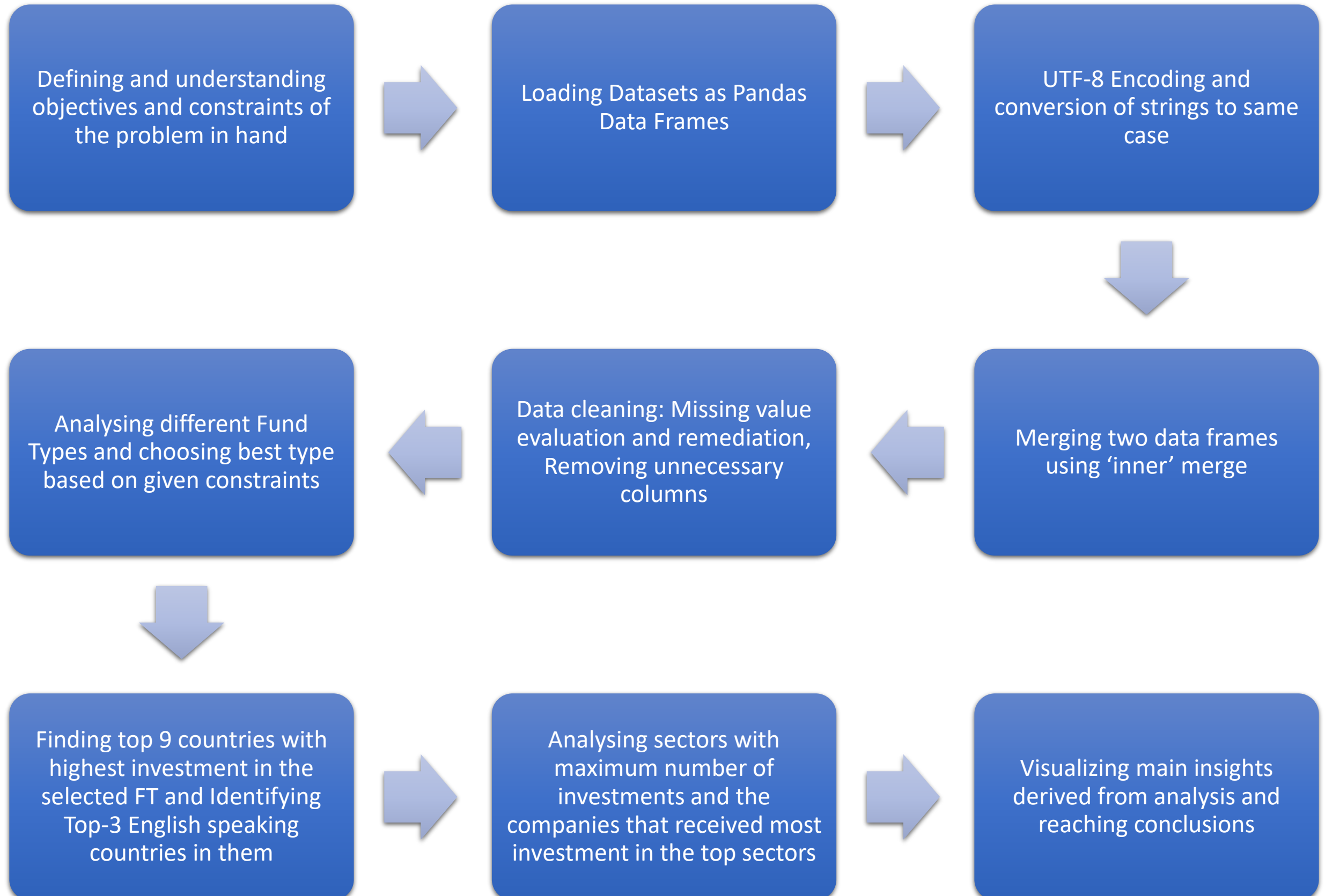
Investment Analysis for Spark Funds

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Abstract

Past data sets are analysed to understand the global trends in investments to gain insights for the asset management company, Spark Funds for their future investments. All analysis is done using python Jupyter notebooks and inbuilt libraries like Pandas, Numpy, Matplotlib, and Seaborn. Data was cleaned using standard procedures, after which Fund Type, Country and Sector Analysis were done on the data. Based on the results obtained, it has been concluded that for the best benefits of Spark Funds, it's better to invest in Sectors like Others and or Social, Finance, Analytics, Advertising of countries USA, GBR or IND using Venture funding. Some of the best companies to invest were found to be Virtustream, Electric Cloud, Celltick Technologies, Manthan Systems, SST Inc., and FirstCry.

