IMPLEMENTING GIS IN STRATEGICAL PLANNING OF ELECTION CAMPAIGN

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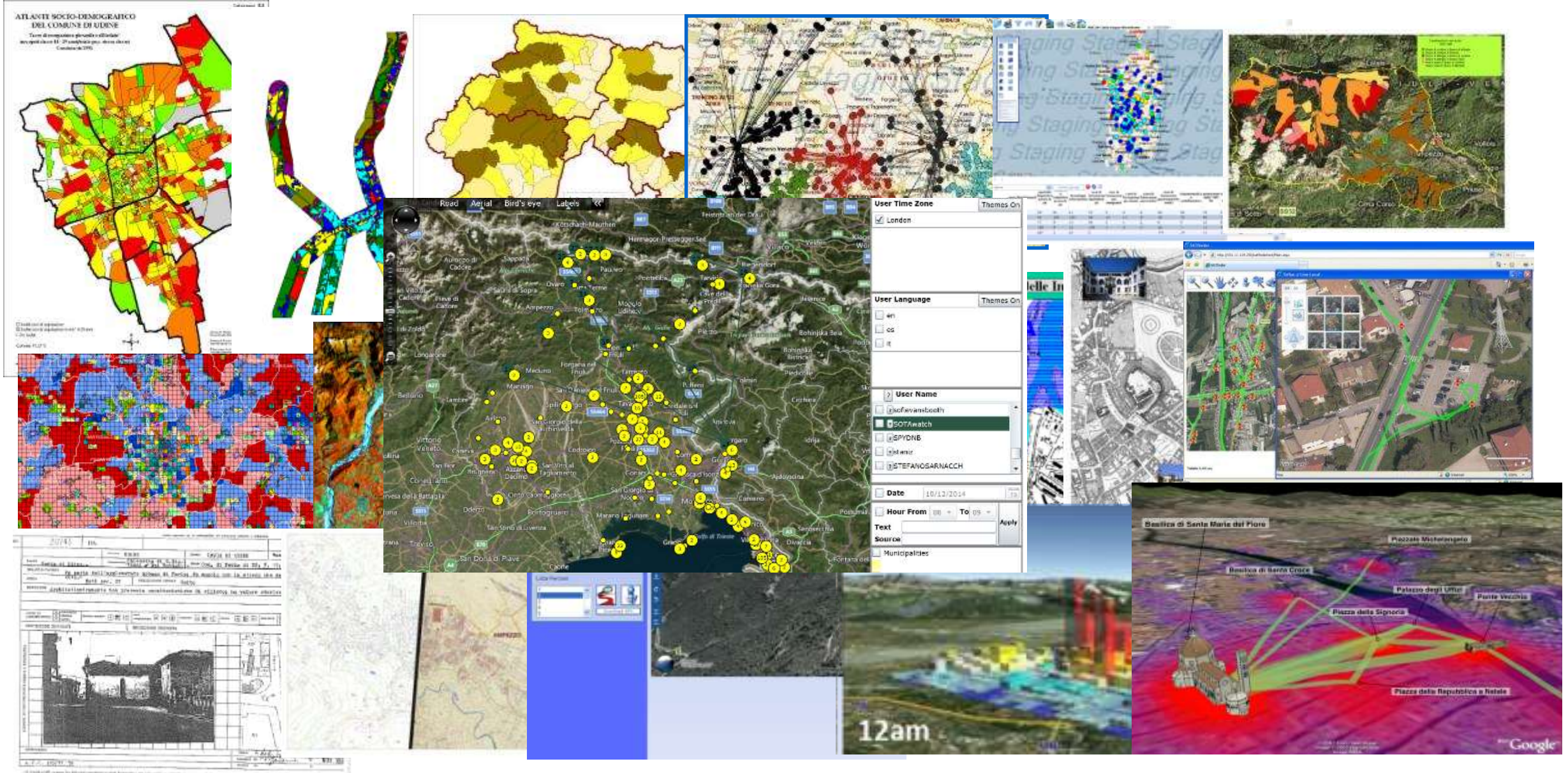
INTRODUCTION

- **ELECTIONS** are the spinal cord for congenial functioning of any democratic country.

- The traditional methods of broadcast campaigning of giving ads on TVs and Radios, printing campaign posters, going door-to-door etc. fetched votes in the past and not in recent times.

- In recent times, it becomes necessary to use **targeted approach** which uses **demographic, socio-economic and geographic data** to contact the individuals and converse with them on the things which affects them the most based on their characteristics influenced by these data.

- One such data driven technology, **Geographic Information System (GIS),** can bring a powerful paradigm shift in political campaigning.

- This location based mapping technology help us locate the clusters of voters having certain socio-economic and geographic characteristics and their tendency to vote for particular political party on the basis of past elections' results.

FINDING ANSWERS TO ....

1. How GIS can be used to find the socioeconomic and demographic factors which spatially affect the election results of a political party ?

2. Once defined the cluster of voters can GIS support the parties in contacting the right cluster to increase number of votes?

