Forced Migration Network Analysis

Group C

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The journey of a refugee is often untold, and if told, it is never heard. Often in western mainstream media, the refugee journey is either termed as a “crisis” and expand to questions on “how this will effect our economy.” However, using various social network analysis techniques, we will debunk the stereotypical notion of a Eurocentric refugee network, and bring light to the stories of the untold.

Blind visualization of the forced migrants network in 2011

This first map is a “blind” data visualization of the migrants social network. As you can see in the first map, the flows are unweighted so it gives a misleading representation of the flow of the migrants around the globe. This is the case for most of the maps online created by famous journalists trying to show the flow of refugees around the globe; however not depicting the reality of the refugees social network. This is why we decided to first start by creating another map you can see below with weighted edges.

The visualization for the migration network using weighted edges

This map still does not give very valuable insights to the reality of the migrants social network. The reason behind this is that we are trying to plot a complex society in a simple graoh, which does not give the social network justice. This is why we are digging deeper into the analysis by dividing our refugees into three types: Refugees,Asylum seekers,Internally Displaced People

Total number of migrants in the network for the year 2011

35441863

Refugees edges table

	from	to	weight	type
76937	65	1	34	Refugees
76939	66	1	3	Refugees
76941	103	1	2972	Refugees
76944	3	2	1	Refugees
76945	29	2	9	Refugees

Asylum-seekers edges table

	from	to	weight	type
76938	65	1	25	Asylum-seekers
76940	66	1	1	Asylum-seekers
76942	103	1	27	Asylum-seekers
76953	119	2	21	Asylum-seekers
76954	124	2	3	Asylum-seekers

Internally Displaced People edges table

	from	to	weight	type
76934	1	1	447547	Internally displaced persons
77626	9	9	599192	Internally displaced persons
77967	17	17	113000	Internally displaced persons
78301	22	22	78796	Internally displaced persons
78758	26	26	105206	Internally displaced persons

