COS 4807 Assignment 1

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1 Abstract

hello

2 Introduction

Human attempts to mathematically predict life expectance is not a new endeavour. Gompertz (1825) introduced an equation to predict life expectancy, which was modified in Makeham (1860) to create the famous Gompertz−Makeham law.

Why use machine learning? find relationships that regression analysis cannot Chen & Asch (2017).
Machine learning is used in medicine Chen & Asch (2017).
life expectancy vs mortality rate?
Rajkomar et al. (2018) Google uses machine learning to predict in hospital medical events for patients.

3 Literature Review

Forecasting Mortality in Developed Countries Tabeau 2001

3.1 ?Grossman?

2017 determinants of health: an economic perspective ???? 1972 The Demand for Health: A Theoretical and Empirical Investigation,
Grossman (2000)

3.2 Life expectancy projections

The United Nations use a Bayesian model to predict future life expectancy (Raftery et al. 2014).
Lee Carter method Shang et al. (2011) later extended into the Li-Lee model
Siminal work Lee & Carter (1992)
Bongaarts (2005)

3.3 Determinants of life expectancy

3.3.1 Income

The relationship beteen income and life expectancy has been given a lot of attention in academic circles (Preston 1975, Hu et al. 2015, Chetty et al. 2016, Oeppen 2019).
Kalwij (2014)
Oeppen (2019) Very Good!!
Preston (1975) is a seminal work according to Oeppen (2019)
inequality Hu et al. (2015)
Chetty et al. (2016) in the US
income inequality does not affect health of a a country Jason Beckfield (2004)
unemployment Bonamore et al. (2015) Roelfs et al. (2011) Roelfs et al. (2015)
Tarkiainen et al. (2012) (To be downloaded)

3.3.2 Education atainment

Kaplan et al. (2015) investigated the relationship between educational atainment and life expectancy in eight states in the United States. They found that even when controlling for variables like income, race, sex and common medical issues like cardiovascular disease, the relationship between educational antainment and life expectance remains statistically significant.

But what is the nature of this correlation? According to Deary & Gottfredson (2004) Inelligence Quotient or IQ could explain the association. While Hayward et al. (2015) does not believe in a "causal relationship" but rather that it depends on factors like "time, place, and the social environment".

Study in Belgium Deboosere et al. (2009)
Inverse relationship Hoque et al. (2019)
netherlands van Kippersluis et al. (2011)
van Baal et al. (2016)

3.3.3 Per capita spending on health

Shaw et al. (2005) showed that pharmaceutical expenditures shows a positive correlation with life expectancy in OECD countries.
medical spending Cutler et al. (2006)

3.3.4 Access to safe drinking water

3.3.5 Infant mortality

Centers for Disease Control & Prevention (1999)

3.3.6 Turmoil

(Low et al. 2008) p211

3.4 The gender gap

Rochelle et al. (2015)

4 Methodology/Procedure

There are many studies that attempt to extrapolate future life expectancy for countries based on current data. This includes studies for high income countries (Kontis et al. 2017) and low income countries ????cite.

This study will attempt to create a model that can predict life expectancy for a country based on various socio-economic conditions in the country.

segment data into groups where each group has the same amount of data points???

Unlike Shaw et al. (2005), this study will not take into account the age distribution of eacmh country.

As for HDI from Bulled & Sosis (2010) Adult literacy rate

primary secondary and tertiary enrolment ratios

GDP per Capita (Purchasing power parity)

4.1 Choice of dataset

4.2 Regression

4.3 k-Nearest Neighbour

4.4 Support Vector Machines

4.5 Cross-validation

5 Analysis

6 Conclusion

7 Recommendations

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8 Appendices