

CAREER CONNECT – A Personalized Job Recommendation AI Chatbot

Sajay Prakash¹, Koushik Sundar², Eashaan Manohar³, Ram Prakash L⁴

^{1,3,4}Department of Computer Science and Engineering, Rajalakshmi Engineering College, Chennai, India.

²Citibank NA, Jersey City, NJ, USA

¹sajayprakash7@gmail.com, ²koushiksundar@gmail.com, ³eashaanmano@gmail.com, ⁴prakashram0820@gmail.com

1 INTRODUCTION

Abstract:

In modern times, getting a candidate with a qualified career prospect is one of the core massive problems of today's fast-going and vibrant job market. The mission of this product is to present a skill/job recommender application utilizing open-source data coupled with state-of-the-art AI technologies as a new tool for creating a mode of counseling to help professionals find their best possible career prospect. It was created, first and foremost, for the young job seekers so as to allow them access to proper guidance in personal employment and career improvement. To have adequate knowledge and analyze many data sources which include user profiles, job vacancies and labor trends the program uses both machine learning techniques and natural language processing algorithms. System has an open-source career guidance module and job recommendations which yield from competence, passion, and aspirations of a single user. It uses the open-source data sets such as job postings, skills databases, and information from professional social networks. A wide range of information like school history, work experience, capabilities, and interests is contained in the detailed user profile system which is the integral of the system. As an AI engine does so, it can determine career paths and jobs that are open to the jumper by the means of this data. However, skills gap analysis is also integral as the program enhances learners' understanding of the courses and credentials as well as sheds light on the skills different occupations require.

Keywords: Artificial Intelligence - Natural Language Processing - Large Language Models - Resume Analysis - Job Recommendation System - Career Guidance - Web Interface - Machine Learning - Job Vacancies - Employment Opportunities - Chatbot

In this modern time of drastic change, young job seekers, attempting to determine what occupation to follow, and what skills they have to offer to the ever-changing market demands, often find themselves between the devil and the deep blue sea. Traditional methods of career guidance often are unable to provide effective assistance and to help professionals make their career progress more quickly limiting the applicants pool and, thus, causing hiring process inefficiencies. Throughout this talk, bring my attention to the fact that crowdsourcing open-source data with AI approaches is a new avenue which can be explored in order to address this inequality [1]. Through customized job module affiliations and skill improvement guidance, the app hopes to make the career advice service more effective and efficient and to create a successful employment environment and the possibility of career progression for young specialists. The imputed software is to first analyze and interpret large datasets, including user profiles, by means of cutting edge machine learning algorithms paired with approaches which employ natural language processing. By way of open-source assets like the profiles on professional social networks and skills databases the application provides applicants with highly personalized career guidance [2].

The platform consists of an in-depth system for gathering such information as an individual's hobbies, abilities, social - occupational background, and academic achievements. The AI analyzes the data to make recommendations and identify employment opportunities that are suitable for the user, through which the users can take actions on them. In addition, the program also offers skills gap analysis which is used to identify the skilled labor that is needed and offer suitable courses and certifications to help users become highly attractive in the market. A feedback loop is built, and the

interaction can be personalized and enhanced ability of the system to suggest is sustained by training from the user interactions. The goal of this new way to bring companies and applicants together is for the method to contribute to a working life that is more compatible with the needs of young people just starting out in their working career [3].

2. LITERATURE SURVEY

ARRS strives to improve the productivity and quality of recruiting personnel ARRS uses NLP algorithms to extract information like Skills, Qualifications and Experience from candidate resumes. Developers then filter extracted data points to score candidates according to predefined criteria, automatically getting rid of the manual and time-consuming screening process. Further, ARRS is capable of being tailored to the applicant tracking needs of individual positions and issues for universal functionality across industries and job types. ARRS is also a feature-rich candidate ranking platform that can not only parse data for you. The system takes into account skill fit, years of experience, and area of study, and returns a ranked list of candidates so recruiters and hiring managers can focus on the qualified few. ARRS focuses on user experience, therefore, it has an easy-to-navigate interface that streamlines the recruitment process [4][5].