STUDY AREA

Regions of Italy

Municipalities of Friuli-Venezia Giulia

Udine
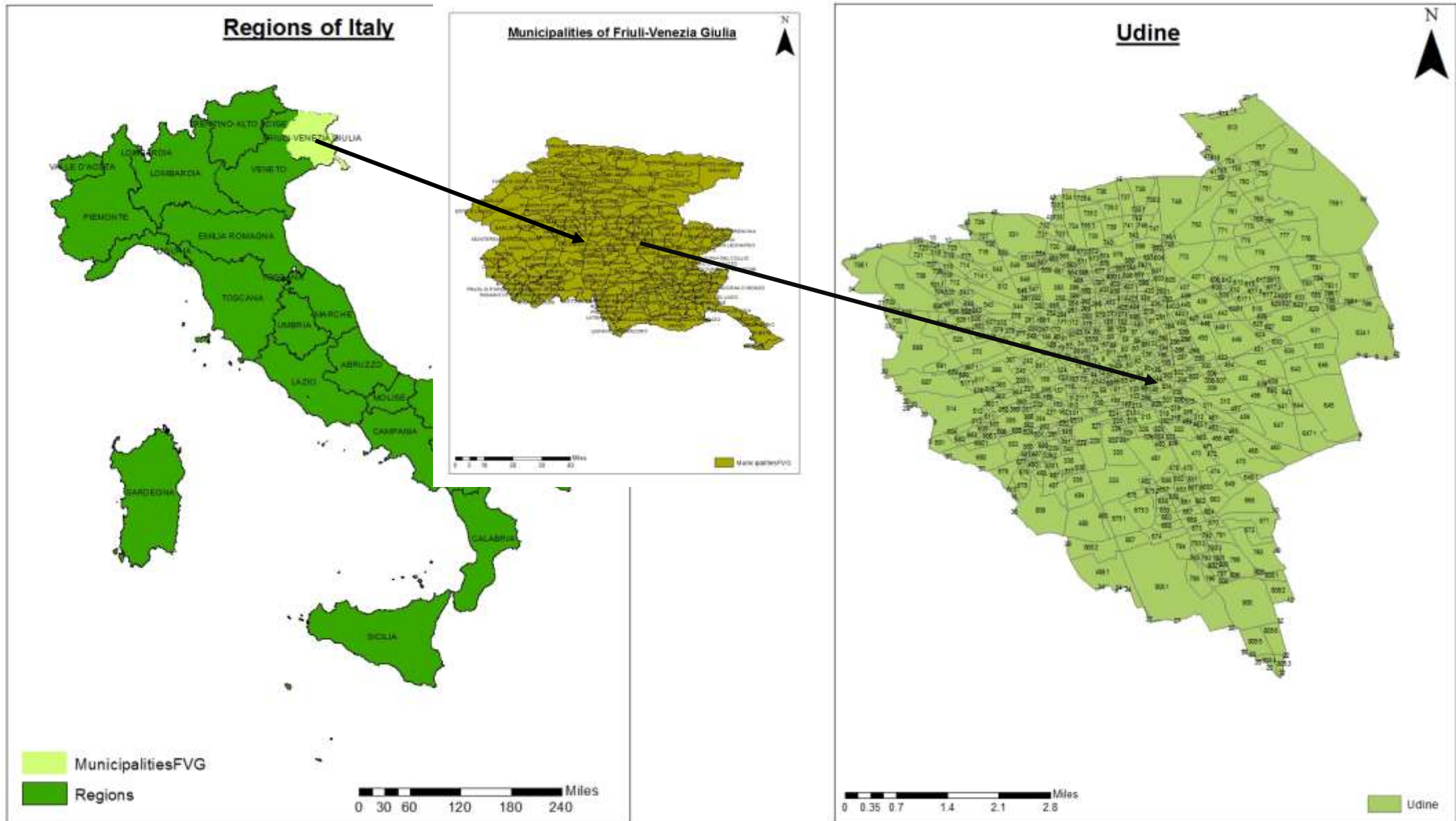
DATA

SHAPEFILES

- Regions of Italy (Polygon)
- Municipalities of Friuli-Venezia Giulia (Polygon)
- Census Section of Friuli-Venezia Giulia (Polygon)
- Roads of Friuli-Venezia Giulia (Line)
- House Numbers of Friuli-Venezia Giulia (Point)
- Polling Stations of Udine (Point) (Projected from .csv file)
- Voters of Udine (Point) (Projected from .csv file)
- Income-Expense data of Udine (Point) (Projected from .csv file)

EXCEL FILES

- Census Data of 2011 for Friuli-Venezia Giulia at a census section level
- Election 2013 Results per Polling station

OTHER DOCUMENTS

- A write up is provided regarding the factors of census data which would play effective role in election campaign by JIM MESSINA.
- A PDF explaining Geo-segmentation of population of country into various classes based on income, education and other characteristics.

