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Unveiling the Landscape of Happiness Prediction with Machine Learning: A PRISMA-Guided Systematic Review

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Abstract

This state-of-the-art paper includes a detailed systematic literature review using the PRISMA of Prediction Techniques used to predict the happiness of humans or nations. It is said that the most significant aspect of life is Happiness. Machine learning performs well at predicting the happiness index, having achieved success in areas such as weather prediction, image processing, fraud detection, sound prediction, and health care. In this paper, a systematic mapping survey is conducted to predict the happiness index using machine learning techniques, covering the period from 2018 to 2023. This study also includes scales and questionnaires for measuring happiness. Academic works are reviewed that suggest, illustrate, and analyse happiness measurement scales and questionnaires. After compiling a pool of 250 papers and applying a set of inclusion and exclusion criteria, a final pool of 150 relevant papers is obtained. Finally, the review concludes with an overview of the literature on an individual's happiness from an analytical perspective and discusses the measurement scales and questionnaires used in predictive models. Therefore, the primary purpose of this study is to analyse previous work on predicting happiness and the scales used for prediction.

Keywords: Happiness Prediction, Machine Learning, Measurement Scales, Systematic Mapping, WHR.

1. Introduction

Happiness is the secret to inner peace of mind. Happiness has many definitions among philosophers and researchers, which is why it isn't easy to measure an individual's or a nation's happiness. Research on happiness has attracted greater attention in recent years. Therefore, researchers are developing, investigating, and documenting a wealth of knowledge about the factors contributing to happiness. The factors affecting happiness are income, education, living conditions, health, family and so on(You, 2021). Measuring a nation's happiness is not easy because the meaning and definition of happiness vary from person to person.

P.L. Roy developed the Happiness Index (HI) in the year 2000. HI makes it easier to measure a nation's population's happiness. The primary data source for the World Happiness Report (WHR) is the Gallup World Poll, which collects data through survey methods. The Gallup

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World Poll typically includes over 100,000 participants from 130 countries (*FAQ | The World Happiness Report*, n.d.). However, the number of participants and countries in the survey varies over the year. According to WHR, six factors affect happiness. These factors are GDP per capita, Healthy life expectancy, social support, Generosity, Freedom to make life choices and Perception of corruption (*World Happiness Index and Its Six Factors - 577 Words | Report Example*, n.d.).

Researchers interested in social development issues still find it challenging to conduct studies on happiness. The issues involved with this topic can be addressed, and future studies can be aided by using Data Science and Machine Learning (ML) methods to model and analyze happiness predictions.

In the field of AI and ML, researchers are working to predict human happiness using techniques such as Regression, Support Vector Machines (SVMs), Decision Trees (DTs), Random Forests (RFs), and other predictive methods. An analytical method for analyzing happiness can better elucidate causal links over time, assisting national leaders in adopting policies that promote their country's welfare, because a country's development index cannot determine national happiness. The landscape of happiness prediction using machine learning has evolved significantly over the past decade, showcasing diverse methodologies and applications across various fields. This systematic literature review highlights key trends, models, and findings that advance understanding of happiness through data-driven approaches. In this systematic review, the papers are classified into two categories: predicting happiness using Machine Learning and measuring happiness using scales.

2. Systematic Review Mapping Approach

This section presents the mapping approach for the systematic literature review. The most essential beginning point for any systematic mapping study is to develop research questions (RQs) and mapping questions (MQs). The following MQs and RQs are prepared and discussed in the subsequent sections.

MQ1: How have inclusion and exclusion criteria been applied to compile a pool of relevant research papers on happiness prediction with ML?

MQ2: Which major publishers were considered for the study?

RQ1: What types of scales and questionnaires are developed to measure happiness?

RQ2: What ML predictive models and techniques are currently used for happiness prediction?

RQ3: What are the most commonly used datasets in the same domain?

3. Systematic Review Mapping Report

This section presents the systematic mapping of research articles. The MQs, as mentioned above, are addressed in this section, demonstrating the step-by-step selection of research papers for systematic literature reviews.

3.1 MQ1: How have inclusion and exclusion criteria been applied to compile a pool of relevant research papers on happiness prediction with ML?