Employing an experimental approach, key variables such as hard skills, soft skills, organizational experience, and job positions are extracted from student CVs, as well as job descriptions and requirements obtained from a corresponding job list. The extraction process is experimented with using OCR (Optical Character Recognition) and several PDF reader libraries. Through manual analysis, it is determined that the PDFPlumber library can handle layouts more effectively using character location data. After the extraction process, the variables obtained from the resumes are compared to those obtained from the job descriptions and requirements using distance-based algorithms [6]. With the introduction of AI, HR will be better able to focus on organizational operations and plan the future course of action in advance to be fierce and competitive in its actions. It will make HR more capable and more decisive in employee management by providing accurate information, thus saving time and money. The chapter will try to provide a deeper understanding of the relevant aspects of AI in improving the efficacy of human resource management functions. It will show that how people, processes, and AI can be combined to bring transformational value within the organization at optimized cost. This chapter will

also present the best way to integrate innovative technologies to securely automate HR functions with the use of AI [7].

Students fear AI's impact on critical thinking and creativity, uncertainty about selection criteria, and the lack of human interaction. To address these issues, the study systematically collected and analyzed data from STEM and Non-STEM students, aiming to construct a theory grounded in empirical evidence. Findings underscore the importance of addressing students' anxiety, promoting continuous learning, and enhancing transparency in AI systems to foster a more equitable recruitment environment [8]. The full advantages of the system are not enjoyed by everyone. All the issues we just discussed will be eliminated by this artifact. The primary contributor to this master's thesis will be a chatbot that offers career counseling services. Through the use of AIML and NLP, the chatbot becomes a friendly companion for students seeking employment [9]. When thinking about the effects on employment patterns and, by extension, on how businesses recruit new workers, manage their human resources departments, and more, these technological advancements are pivotal. Following the introduction, this paper is divided in three sections. The first of which speaks to Blockchain and AI HR Practice. This one questions the recruiting practices of businesses, the second one highlights kinds of employment within the rising period of high-tech super-automation [11] This AIML powered content categorization is specifically meant to create a very effective the mobile and desktop user experiences. Support points can also be given to candidates from the self-supporting sector level of information service using natural language processing along with complex algorithms designed for understanding the preconditions and priorities of users at a high level of the star-rating. The Online Job Finding Portal is powered by Artificial Intelligence (AI) and utilizes a network of programming and adaptation to go beyond simple matching. It takes a holistic view of the job description and candidate profiles, learning to understand all the contextual details beyond just explicit keywords [11].

The chapter here teases out the risk of class and social background discrimination when employers use automated job candidate screening technologies, which includes algorithms and artificial intelligence. This is subject to the old question of discrimination on grounds of 'social origin' in Australian and South African law. [12] The project's final decision follows extensive research into emerging technologies: the LLM might be utilized to create an

AI-powered chatbot that assists migrants. This helps with language (very important with economic migrants), with cultural adaptation, and financial literacy, all of which are the major issues in integration. This chatbot is programmed with distinct data associated with the issues and will help resolve them. In the end, while the chatbot may function well within the realm of the given data, it is limited to what information is available in the database to provide full-fledged answers [13].

Consequently, the application of using the metaverse in recruitment naturally leads to a discussion about the pros and cons that it has. Our study aims primarily to achieve two objectives. A model that we offer here shows the candidate-employer relationship displayed in the metaverse using a smart virtual recruiter and illustrates how both dimensions [employers and recruits] can leverage the synergy to streamline the recruitment experience. The second objective of the study is to explore the impression of candidates when to use metaverse and artificial intelligence for matching employment offers with demands [14].

3. SYSTEM ARCHITECTURE

The figure 1 discusses the architecture of our web-based chatbot for career counseling. Customers will be able to open the chatbot through the web browser interface, which will allow them to avoid the installation of additional software. Streamlit which is a web framework that simplifies the creation of user interface and handles the user interaction in the browser window. The main part is the chatbot controller which plays the role of the brain. Receives queries from the UI and routes the queries to their processing unit. A key piece is a chatbot model that is pretrained on an extensive dataset of career-specific text and code. This is a dataset to help the model understand the queries users have with regards to the career opportunities, skills required, and available jobs. The chatbot controller communicates with the model to produce tailored responses that are responsive to both user queries and their career aspirations [15].