Problem solving methodology



Fund Type Analysis

- First, fund types that are not in the range of analysis were removed from the data frame.
- Then the data was grouped based on the four fund types that are being analysed.
- Statistical analysis of Investment Amount based on the four Funding Type was done.
- From the statistical distribution, mean doesn't seem to be a good summary measurement of the data.
- Thus it was deduced that median or mode will better represent the skewed data set.

- Therefore, skewness of the distribution was analysed and was found all data are highly positively skewed.
- Given constraints by Spark Funds were that they are interested to invest between 5-15 Million USD only.
- While analysing the representative values (median and mode) for the four fund types, the only fund type that satisfied the given constraint was 'Venture'.
- Hence, 'Venture', was chosen as the desirable FT for all future analysis.

	count	mean	std	min	25%	50%	75%	max	skewness	Median	Mode
funding_round_type											
angel	4860.0	0.958694	7.404397	0.0	0.150000	0.400	1.0	494.511992	59.805769	0.415	0.5
private_equity	1936.0	73.308593	198.113458	0.0	5.000000	20.000	75.0	4745.460219	12.040600	20.000	100.0
seed	23603.0	0.719818	2.221733	0.0	0.055000	0.275	1.0	200.000000	49.844230	0.300	1.0
venture	50228.0	11.748949	86.352067	0.0	1.600902	5.000	12.0	17600.000000	169.252252	5.000	10.0

Country Analysis

- The records without country code were dropped from the data frame before starting analysis.
- The records were then grouped by country for the chosen Fund Type 'Venture'.
- The grouped records were then sorted in the descending order of amount of investment received.
- The top 9 countries with highest investment amount in the selected Fund Type were filtered and saved as top9.
- From the top-9 countries in the top9 the top-3 English speaking countries were identified to be United States of America, United Kingdom or Great Britain and India.

raised_amount_millions_usd	
country_code	
USA	422510.842796
CHN	39835.418773
GBR	20245.627416
IND	14391.858718
CAN	9583.332317
FRA	7259.536732
ISR	6907.514579
DEU	6346.959822
JPN	3363.676611



Top 1 English Speaking Country



Top 2 English Speaking Country



Top 3 English Speaking Country

Sector Analysis

- First, Primary Sector was extracted from the category list of master data frame and added in the master frame as a new column
- 'mapping' data were imported as pandas data frame and was cleaned and reformatted as per the requirement for the easy identification of main sector associated with each primary sectors.
- Mapping data frame was merged to master frame so as to add Main Sector details from mapping data frame to the master frame.
- Individual data frames were created for each of the top-3 English speaking countries.
- Main sectors with maximum number of investments in each country and the companies that received highest investment amount in these top sectors were identified.