METHODOLOGY

CONTENT ANALYSIS AND SELECTING INDICATORS

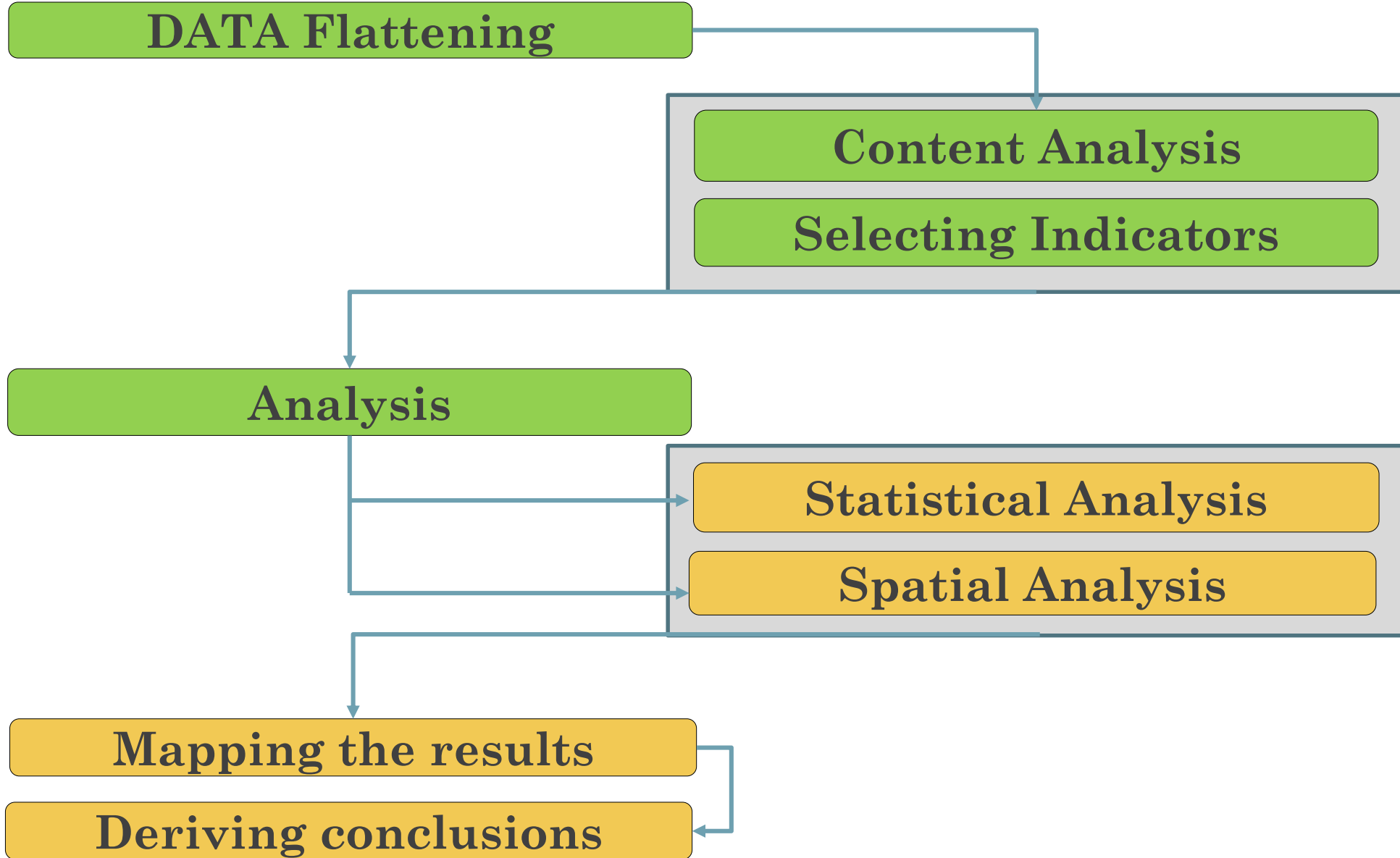**FACTORS** taken into consideration from **VOTERS** file are

VOTERS

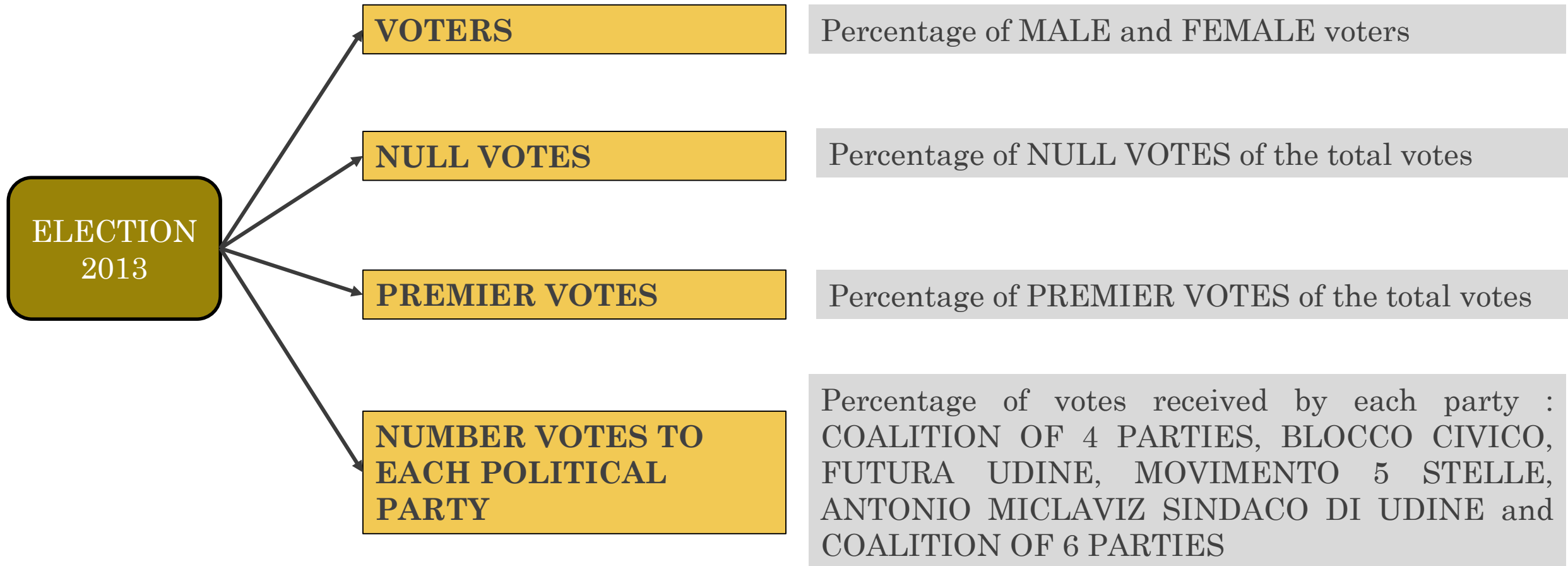| Factor	Description
AGE	Age groups of (0-19), (20-39), (40-59), (60-74) and (>74) years
GENDER	Percentage of Male and Female
MARITAL STATUS	Percentage of Bachelors and Widows
EDUCATION	Percentage residents with Graduate degree, Secondary Diploma degree and low secondary diploma and Primary education
HOUSE OWNERSHIP	Percentage of families with Rented and Owned accommodation
FOREIGNERS AND STATELESS PEOPLE	Percentage of Europeans, Africans, Americans, Asians and Oceanians
EMPLOYMENT	Percentage of population belonging to workforce (above 15 years), Employed (above 15 years), Unemployed (above 15 years)
COMMUTING POPULATION	Percentage of population commuting within municipality of residence and outside municipality of residence for work