Total number of refugees

10404804

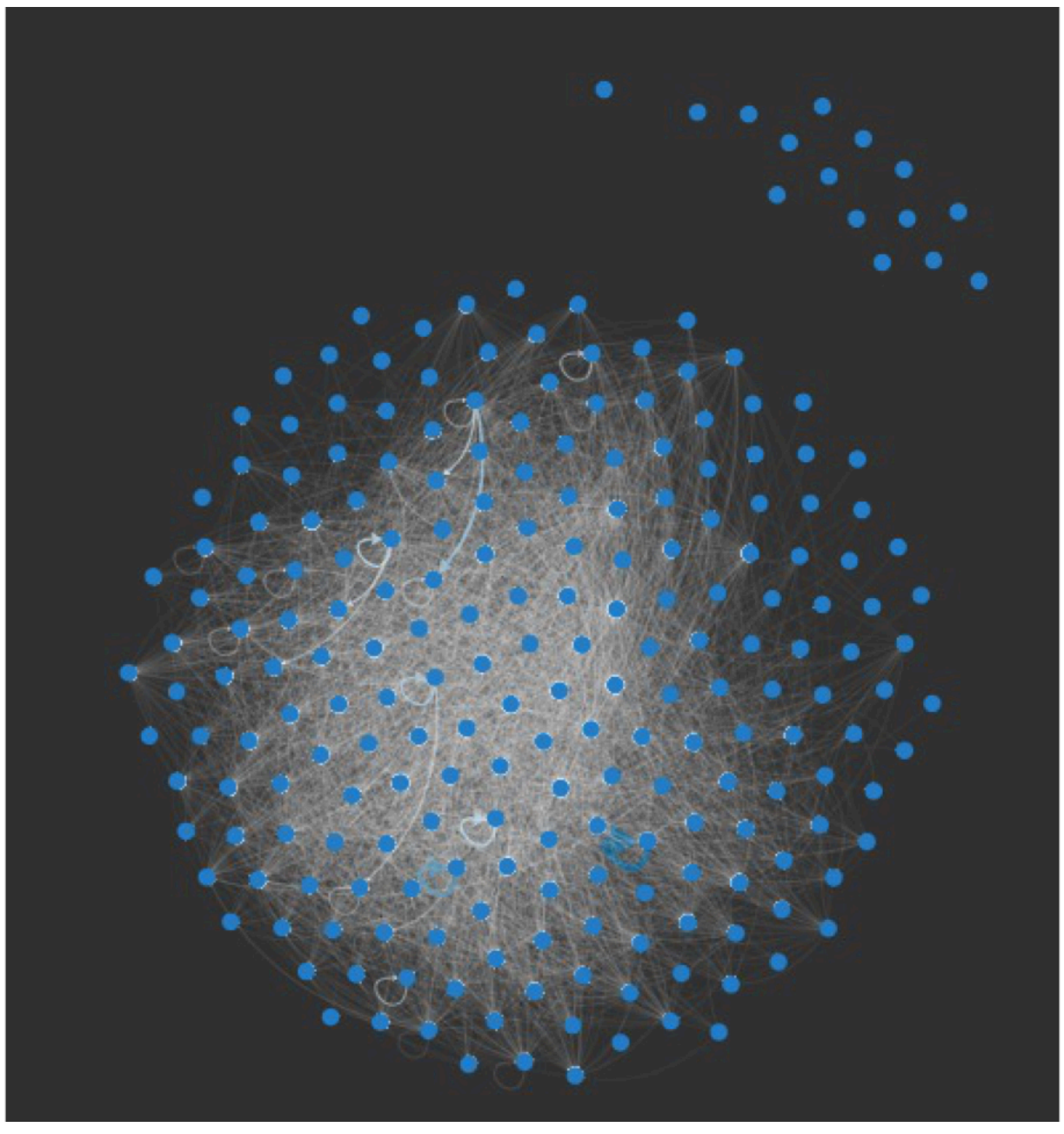
Total number of rasylum seekers

897021

Total number of internally displaced

15473378

First visualisation of the migrants social network



We can see that the graph is disconnected with a giant component and many other nodes not connected to it that we need to further analyze later.

Internally Displaced People

Node importance: Centrality measures for Internally Displaced People

When we are looking at the graph in general, We found many countries with self loops as you can see in the graph below. As calculating the total weighted degree of the countries, Colombia had the highest number. So we wanted to dig deeper in the analysis and first look at only the internally displaced people. Indeed columbia had the highest total number of people internally displaced (7.7M people). The reason for massive internal displacement is due to so many guerillas attacking main cities in and around Colombia (FARC is the most famous one). This Network by itself is worth analyzing as a social network because as a network on its own it has 32 nodes as municipalities and 4958 edges.

Refugees Getaway

Node importance: Centrality measures for Refugees

Top three countries with the most refugees going out

refugees.degin	refugees.degout	refugees.bet	refugees.close	country	hf_scorec	life_expectancy_women	life_expectancy_
3009	2664436	27.5000	5.72e-05	Afghanistan	161	49	
35189	1428308	813.7571	5.69e-05	Iraq	158	73	
2099	1077048	522.2865	5.70e-05	Somalia	150	53	

Top three countries with the most refugees going in

refugees.degin	refugees.degout	refugees.bet	refugees.close	country	hf_scorec	life_expectancy_women	life_expectancy_me
1702700	35952	291.3296	5.69e-05	Pakistan	140	67	6
886468	72361	1719.5869	5.73e-05	Iran (Islamic Rep. of)	154	75	7
755445	19931	6765.8648	5.70e-05	Syrian Arab Rep.	162	78	7