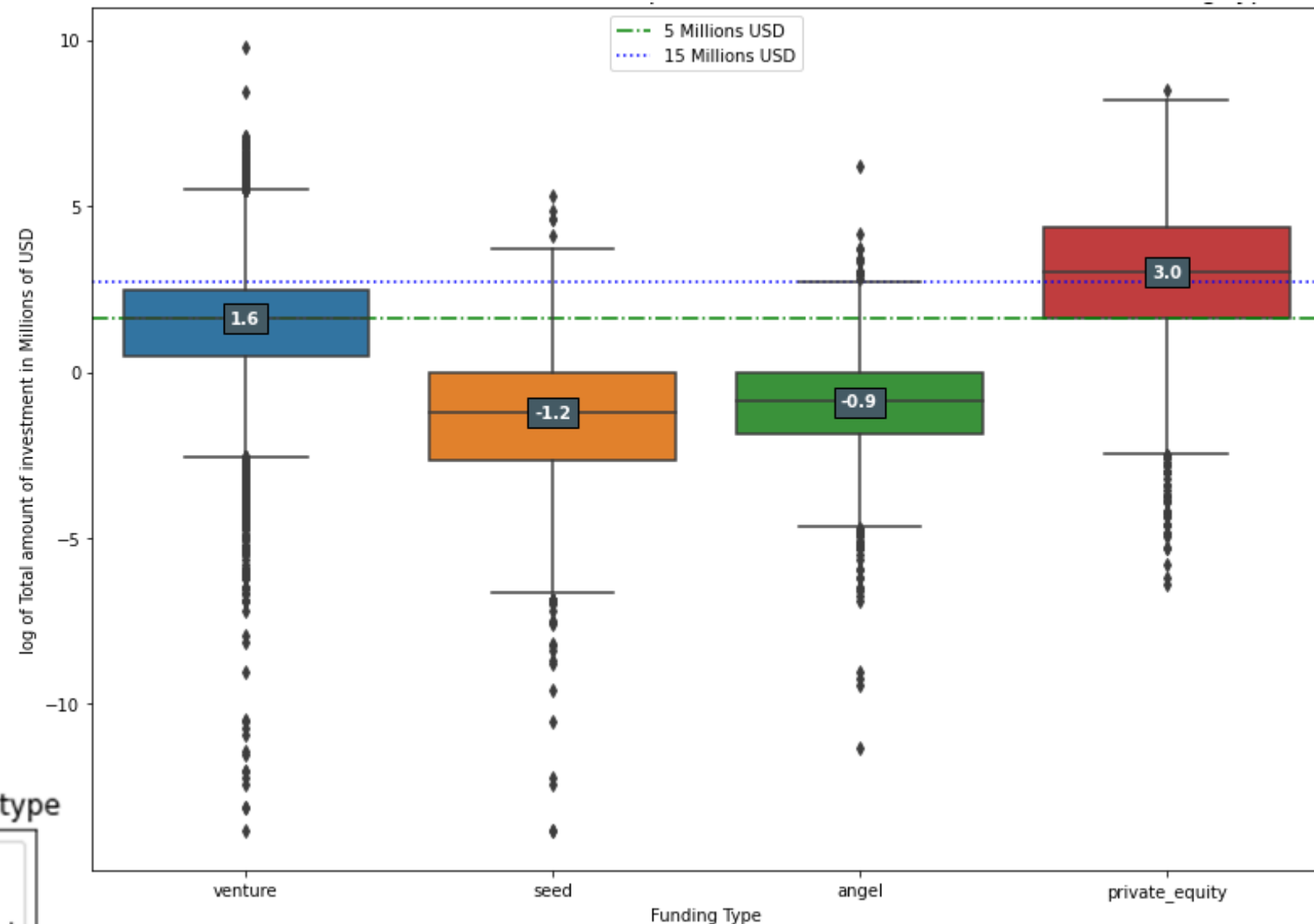
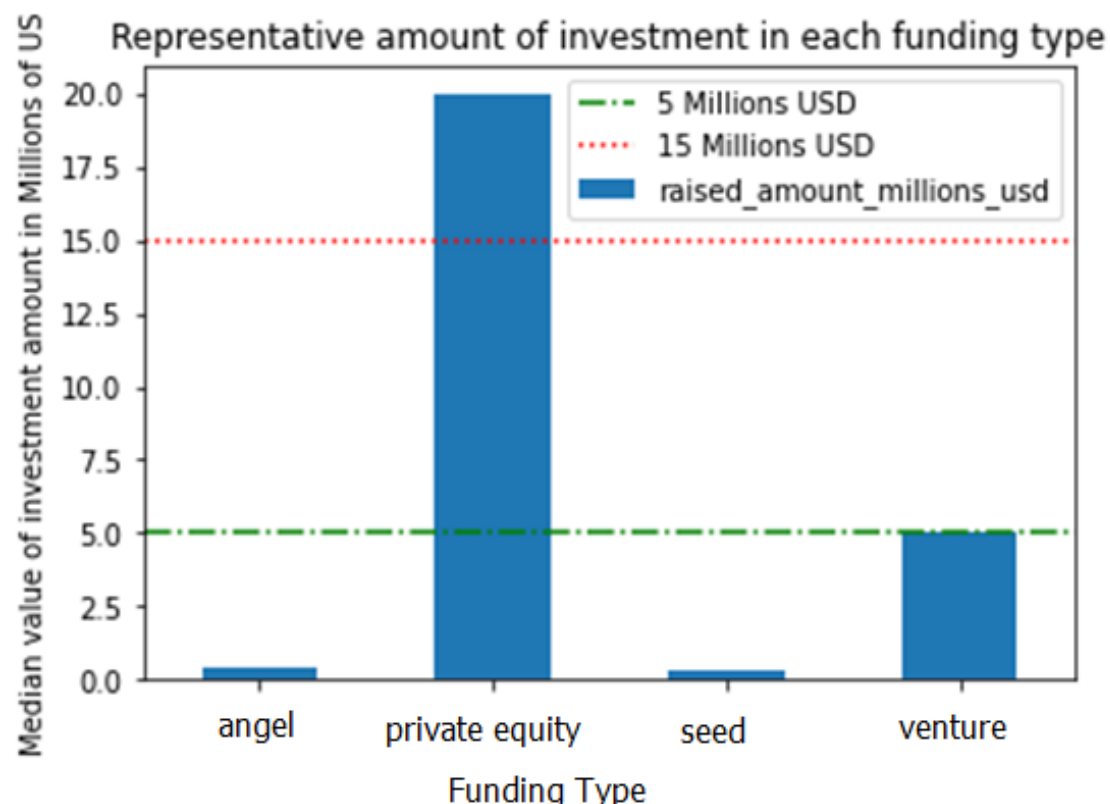
Sector Analysis/ Country =>
Total number of Investments (count)
Total amount of investment (USD)
Top Sector name (no. of investment-wise)
Second Sector name (no. of investment-wise)
Third Sector name (no. of investment-wise)
Number of investments in top sector
Number of investments in second sector
Number of investments in third sector
Company that received the highest investment in top sector
Company that received the highest investment in second sector