CONTENT ANALYSIS AND SELECTING FACTORS

FACTORS taken into consideration from **INCOME-EXPENSE** file are
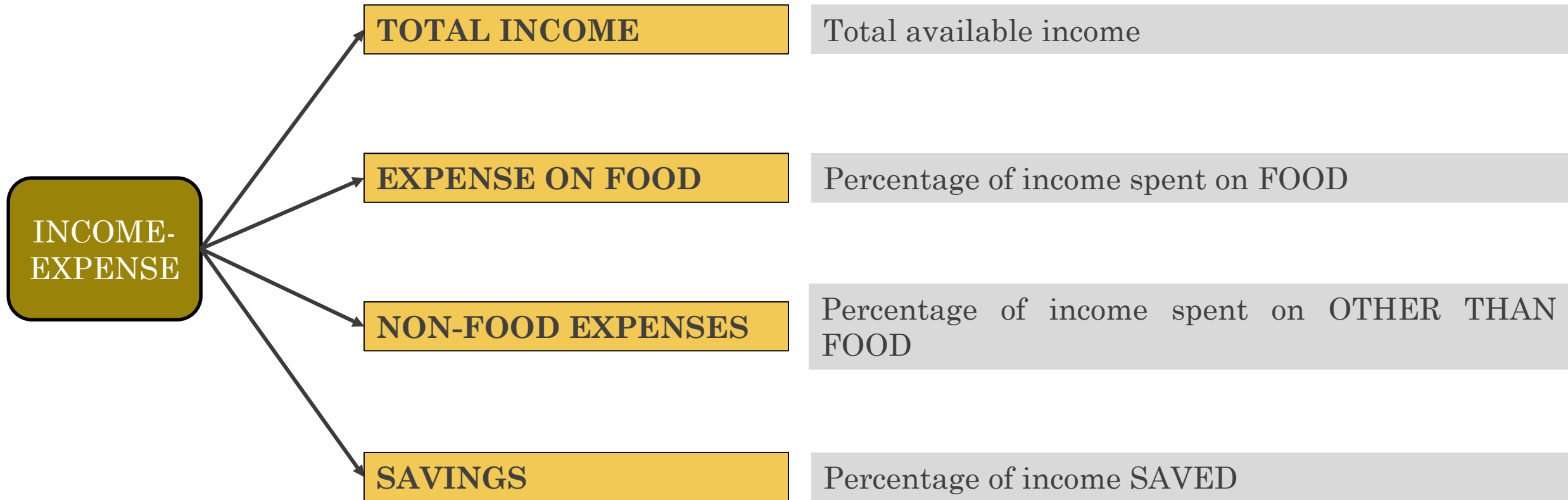
CONTENT ANALYSIS AND SELECTING FACTORS
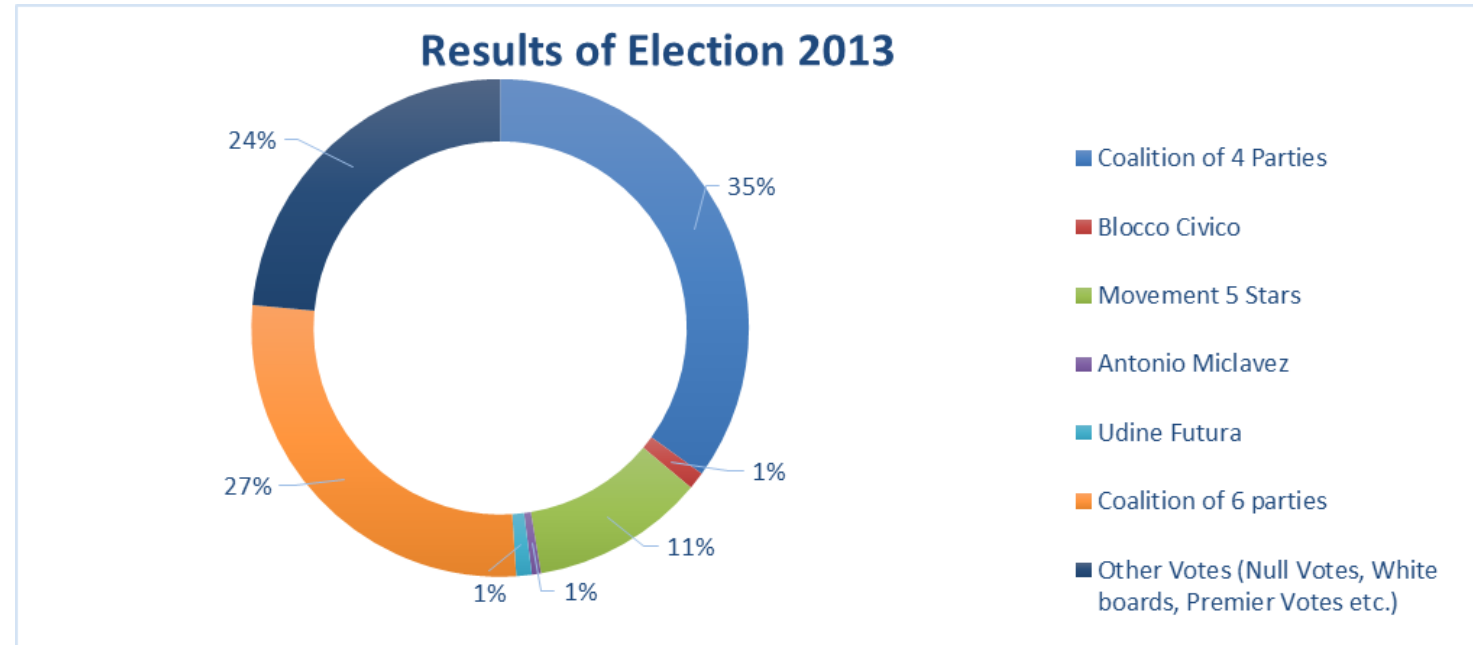
FACTORS taken into consideration from **ELECTION 2013** file are