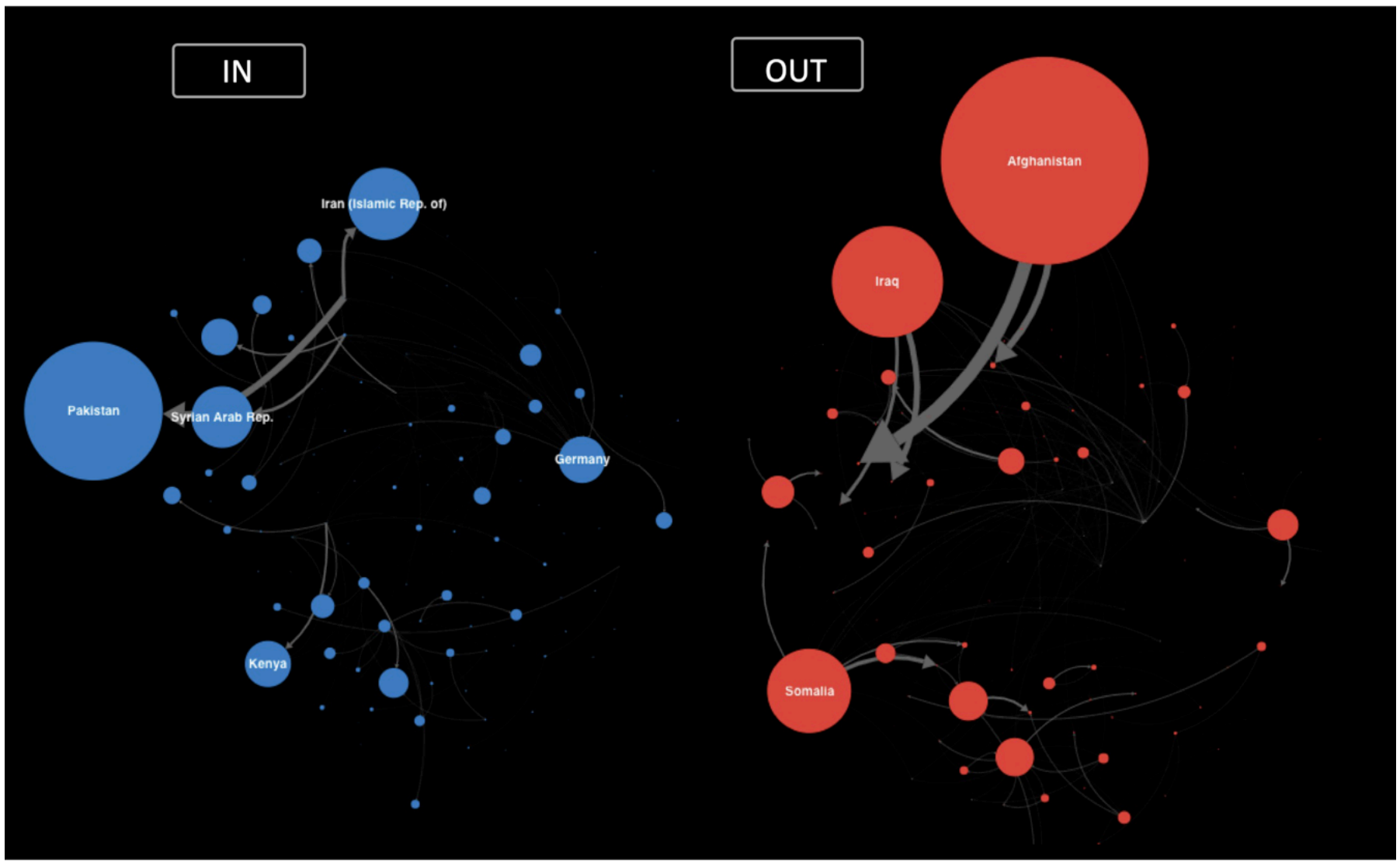
Top three countries with the highest closeness

refugees.degin	refugees.degout	refugees.bet	refugees.close	country	hf_scorec	life_expectancy_women	life_expectancy_me
131243	1163	0	6.26e-05	United Rep. of Tanzania	110	60	5

990	337829	0	6.03e-05	Viet Nam	128	77	7
105023	1	0	5.92e-05	South Sudan	158	64	6

Top three countries with the highest betweeness

refugees.degin	refugees.degout	refugees.bet	refugees.close	country	hf_scorec	life_expectancy_women	life_expectancy_
755445	19931	6765.865	5.70e-05	Syrian Arab Rep.	162	78	
8990	15013	6335.779	5.70e-05	Lebanon	88	75	
74598	64	5703.032	5.65e-05	Netherlands	11	83	



Analyzing the refugees data, we compared again the ranking of countries sending and receiving more refugees. But even more interesting was understanding how to interpret other centrality measures like betweenness: in this context, a country with high betweenness represent a “transitory” country.
Syria was acting as a transit country bridging 77 countries with a total of 775 refugees in transit.
As we identified is the case for Syria due to their strategic geographical location, they acted as refugee gateway to connect countries from Middle East to Europe. Their borders with the Mediterranean Sea and more than 5 countries can also explain this behavior.

Here we have a table all the countries Syria is bridging as a transit country , we are showing five not to have a long table.