A total of 250 papers on happiness prediction published from 2018 to 23rd May 2023 were considered to find relevant documents. 20 research papers and 3 web pages were ultimately chosen for this literature study. After removing duplicate documents (N = 100) from the published works (N = 250), only 150 publications were left for screening. After screening the research articles by title and abstract, only 23 documents remained. Figure 1 depicts the flowchart of the PRISMA-style depiction used for publication selection in this systematic review. Based on the criteria for being included or excluded, only 20 papers were selected for the final study, and three websites were selected to collect data for the World Happiness Report. The inclusion and exclusion criteria are stated as follows:

Inclusion Criteria (IC):

IC1 Articles published between 2018 and 23rd May 2023;

IC2 Presenting a systematic review of Machine Learning predictive algorithms and happiness index.

IC3 The articles addressed Happiness as a challenge to predict.

IC4 The study discusses the use of Machine Learning in Happiness Prediction.

Exclusion Criteria (EC):

EC1 The study is not written in English.

EC2 The title does not include happiness, Machine Learning, and prediction techniques.

EC3 Excluded the papers that are not available electronically.

EC4 The study has only an abstract.

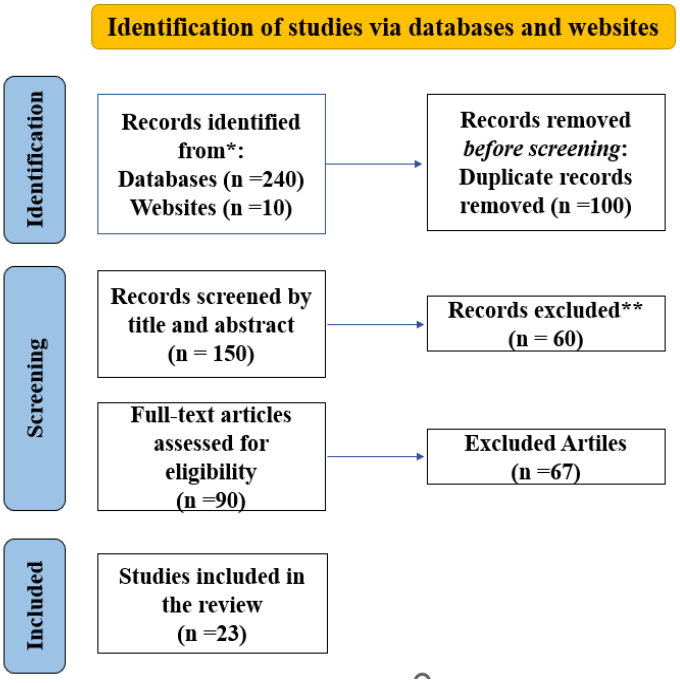

Figure 1: The PRISMA style visualization is adopted in the case of document selection for the literature.

3.2 MQ2: Which major publishers were considered for the study?

For the study, 20 papers and 3 websites were selected from various publishers, including Springer, ScienceDirect, IEEE Xplore, MDPI, Wiley, and PubMed. For the population sample size, WHR is also considered from 2020 to 23rd May 2023. The publisher's paper distribution is shown in Table 1. IEEE, both journals and conferences, publishes 26% of the documents; Elsevier publishes 18% of the articles via its ScienceDirect database; and 56% of the papers are published by other publishers such as MDPI and Wiley.

Table 1: Distribution of papers based on different publishers.

SN	Publication	No. of Papers	Percentage	Databases
1	IEEE Conference & IEEE Journal	6	26%	IEEE Xplore
2	Elsevier Conference & Elsevier Journal	4	18%	Science Direct
3	Others (MDPI, Wiley etc. and web pages)	13	56%	MDPI, Wiley, PubMed, Google Scholar, etc.
Total		23		

4. Systematic Review Based on Machine Learning and Measurement Scales

This section provides an overview of the literature and a discussion of the predictive techniques and scales used to predict happiness in past research.

4.1 RQ1: What scales and questionnaires are developed to measure happiness?

Bhutan's Gross Happiness Scale and the Global Happiness Scale are the most often used. Based on four self-report questions with validity across 14 distinct samples, the Global Happiness Scale is recommended for evaluating individual happiness. The Gross Happiness scale evaluates happiness on a national or global scale, whereas the Global Happiness scale evaluates happiness on an individual scale (Jedhe et al., 2022).

Many psychologists and researchers have developed Happiness scales and questionnaires to measure happiness, such as

1. **The Oxford Happiness Questionnaire**(Hills & Argyle, 2002) It is a modified version of the Oxford Happiness Inventory, comprising 29 items and using a six-point Likert scale to calculate happiness scores.
2. **Satisfaction with Life Scale**(Diener et al., 2010) It is a very short questionnaire with only five questions and a seven-point scoring system.