ELECTION 2013

VOTERS — Percentage of MALE and FEMALE voters

NULL VOTES — Percentage of NULL VOTES of the total votes

PREMIER VOTES — Percentage of PREMIER VOTES of the total votes

NUMBER VOTES TO EACH POLITICAL PARTY — Percentage of votes received by each party : COALITION OF 4 PARTIES, BLOCCO CIVICO, FUTURA UDINE, MOVIMENTO 5 STELLE, ANTONIO MICLAVIZ SINDACO DI UDINE and COALITION OF 6 PARTIES

DATA FLATTENING

Voters and Polling Stations

Polling Stations
Votersnew
Udine

LATTENING we get is a POINT SHAPE FILE having files VOTERS, CENSUS SECTIONS, CENSUS DATA, N 2013

Results of Election 2013

- 24%
- 35%
- 1%
- 11%
- 27%
- 1%
- 1%

Legend:
- Coalition of 4 Parties
- Blocco Civico
- Movement 5 Stars
- Antonio Miclavez
- Udine Futura
- Coalition of 6 parties
- Other Votes (Null Votes, White boards, Premier Votes etc.)

ANALYSIS

The analysis of data consist of two parts

- **Bivariate Correlation (Statistical Analysis)**

Correlation coefficient (Pearson's correlation, for short) is a measure of the strength and direction of association that exists between two variables measured on at least an interval scale. IBM SPSS Statistics 24 is used to find this correlation between each indicator and number of voter received by particular political party.

- **Ordinary Least Squares (Spatial Analysis)**

Ordinary Least Squares (OLS) linear regression generate predictions or models a dependent variable in terms of its relationships to a set of explanatory variables. Ordinary Least Square tool of ArcMap 10.3 is used for performing this operation.

ANALYSIS : COALITION OF 4 PARTIES

Total indicators	Coalition of 4 Parties
% MALE population	0.131
% FEMALE population	-0.131
% BACHELORS/SPINSTERS	0.018
% WIDOWER/WIDOW	-0.154
% >74 years	-0.206
% 0-19 group	0.105
% 20-39 group	0.086
% 40-59 group	0.175
% 60-74 group	-0.090
% population with GRADUATE DEGREE	-0.125
% population with SECONDARY DIPLOMA	0.103
% population living with LOWER SECONDARY DIPLOMA	0.043
% population with PRIMARY EDUCATION	0.021
% Pop belonging to workforce (15&above)	0.154
% Pop employed (15&above)	0.172
% Pop unemployed (15&above)	-0.036
%Pop commutes within municipality	0.151
%Pop commutes outside municipality	0.167
% FOREIGNERS and STATELESS population	-0.122
% EUROPIANS on total population	-0.062
% AFRICANS on total population	-0.137
% AMERICANS on total population	-0.035
% ASIANS on total population	-0.077
% families with RENTED accommodation	-0.166
% families with OWNED accommodation	0.193
Available INCOME of families	0.005
FOOD consumption of families	0.003
NON FOOD consumption of families	0.006
Savings	-0.002
% MALE voters	0.332
% FEMALE voters	-0.332

Correlation of each GENERAL INDICATORS of the data was calculated with the number of Votes received by Coalition of 4 Parties