Countries with refugees coming from or leaving to Syria

country	continent	hf_scorec	life_expectancy_women	life_expectancy_men
Afghanistan	Asia	161	49	49
Algeria	Africa	155	75	72
Armenia	Asia	54	77	71

Australia	Oceania	5	84	80
Austria	Europe	13	84	78

ASYLUM SAFE HAVEN

Node importance: Centrality measures for Asylum seekers

Top three countries with the most asylum-seekers going out

asylum.degin	asylum.degout	asylum.bet	asylum.close	country	hf_scorec	life_expectancy_women	life_expectancy_men
0	283849	0.0000	7.90e-06	Various	1	83	79
1136	52324	119.7675	6.39e-05	Dem. Rep. of the Congo	152	51	47
120	42587	895.2438	6.38e-05	Colombia	71	78	70

Top three countries with the most asylum-seekers going in

asylum.degin	asylum.degout	asylum.bet	asylum.close	country	hf_scorec	life_expectancy_women	life_expectancy_men
219368	214	2533.186	6.42e-05	South Africa	64	54	53
62680	32	2967.356	6.35e-05	Germany	8	83	78
49240	54	0.000	6.49e-05	France	33	85	78

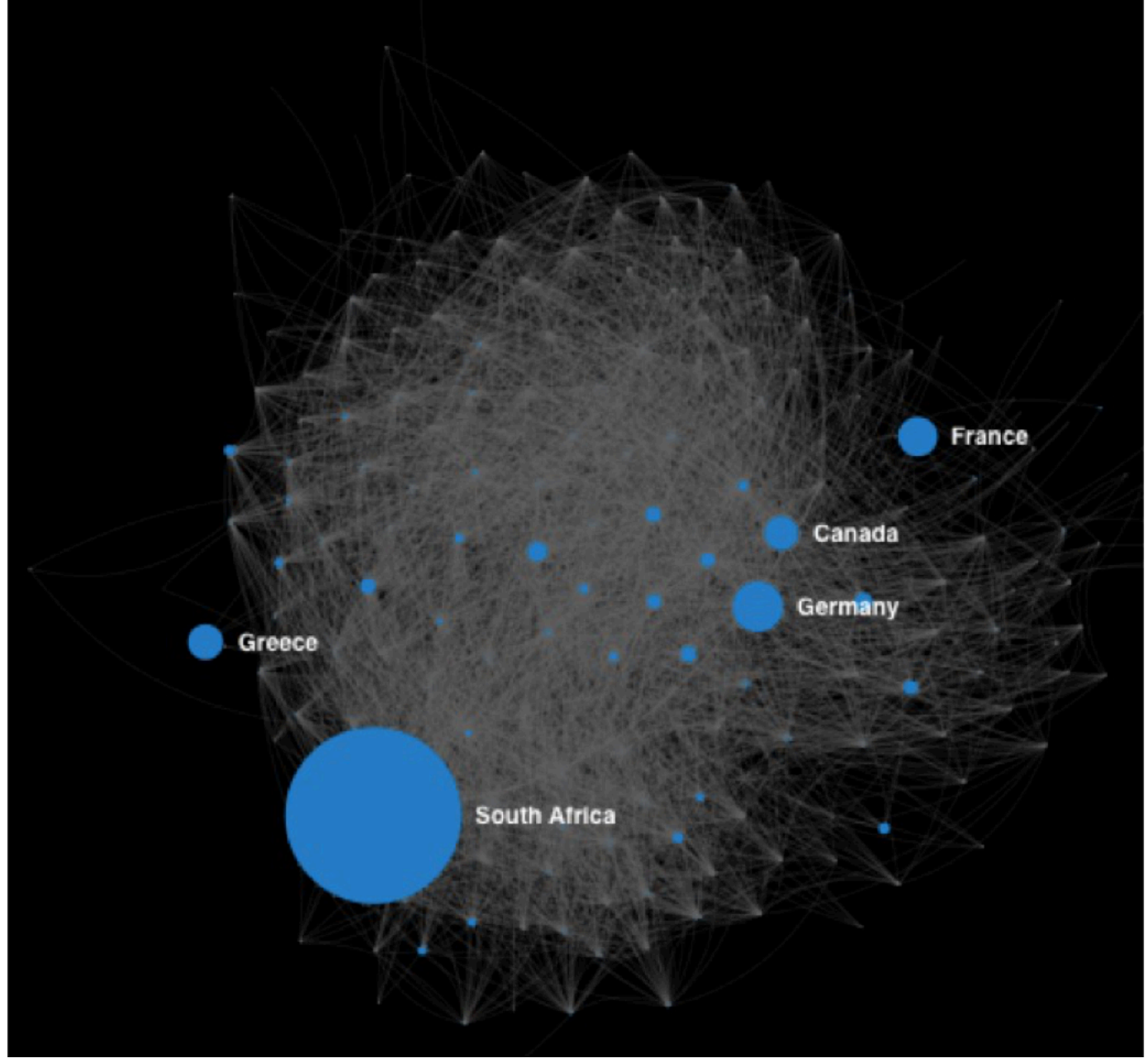
Top three countries with the highest closeness