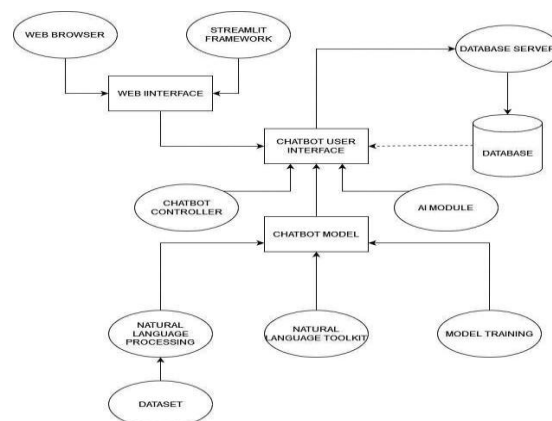


Figure 1: System Architecture

The next era comprises the NLP the tool kits, which is a basic a portion of it. This toolkit gives your chatbot a manner to gain knowledge of and process language. One of things it has to do is often not just parse the text, but perform more complex tasks: sentiment analysis, or identify entities that become relevant in the context of what the user is asking about. With assistance of this toolkit, the chatbot can understand what the user is trying to say and can produce a refinement-specific response suitable for career counseling [16]. This is a database server-centric system. What it means in practice is that there are conversations history, user info (if it has any) and some more relevant data points in memory. The data is useful in several things. That can add some context to the chatbot replies to remember what a specific user was jiving with in past conversations. On the other hand, it may be used to suggest inquiries from the users to improve the overall performance of the chatbot over time [17].

The career guidance module is one of the most striking features of this architecture. In the next module there will be the integration with external resources or databases that contain information about careers such as job description, skill requirement, and educational pathways. When a chatbot controller realizes that the user's query needs career-specific advice, it may connect to this module to get the information and then display it to the user in a way that is logical and comprehensible. In the end, this architecture is developed to build a user-friendly career counseling platform through a chatbot interface. The web browser interface makes accessing your data very easy, and Streamlit lessens the user's interaction. The communication among the trained model that is managed by the chatbot controller, the NLP toolkit, and the career guidance module allows for natural language understanding, career-related generation of responses and potential retrieval of relevant career information. Lastly, the chatbot database is of utmost significance to store conversation history, as well as personal user

information and information that can be used to improve its performance with time. This architecture is the groundwork for the chatbot system which is web-based and could offer career counseling and guidance that is customized to individual users [18].

4. METHODOLOGY

This paper presents the methodology and module descriptions for a web canonical job recommendation system to enhance job search. It uses a web-browser interface which is user-first oriented. The platform is available on any internet-connected device, meaning users do not have to download expensive additional software. This broadens the reach of the system and eases the job search. At the core of the system is a dedicated text analysis model, carefully fitted to the dataset of resumes and job descriptions. Once the user uploads their resume, a number of actions are related to this upload [19]. It is possible that the web interface is connected with a central processing unit (CPU) where the document uploaded is sent to a model, the machine learning engine processing the recommendations. Great model for the nuance in job postings and resumes. The model breaks down the text of the uploaded resume, and detects information such as skills, experience, education and qualifications of a resume in the context with the job market. The extracted information is then compared by the model to the schema it was trained on. Here the model is then able to identify job descriptions from its database that highly match the profile of the users. The model starts by examining these matches before arriving at a shortlist of recommended jobs most suitable to the individual user, based on the specific requirements of the job and the personal experience and skills of the user [20].

4.1 MODULES IMPLEMENTATION

4.1 Web Interface: It has a user-friendly upload resume, UI form to track the user experience and view job recommendations. Streamlit (or something similar) would be responsible for taking care of user interactions and optionally data plots within the web browser window.

4.2 Machine Learning Model: This core module contains the particular model used to perform the analysis of the text. Untapt uses its vast database of job descriptions and extracts job information from the user resumes and helps them to provide personalized recommendations.

4.3 Natural Language Processing (NLP) Toolkit: This is the component that gets human language to machine readableness. Natural language processing techniques such as text parsing helps to

decompose the resume text into smaller, understandable components of the machine learning model. Sentiment analytics could also be used to detect the general mood/message portrayed in the resume content.

4.4 Career Guidance Module: This module indicates a capability for further extension to sync with remote career resources. These might be job boards, company websites, or databases of educational pathways. Engagement with this module allows the system to request further information on topics like specific job details, the range of salaries or career routes most appropriate to a user based on their profile.