The highlighted indicators have the higher value of Correlation coefficient.
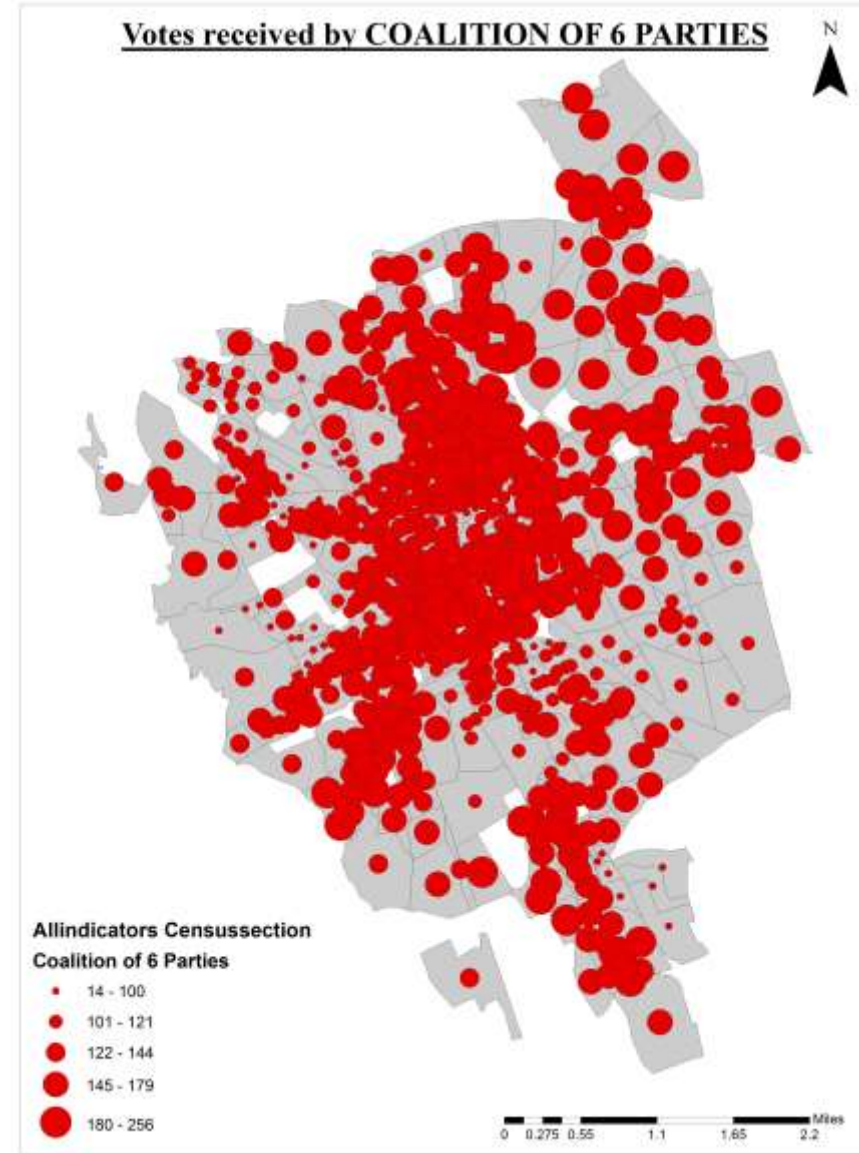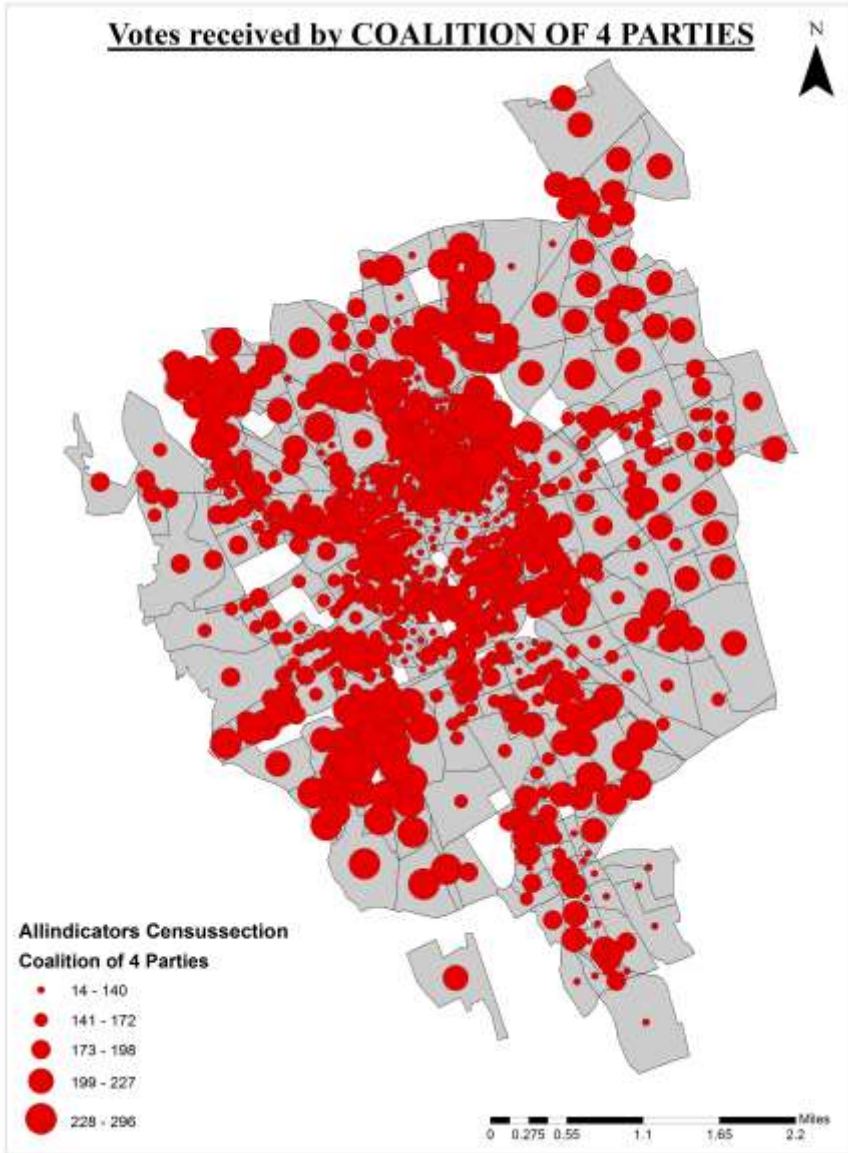
ANALYSIS : COALITION OF 4 PARTIES

Now in order to increase the model performance, the indicators were bifurcated into MALE and FEMALE