3. **Subjective Happiness**(Lyubomirsky & Lepper, 1999) It is also a very short questionnaire with only four questions, using a seven-point Likert Scale.
4. **The PANAS**(Watson et al., 1988) includes two subscales measuring negative and positive affect independently, and it is a five-point Likert scale,
5. **Ryff's psychological well-being scale**(Ryff, 1989) It is based on six factors: autonomy, positive relations with others, environmental mastery, purpose in life, personal growth, and self-acceptance. It is a seven-point Likert scale with two versions of the questions. In the first version, there are 18 items; in the second, 42 items/questions.

Table 2: Evaluation measures and findings of the selected research papers.

References	Dataset	Algorithm used	Evaluation Measures	Score	Findings
(You, 2021)	A survey of 10968 random Chinese adults.	Lasso Regression DT RF Gradient Boosting	R-Squared RMSE RMSE RMSE	0.906 0.935 0.609 0.621	Income, health and education are related to happiness. Only analyse some features related to happiness, so need to study more factors affecting happiness.
(Agarwal et al., 2022)	World Happiness Report 2020	DT Linear Regression Gradient Boosting XGBoost	Accuracy	77.76% 97.56% 90.94% 92.13%	Health and economic factors were explored the best predictors of happiness. The best outcome was achieved with Linear Regression, with an accuracy of 97.56%.
(Kong et al., 2021)	China Comprehensive Social Survey (CCSS)	Linear Regression Lasso Ridge Logistic MLP XGBoost KNN	Accuracy	56.22% 77.01% 58.68% 70.63% 77.38% 55.17% 63.50%	Social, family, and individual factors have a greater impact on happiness. The most effective model is boosting. Need to explore the factors deeply affecting happiness.
		Cubist Decision Tree Elastic Net		77.97% 88.26% 77.84%	The proposed stack-based ensemble model was a more accurate indicator of life

(Kaur et al., 2019)	OECD regional statistics	Linear Model Neural Network Random Forest SVM	Accuracy	79.33% 83.33% 86.67% 91.58%	satisfaction, achieving 90% accuracy. Can use meta-heuristic techniques to improve prediction accuracy.
(Prashanthi & Ponnusamy, 2019)	OECD regional statistics	Linear Regression	Accuracy	90%	Can use meta-heuristic techniques to improve prediction accuracy.
(Chakraborty & Tsokos, 2021)	World Happiness Report 2019	Proposed Model Lasso Ridge Elastic Net	RSME	0.31 0.36 0.38 0.36	The proposed model outperformed other models used in the study. Useful for decision-making on controlling the factors that cause unhappiness and depression.
(Dixit et al., 2020)	World Happiness Report 2016-2018	GRNN Deep NN Random Forest XGBoost Ridge Decision Tree	R-squared	0.88 0.86 0.84 0.82 0.75 0.62	10000 different networks were designed to learn, and an average world happiness network was fixed. The relationships among the factors affecting happiness were identified.
(Ma et al., 2020)	WHR from 2015 to 2019	Linear Regression	Accuracy	54%	The economy was the most essential feature affecting happiness. Can employ a neural network.
(Zhang, 2023)	WHR from 2016 to 2021	Linear Regression	Accuracy	77%	GDP was the best predictor of happiness scores in a linear regression model. Can use SVM and Neural Networks in future.
(Nikam, 2021)	World Happiness Report from 2015 to 2021	DT RF KNN Linear Regression	R Square	0.956 0.9979 0.9958 0.9813	Linear Regression fitted the data well and performed better than other models.

(Ibnat et al., 2021)	World Happiness Report 2019	DT RF SMOreg	Root Relative Squared Error	85.80% 82.24% 85.95%	Random Forest performed the best. The most crucial factor for measuring happiness was generosity. Will use more ML algorithms in the future.
(Chaipornkaew & Prexawanprasut, 2019)	A questionnaire was conducted in 2017	DT Multi-layer Perceptron KNN Naïve Bayes	Accuracy	40.18% 41.44% 39.61% 33.93%	The proposed model achieved the best predictive performance with the Decision Tree and RandomOverSampler techniques, achieving an accuracy of 87.66%.
(Tan et al., 2020)	Questionnaire from World Values Survey Database	Linear Regression Ridge Regression Lasso Regression Elastic Net	RMSE	0.34 0.33 0.34 0.33	The most accurate model was Elastic Net. To provide a reference for the Government to improve the happiness level of countries.
(Nayak et al., 2022)	Life expectancy dataset aggregated by the WHO	Linear Regression DT RF	R square	0.84 0.90 0.94	The best accuracy was of Random Forest. Life expectancy increased as living standards improved. Will use COVID-19 data to analyse.
(Khder et al., 2022)	World Happiness Report	Neural Network Random Forest XGB	Accuracy	88.2% 84.3% 68.64%	GDP was one of the primary indicators of life happiness score. Can use more ML approaches in future.