asylum.degin	asylum.degout	asylum.bet	asylum.close	country	hf_scorec	life_expectancy_women	life_expectancy_men
0	1780	0	6.50e-05	Palestinian	143	75	72
0	33	0	6.49e-05	Comoros	94	63	60
49240	54	0	6.49e-05	France	33	85	78

Top three countries with the highest betweeness

asylum.degin	asylum.degout	asylum.bet	asylum.close	country	hf_scorec	life_expectancy_women	life_expectancy_men
11721	605	6381.653	6.40e-05	United States of America	17	81	76
23453	1985	3895.107	6.43e-05	Uganda	88	55	54
3298	2501	3461.841	6.46e-05	Cameroon	143	54	51

We see that south africa has the highest in degree so we want to check the countries that went to south africa South Africa has ID = 125



The highest weighted-in degree for asylum seekers is with South Africa with 220 000. Many asylum-seekers originated from Somalia, the Democratic Republic of Congo (DRC), Rwanda, Burundi, Ethiopia and Zimbabwe fleeing repressive regimes and internal conflicts.
Typically, one would expect a developed country to have the highest degree however, having conducted further research (Marang), South Africa is a party to the 1951 Refugee Convention relating to the Status of Refugees, its 1967 Protocol and the 1969 OAU Convention regarding Specific Aspects of Refugee Problems in Africa. Moreover, South Africa is also the only country in Southern Africa that has not entered reservations to the 1951 Refugee Convention and has fully embraced international standards of refugee protection in its national legislation, the Refugee Act of 1998.
The primary reason for the open refugees and asylum policies are that many African countries became safe-havens for freedom-fighters during Apartheid. In South Africa there is culture which says “Umntu ngumntu ngabanye abantu.”, which translates to “I am what I am, because of who we are.” This philosophy is ingrained in South African culture, despite South Africa not having the requisite infrastructure and human freedom index.

Here we have a table all the countries with asylum seekers going to South Africa, we are showing five not to have a long table.

