Social choice: locating public facilities & voting in a large electorate

Valorisation

Valorisation of learning or innovation exchange and can be defined as:

The procedure of significant worth creation out of learning, by making this information reasonable and accessible for monetary or societal use and to make an interpretation of this into high-potential items, administrations, forms and mechanical action. Valorisation is not just about 'money', but rather about effect that can be made through the exchange of logical learning. Aside from commercialising your development through a turn off organization, patent, or permit, there are numerous approaches to have effect, for instance through the exchange of learning to human services associations, by making information and ability accessible for other (societal) associations and by conveying your insight to the overall population.

This thesis broadly studies how to aggregate preferences or opinions of people in a society. In the first part of this thesis we study the issue of selecting locations for public facilities within a region. In real life a social planner has to decide where to locate such public facilities taking into account the preferences of people in the concerned region. So, the planner must have a rule which he applies while deciding the location. This thesis studies which rules are possible to achieve the desired result. Furthermore to make this choice non manipulable by anyone in the society we impose a condition called strategy-proofness, which ensures that truthful reporting of preferences is weakly dominant strategy for each member in the region under consideration. We also put some additional properties which

are particular to the specific location problem.

In the second chapter we study where to locate a public good(bad) on a sphere. Considering earth as a sphere this study is easily applicable in real life. Notice that the public good(bad) in this context has to be global in effect. Global public goods are products with benefits as well as costs that possibly reach out to all nations, individuals, and eras. Global public goods are in a double sense open: they are open rather than private; and they are worldwide instead of national. For instance, greenhouse gasses must not rise and weight the air to the degree they do. The majority of this is today a matter of policy choice. Another modern life example is to choose a location for a huge data center for keeping all human knowledge safe and secure. On the other hand global public bads are also required for mankind but they have negative externalities. For instance, to locate a nuclear experiment center which is much larger than the Large Hadron Collider. This might be required for the advancement of quantum physics but it could also be potentially risky to the neighbourhood. Interesting aspect of this chapter is that the result for public goods applies to for public bads.

We can apply the results from chapter three in a situation where for example, the municipality of Maastricht wants to locate two libraries. People in Maastricht are asked to report their preferences. This is also applicable if the municipality wants to locate two hospitals or two sports centres but not if they want one hospital and one sports centre. So, two public facilities must be identical. Here, we characterise a set of rules that only cares about the most preferred location for everyone in the region.

In part two chapter four we deal with voting problem that appears in a nation-wide election. As we know that a major election reform is happening in Italy as parliament approves new law. The main issue in Voting is to choose a voting method that satisfies many properties. But every voting method has some disadvantages. We tackle this situation in a different manner. We treat voters preferences as frequency distributions. Any such frequency distribution can be written as a so called multimodal frequency distribution. We study unimodal frequency distributions which are building blocks of multimodal distributions. We show that under a unimodal distribution candidate with highest frequency must be chosen by any existing voting rule. Aggregation of several unimodal distributions result in a multimodal distribution. It is possible to predict the outcome from a multimodal distribution by studying its unimodal components. Thus this study shows a possibility of having a general voting method which can be applied in reality.