There are many more scales available to measure an individual's happiness. However, the above-mentioned scales and questionnaires are mainly used to predict happiness using ML algorithms.

4.2 RQ2: What ML predictive models and techniques are currently used for happiness prediction?

A large number of studies have been done to predict happiness and which factors affect the happiness of a nation or an individual using Machine Learning approaches like Linear Regression, Decision Tree, Random Forest, Neural Network, Naïve Bayes, KNN and so on.

Table 3 presents the currently used ML techniques for predicting happiness, along with their accuracy and findings.

4.3 RQ3: What are the most commonly used datasets in the same domain?

Datasets used in previous literature reviews are discussed in this section, along with their nature, sample sizes, and associated factors.

Table 2 shows that the most commonly used dataset for predicting happiness is the World Happiness Report from 2012 to 2022. The Gallup World Poll was surveyed to collect the data, and the sample size was very small, as only 1000 people were taken as the sample size from each country(*FAQ | The World Happiness Report*, n.d.). According to WHR, six factors affect happiness. GDP per capita, Healthy life expectancy, Social support, Generosity, Freedom to make life choices, and Perception of corruption are six factors(*World Happiness Index and Its Six Factors - 577 Words | Report Example*, n.d.).

A few studies designed their questionnaires and distributed them to collect data for predicting happiness. Lexin You (You, 2021) surveyed 10968 random Chinese adults, Yu Tan et al.(Tan et al., 2020) used a questionnaire from 20 countries in the World Values Survey Database to predict happiness, Takorn P. and Piyanuch C(Chaipornkaew & Prexawanprasut, 2019) conducted a questionnaire in 2017 and so on. The most used questionnaire by authors in the field of Machine Learning is the Oxford Happiness Questionnaire.

6. Limitations of this Systematic Study

Only English-language publications were considered and examined for the literature survey. Since 99.7% of articles were written in English, publications written in other languages were not considered in this research.

Only Supervised Machine Learning Predictive Techniques were considered in the analysis and discussion.

This paper considered and discussed a limited number of measurement scales. Only focused on the measurement scales that were used in Machine Learning related articles.

Research papers analysing the World Happiness Report were considered to predict Happiness. Several outstanding factors and situations were not considered during the prediction process, which would surely have a significant impact on the happiness indices of specific countries.

7. Conclusion and Future Directions

Five observations emerged from this literature review, each with research opportunities.

First, a systematic review of the prediction of the happiness index was provided using Machine Learning Approaches. The mapping methodology covered mapping aspects, publication trends, and current scenarios.

Second, a detailed discussion of the limitations of this study was presented, which will help researchers identify the research gap.

Third, as most previous articles used the World Happiness Report dataset to predict happiness, one future direction is to explore other datasets or to design a questionnaire to collect data, so that happiness predictions can be conducted efficiently.

Fourth, Supervised Machine Learning Predictive Techniques were considered in most of the research, and future studies using unsupervised and reinforcement algorithms have an opportunity to predict happiness.

Fifth, previous studies considered the factors affecting happiness listed in the World Happiness Report. There is a need to research additional factors to calculate the happiness index more effectively.