4.5. Database Server: The data in this module is about user resumes which are then matched or not with the available recommendations obtained from other modules in the system, for example (described in detail job recommendation) and how user interacts with the system. This data has an abundance use of kaboom. It does so by giving proper context to user preferences along with how good past suggestions worked out which can lead to better future recommendations made by the machine learning model. Moreover, it can use this information to explore how well different NLP techniques work or practical interaction with external resources by analyzing user interactions.

5. RESULTS AND DISCUSSIONS

Figure 2: Landing Page

This figure 2 depicts a user interface for our "Job Recommender" tool. It guides users to upload their resumes in PDF or DOCX format, with a file size limit of 200MB, to receive job recommendations tailored to their skills and preferences. The interface includes a text input field for specifying job preferences and a drag-and-drop area for file uploads.

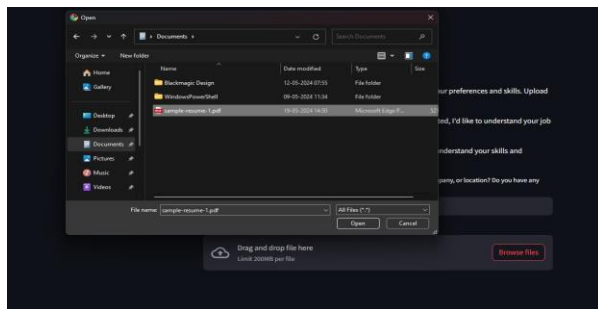


Figure 3: Uploading Resume

In this figure 3 the user is prompted to upload their resume from the local directory to the Job Recommender System. The uploaded document (resume) must be either of a PDF or a .doc format.

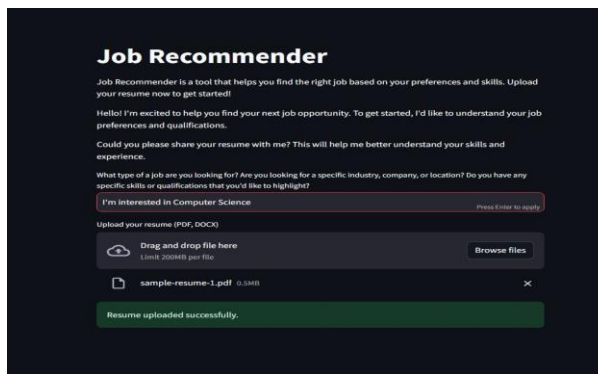


Figure 4: Success Message

In this figure 4 a success message is displayed if the user successfully uploaded their resume to the Job Recommender tool. This tool also allows the user to describe their qualifications and field of interest which allows our model to give desired job recommendations that would be helpful for the users.

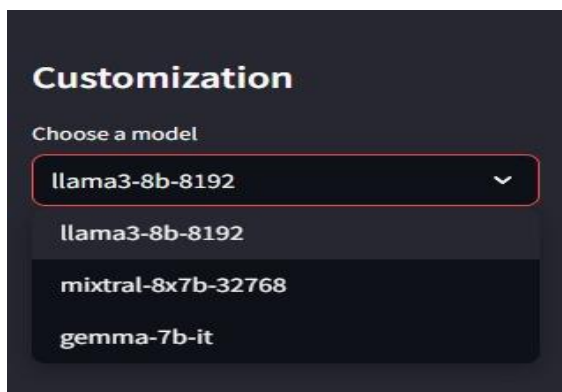


Figure 5: Model Selection

The image refers to the model selection menu. Our project uses more than one model for recommending the desired jobs for the users based on the selected model. They are llama 3b-8b-8192, llama3-8b-8192, mixtral-8x7b-32768 and gemma-7b-it. Out of which, one must be chosen.