Countries leaving to seek asylum in South Africa

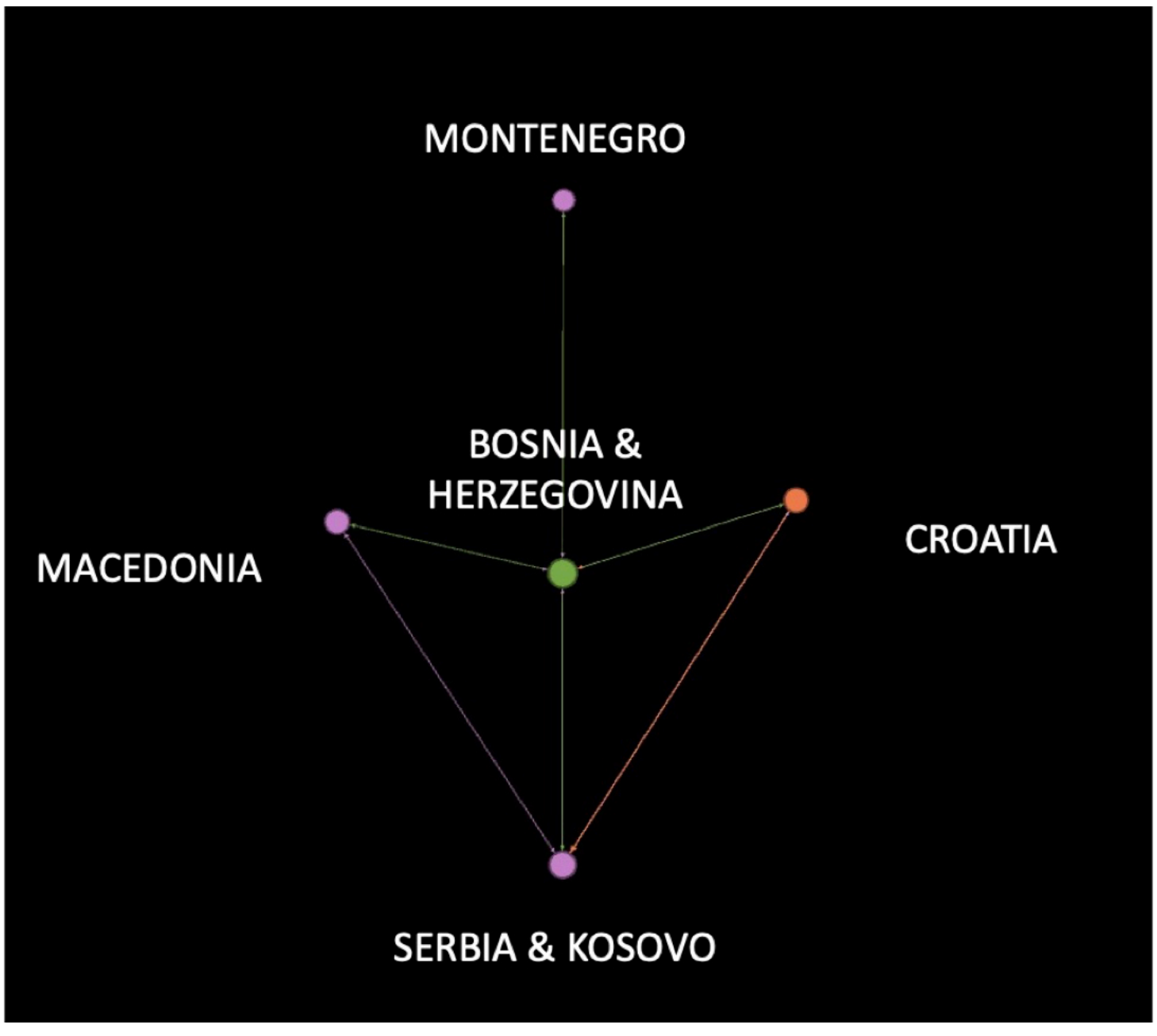
country	continent	hf_scorec	life_expectancy_women	life_expectancy_men
Afghanistan	Asia	161	49	49
Algeria	Africa	155	75	72
Angola	Africa	151	53	50
Bangladesh	Asia	138	70	69
Benin	Africa	85	59	55

Community Dynamics.

The goal of our community detection is to identify characteristics of the communities that have been broken but are subsequently rebuilt. The strength of the detected communities can be detected by its modularity however increasing the modularity is becomes. We utilized the attributes (population, Human Freedom Index Ranking, Life Expectancy for men and Women) as previously defined on the nodes, to execute an effective community detection analysis with the Leiden and Louvain algorithm first with the Constant pots Model, then with Modularity. They both resulted in 26 communities and validated each other’s approach. However, upon further analysis, we identified that some communities were nascent, but

negligible and so misleading. We subsequently employed DBScan.
DBSCAN clustering has been implemented for the task of detecting the outliers in the process of detecting the communities in this refugee social network, and these outliers “noisy nodes”, are removed from the main formed network graph.

This resulted in four different clusters with similar profiles connected with each other. However, this also produced a detached cluster with high transitivity and reciprocity. Upon further review, this represented the countries of the former Yugoslavia: Serbia & Kosovo, Bosnia & Herzegovina and Macedonia. Exploring further literature about this region, we found that because of the Yugoslavia wars in the mid 90’s and subsequent internal conflicts, many families who were displaced after the dissolution of Yugoslavia, are reformed in countries of the similar hue. From death, until rebirth.



Conclusion

With this social netwrok analysis of the forced migrants, we have been able to dispell the eurocentric notion of the refugee crisis. Moreover, it is about rethinking our humanity.