REFERENCES

1. Agarwal, T., Mahato, K. D., Azad, C., & Kumar, U. (2022). Predicting Happiness Score during Covid-19 Using Machine Learning. *AIST 2022 - 4th International Conference on Artificial Intelligence and Speech Technology*. https://doi.org/10.1109/AIST55798.2022.10065012
2. Chaipornkaew, P., & Prexawanprasut, T. (2019). A Prediction Model for Human Happiness Using Machine Learning Techniques. *Proceeding - 2019 5th International Conference on Science in Information Technology: Embracing Industry 4.0: Towards Innovation in Cyber Physical System, ICSITech 2019*, 33–37. https://doi.org/10.1109/ICSITECH46713.2019.8987513
3. Chakraborty, A., & Tsokos, C. P. (2021). *A Real Data-Driven Analytical Model to Predict Happiness A Real Data Driven Analytical Model to Predict Happiness*. https://doi.org/10.21203/rs.3.rs-224834/v1
4. Diener, E., Emmons, R. A., Larsem, R. J., & Griffin, S. (2010). The Satisfaction With Life Scale. *Https://Doi.Org/10.1207/S15327752jpa4901_13*, *49*(1), 71–75. https://doi.org/10.1207/S15327752JPA4901_13
5. Dixit, S., Chaudhary, M., & Sahni, N. (2020). *Network Learning Approaches to study World Happiness*. https://arxiv.org/abs/2007.09181v1
6. *FAQ | The World Happiness Report*. (n.d.). Retrieved July 14, 2023, from https://worldhappiness.report/faq/
7. Hills, P., & Argyle, M. (2002). The Oxford Happiness Questionnaire: a compact scale for the measurement of psychological well-being. *Personality and Individual Differences*, *33*(7), 1073–1082. https://doi.org/10.1016/S0191-8869(01)00213-6
8. Ibnat, F., Gyalmo, J., Alom, Z., Awal, M. A., & Azim, M. A. (2021). Understanding World Happiness using Machine Learning Techniques. *6th International Conference on Computer, Communication, Chemical, Materials and Electronic Engineering, IC4ME2 2021*. https://doi.org/10.1109/IC4ME253898.2021.9768407
9. Jedhe, A., Varghese, S., & Jos, J. (2022). A Systematic Survey of Happiness from an Analytical Perspective. *Proceedings - 2022 4th International Conference on Advances in Computing, Communication Control and Networking, ICAC3N 2022*, 95–100. https://doi.org/10.1109/ICAC3N56670.2022.10074361

10. Kaur, M., Dhalaria, M., Sharma, P. K., & Park, J. H. (2019). Supervised Machine-Learning Predictive Analytics for National Quality of Life Scoring. *Applied Sciences 2019, Vol. 9, Page 1613*, *9*(8), 1613. https://doi.org/10.3390/APP9081613
11. Khder, M. A., Sayfi, M. A., & Fujo, S. W. (2022). Analysis of World Happiness Report Dataset Using Machine Learning Approaches. *Int. J. Advance Soft Compu. Appl*, *14*(1). https://doi.org/10.15849/IJASCA.220328.02
12. Kong, M., Li, L., Wu, R., & Tao, X. (2021). An Empirical Study of Learning Based Happiness Prediction Approaches. *Human-Centric Intelligent Systems*, *1*(1–2), 18. https://doi.org/10.2991/HCIS.K.210622.001
13. Lyubomirsky, S., & Lepper, H. S. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research*, *46*(2), 137–155. https://doi.org/10.1023/A:1006824100041/METRICS
14. Ma, Y. an, Liu, A., Hu, X., & Shao, Y. an. (2020). HAPPINESS SCORE IDENTIFICATION: A REGRESSION APPROACH. *E3S Web of Conferences*, *218*, 01051. https://doi.org/10.1051/E3SCONF/202021801051
15. Nayak, S., Pandey, M., & Rautaray, S. S. (2022). A Proposal for Life Expectancy Analysis using Machine Learning Techniques. *3rd International Conference on Smart Electronics and Communication, ICOSEC 2022 - Proceedings*, 1331–1335. https://doi.org/10.1109/ICOSEC54921.2022.9951919
16. Nikam, S. (2021). Predicting World Happiness using Machine Learning. *International Journal of Scientific Research in Engineering and Management*. www.ijsrem.com
17. Prashanthi, B., & Ponnusamy, R. (2019). Future Prediction of World Countries Emotions Status to Understand Economic Status using Happiness Index and SVM Kernel. *International Research Journal of Engineering and Technology*. www.irjet.net
18. Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*(6), 1069–1081. https://doi.org/10.1037/0022-3514.57.6.1069
19. Tan, Y., Singhapreecha, C., & Yamaka, W. (2020). *Applying Machine Learning to Predict Happiness : A case study of 20 Countries*.
20. Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and Validation of Brief Measures of Positive and Negative Affect: The PANAS Scales. *Journal of Personality and Social Psychology*, *54*(6), 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063
21. *World Happiness Index and Its Six Factors - 577 Words | Report Example*. (n.d.). Retrieved July 14, 2023, from https://ivypanda.com/essays/world-happiness-index-and-its-six-factors/
22. You, L. (2021). Utilizing Machine Learning to Predict Happiness Index. *Proceedings - 2nd International Conference on E-Commerce and Internet Technology, ECIT 2021*, 233–238. https://doi.org/10.1109/ECIT52743.2021.00058
23. Zhang, Y. (2023). Analyze and Predict the 2022 World Happiness Report Based on the Past Year's Dataset. *Journal of Computer Science*, *19*(4), 483–492. https://doi.org/10.3844/jcssp.2023.483.492