	Total_Votes_of_4_Coalition_parties
Total_Resident_population	0.051
%_MALE_population	0.105
%_BACHELORS/SPINSTERS	0.021
%_WIDOW/WIDOWER	-0.123
%_>74_years	-0.177
%_0-19_group	0.089
%_20-39_group	0.074
%_40-59_group	0.158
%_60-74_group	-0.090
%_population_with_GRADUATE_DEGREE	-0.131
%_population_with_SECONDARY_DIPLOMA	0.088
%_population_living_with_less_than_AVERAGE	0.039
%_population_with_PRIMARY_SCHOOL	0.046
%Pop_belonging_to_workforce(15&above)	0.129
%Pop_employed(15&above)	0.150
%Pop_unemployed(15&above)	-0.041
%Pop_commutes_within_municipality	0.130
%Pop_commutes_outside_municipality	0.155
%_FOREIGNERS_and_STATELESS_population	-0.125
%_EUROPIANS_on_total_population	-0.066
%_AFRICANS_on_total_population	-0.142
%_AMERICANS_on_total_population	-0.035
%_ASIANS_on_total_population	-0.074
%_families_with_RENTED_accomodation	-0.160
%_families_with_OWNED_accomodation	0.185
Available_INCOME_of_families	0.005
FOOD_consumption_of_families	0.005
Total_SAVINGS_of_families_in_2004	-0.002
%_MALE_voters	0.321
%_PREMIER_VOTES	-0.100

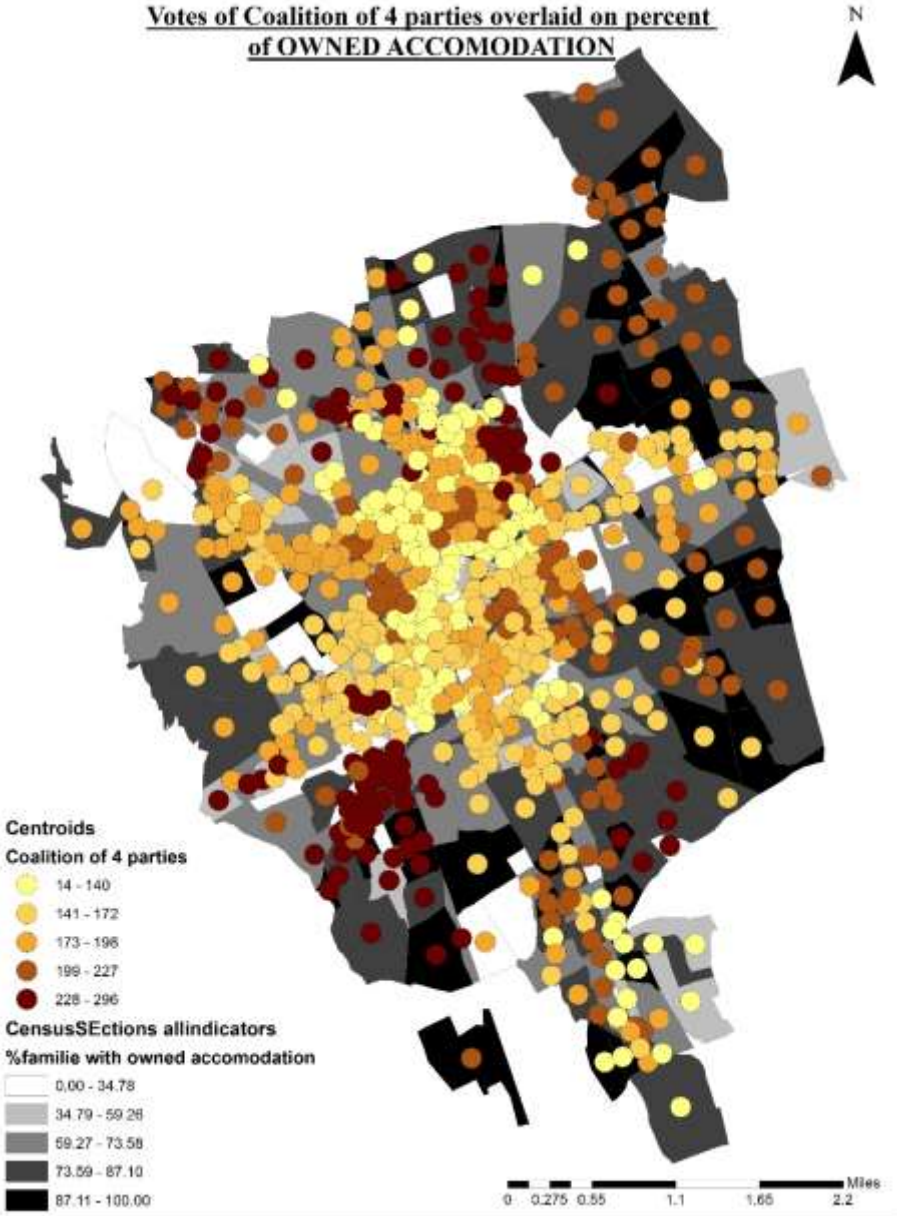|	Total_Votes_of_4_Coalition_parties
Total_Resident_population	0.049
%_MALE_population	0.152
%_BACHELORS/SPINSTERS	0.015
%_WIDOW/WIDOWER	-0.178
%_>74_years	-0.228
%_0-19_group	0.117
%_20-39_group	0.095
%_40-59_group	0.188
%_60-74_group	-0.089
%_population_with_GRADUATE_DEGREE	-0.120
%_population_with_SECONDARY_DIPLOMA	0.115
%_population_living_with_less_than_AVERAGE	0.047
%_population_with_PRIMARY_SCHOOL	0.001
%Pop_belonging_to_workforce(15&above)	0.173
%Pop_employed(15&above)	0.190
%Pop_unemployed(15&above)	-0.032
%Pop_commutes_within_municipality	0.168
%Pop_commutes_outside_municipality	0.177
%_FOREIGNERS_and_STATELESS_population	-0.118
%_EUROPIANS_on_total_population	-0.059
%_AFRICANS_on_total_population	-0.133
%_AMERICANS_on_total_population	-0.035
%_ASIANS_on_total_population	-0.079
%_families_with_RENTED_accomodation	-0.171
%_families_with_OWNED_accomodation	0.199
Available_INCOME_of_families	0.005
FOOD_consumption_of_families	0.001
Total_SAVINGS_of_families_in_2004	-0.002
%_FEMALE_voters	0.340
%_PREMIER_VOTES	-0.087