USA	GBR	IND
12012	619	323
107318294664	5365228300	2949543602
Others	Others	Others
Social, Finance, Analytics, Advertising	Social, Finance, Analytics, Advertising	Social, Finance, Analytics, Advertising
Cleantech / Semiconductors	Cleantech / Semiconductors	News, Search and Messaging
2950	147	110
2714	133	60
2300	128	52
Virtustream	Electric Cloud	FirstCry.com
SST Inc. (Formerly ShotSpotter)	Celltick Technologies	Manthan Systems

Results

➤ In Private Equity FT, the variation in investment amount is comparatively larger.

- All FTs have highly positively skewed data, owing to very high investments received by established and very large sized companies
- Both 'Seed' and 'Angel' funding types have comparatively lower investment amounts than the constraints present.
- The highest investments are happening in Private Equity funding and lowest in Seed funding

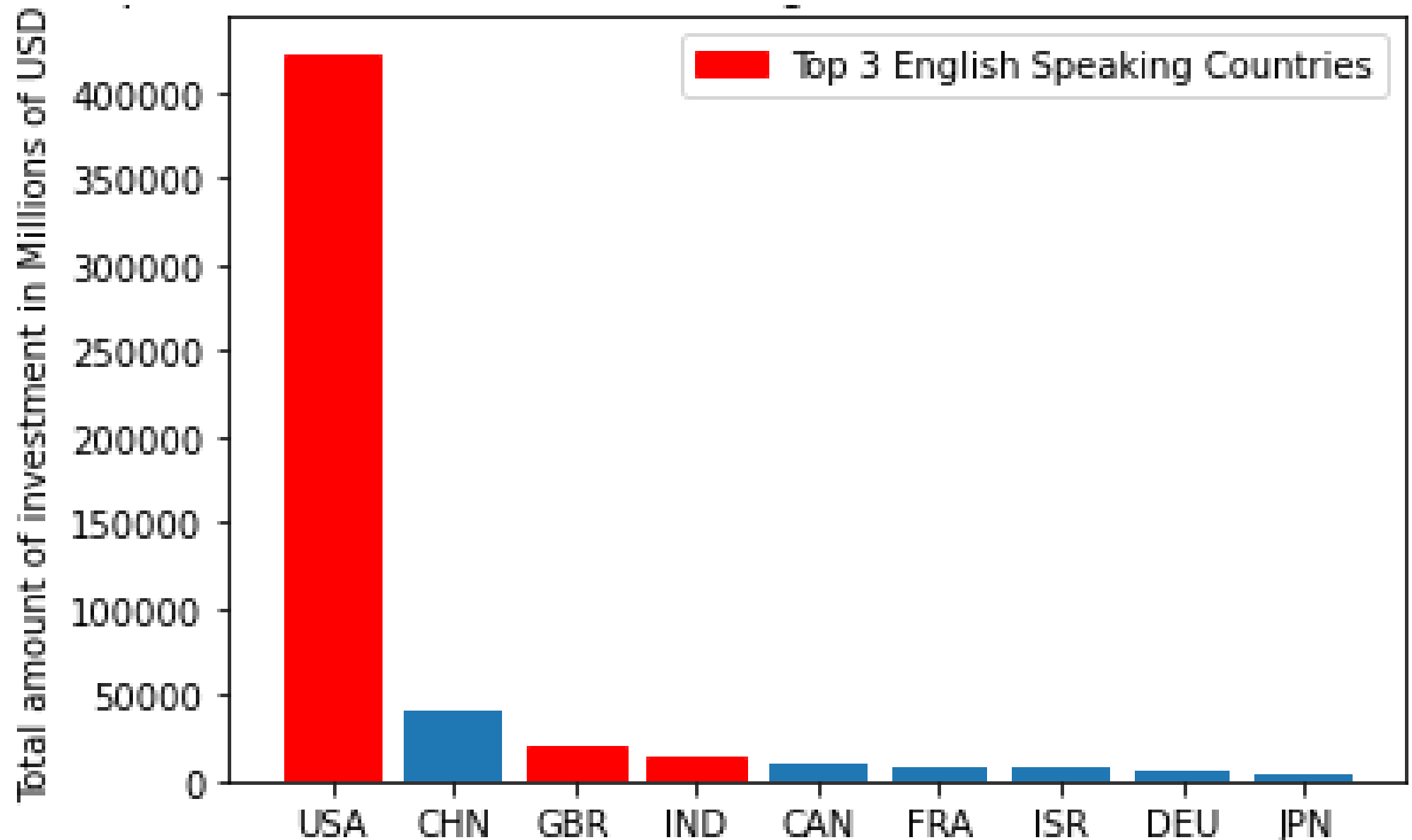


Funding Type	Median Value
Venture	5 Millions
Angel	0.4 Millions
Seed	0.275 Millions
Private Equity	100 Millions

➤ All funding types have outliers owing to the very large and very small companies in the dataset. As outliers are representative of the distribution they were not removed during analysis