MAPPING THE RESULTS

The numbers of Votes received by each party in different census section shown with graduated symbol

Votes received by COALITION OF 4 PARTIES

Allindicators Censussection
Coalition of 4 Parties
- 14 - 140
- 141 - 172
- 173 - 198
- 199 - 227
- 228 - 296

Votes received by COALITION OF 6 PARTIES

Allindicators Censussection
Coalition of 6 Parties
- 14 - 100
- 101 - 121
- 122 - 144
- 145 - 179
- 180 - 256

Votes of Coalition of 4 parties overlaid on percent of OWNED ACCOMODATION

The CO4P in the sections with high %FAMILIES WITH HOME OWNERSHIP receives high % of votes. Census sections where %FAMILIES WITH HOME OWNERSHIP is 40% to 60%, receives low% of votes

The CO4P in the sections with low %MALE GRADUATES receives high % of votes. Census sections where %MALE GRADUATES is 4% to 10% receives low % of votes

Votes of Coalition of 4 parties overlaid on percent of MALE GRADUATES
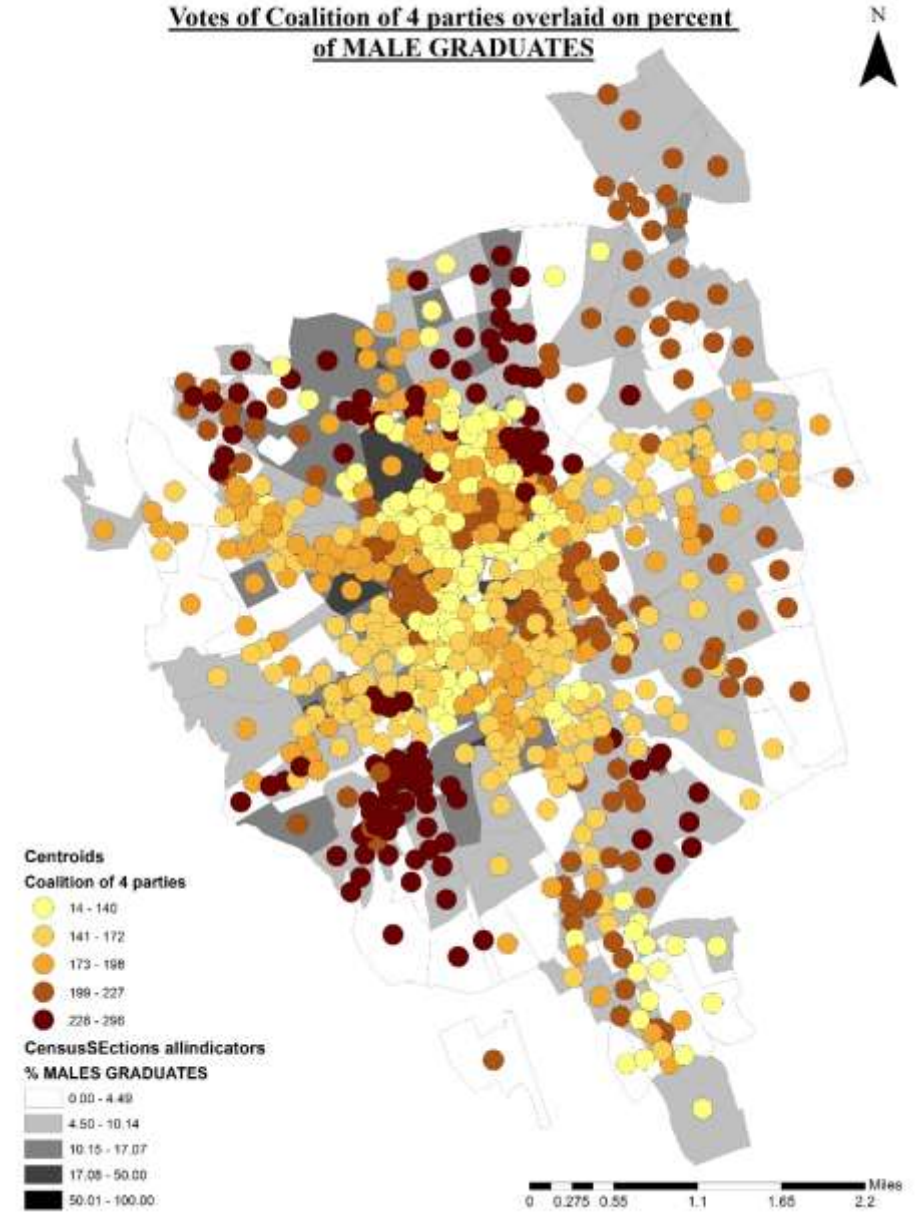
FUTURE SCOPE OF WORK

- Finding other socio-economic and non-socio-economic factors which can better explain variation in our dependent variable

- We have used for this study the results of the pool 2013, we will integrate with further historical elections data to improve the precision of the model.

THANK YOU