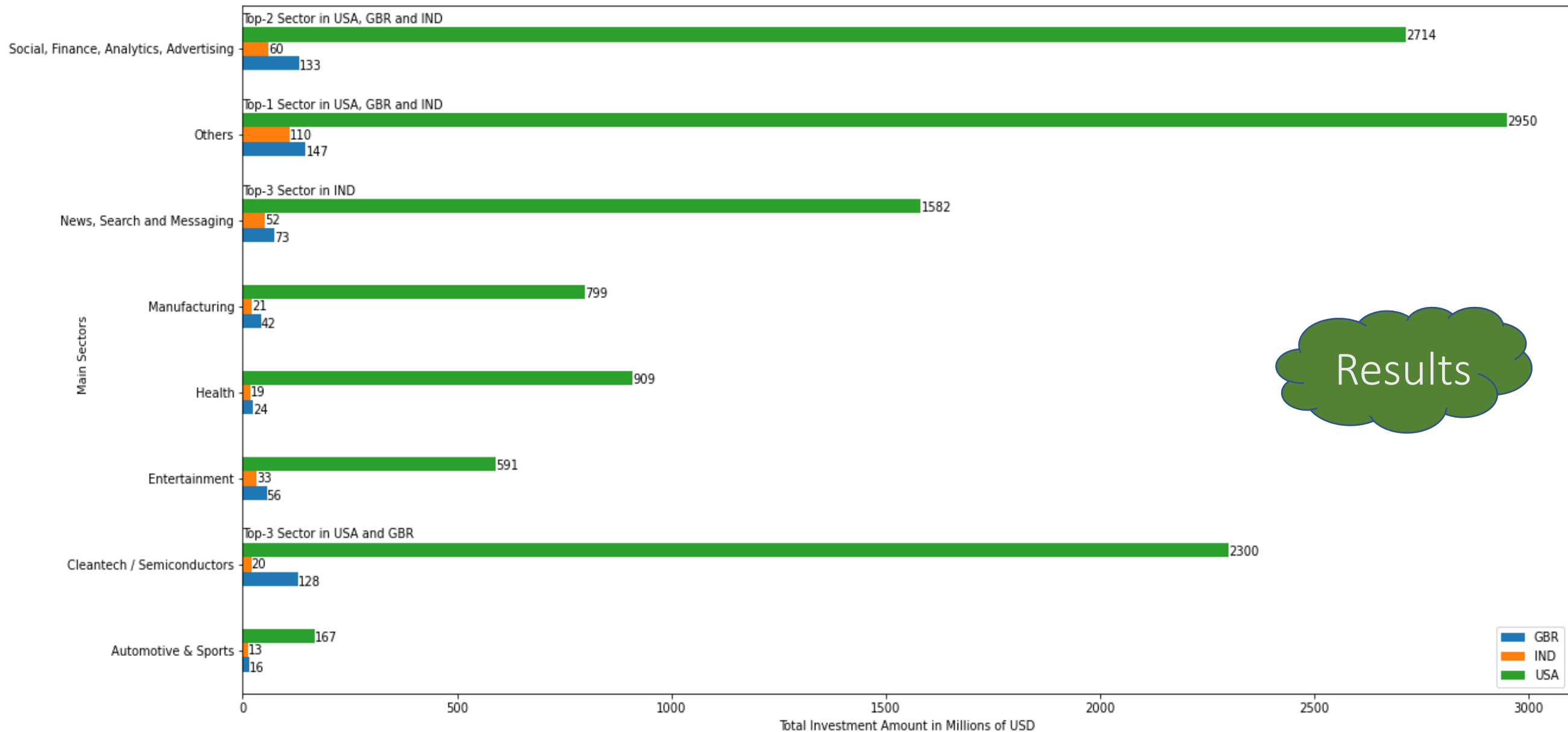
Out of the four fund types only 'Venture' has median value that falls within the constraints of 5-15 Millions USD set by Spark Funds

Results



- Countries with highest amount of investment in Venture funding type were all the popular technologically developed countries.
- As expected USA ranked first with more than 400 Billion USD of investments in Venture funding which is significantly higher than all other countries in the list.
- Even the second ranked China could have only ~40 Billion USD investments which is much smaller compared to that of USA.
- In English Speaking countries, United Kingdom(GBR) and India ranked in top-3 after USA and have total investments around 15 to 20 Billion USD.

Number of investments made by Top-3 English-speaking Countries in the Top-3 Main Sectors of each in Venture funding



Results

- The top sector and second to top sector for all three countries are the same: Others and Social, Finance, Analytics, Advertising respectively.
- As seen earlier in country analysis, here also the we can see the predominance of USA in all sectors with significantly higher number of investments compared to GBR and IND.
- For USA and GBR the third popular sector is Cleantech/Semiconductors whereas for IND it's News, Search and Messaging.
- Since Others is a sector comprising of all the sectors that are not mentioned separately in the graph, it's normal to find that as the top sector in all countries.
- Similarly as Social Media and Analytics are gaining popularity and attracting more and more investors, their second top sector position is justifiable and is an important insight to make decisions.

Conclusions

- The suitable Funding Type to invest in is 'Venture'.
 - The English Speaking Countries with highest investments are USA, GBR and IND.
 - In these countries Others; Social, Finance, Analytics, Advertising; Cleantech/Semiconductors; News, Search and Messaging are the Sectors with maximum investment.
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- Hence for Spark Funds it's best to invest in **Others** or **Social, Finance, Analytics, Advertising** Sectors in **USA, GBR** or **IND** through **Venture** fund type.
 - In these sectors **Virtustream, Electric Cloud, Celltick Technologies, Manthan Systems, SST Inc., and First Cry** are some of the best companies to invest in.