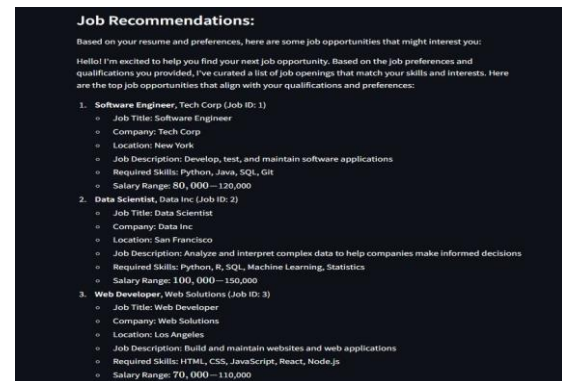


Figure 6: Response From Job Recommender - 1

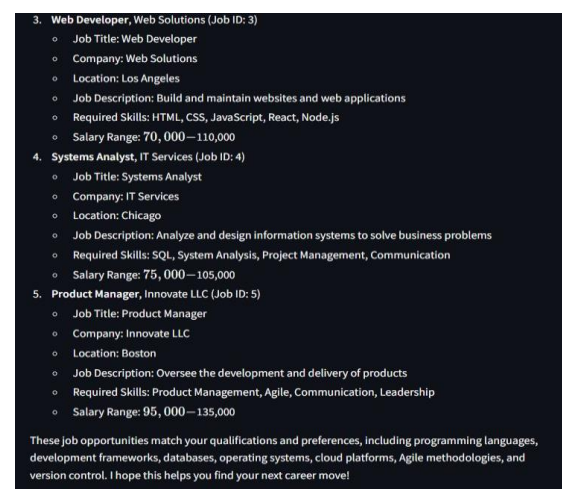


Figure 7: Response From Job Recommender – 2

These figures 6 and 7 shows the results from our Job Recommender System, providing personalized job recommendations based on the user's resume and preferences. Each job listing includes specifics such as the position's name, employer, location, description, necessary abilities, and salary range, all based on the user's choices and credentials.

The transfer of the suggested job recommendation and career guidance system is expected to give rise to numerous outcomes which will affect both the user and the broader world of employment in a profound way. The first advantage of this setup would be the experience of users which would improve dramatically due to highly customized recommendations. AI algorithms will be built upon using the data such as user profiles, skills, and career preferences for the system to determine the diverse jobs that will be tailored against each learner's aspiration and strength. The personalization of these services are therefore intended to foster improved satisfaction and involvement as users identify more with the platform's relevance and utility. Lastly, the

set of interactive tools such as assessment skills, the career advancement function and might be helpful to the users to gain more power to control their professional development on their own, and this contributes to the enrichment of the experience.

Noteworthy, the proposed system will have a positive impact on the career development goal attainment for users. Learning sources of a personal nature and training programs would provide individuals with an avenue to improve their skills all the time and remain relevant in the job sector. Job market trends, up-to-the-minute salary data in real-time will give users an insight necessary to make the best decisions about their careers. These professionals will end up with better long-term outcomes for themselves. By personalizing recommended career paths and creating networks with actual professionals of the industry, the system will help people tackle their career track progress with more confidence and discover ways for further development and advancement.

6. CONCLUSION

To sum up, the new job advisory and vocational guidance system is an innovative recommendation which aims to change the current employment regulation that insecure young people are subjected to. The system strives to achieve this goal by implementing sophisticated AI algorithms and through the provision of personalized features and interactive functionalities that, in turn, will empower users with job recommendation services that are highly-tuned to their requirements, those that offer skill development resources, and a support system for career management. This system offers improved user experiences with the developed career opportunities and brings about the positive effect to the whole employment ecosystem. Thus, the system becomes an instrument of change. On the other hand, the system would show more concern in the areas of data privacy, security and inclusivity which would allow for the creation of a trustful and accountable environment thus eliminating the inequality in access to opportunities. Of significance is the fact that, whereas the position or the system to be put in place can achieve the proposed goal of guiding the decision, which is to facilitate the careers path, then encourage everyone to work without problems and ultimately, the work force landscape will be developed into an inclusive, efficient and worthwhile as expected.

As future work, the personalized career path steerage may be offered by means of analyzing the person's capabilities, work records, and enterprise tendencies, suggesting capability career trajectories, vital skill development, and applicable schooling packages to help users prepare for rising process roles and industries. An AI-driven interview practice

module may want to simulate ability interview questions based totally on process descriptions, offering guidelines on answering them and offering personalized remarks and development recommendations the usage of herbal language technology strategies. Additionally, implementing multilingual assistance could allow non-English speaking customers to engage with the tool in their favored language, broadening its accessibility and usability across different areas. Those upgrades can rework the job Recommender device into a complete career development platform.

REFERENCES

1. Pandey, Anamika, Simon Grima, Suruchi Pandey, and Balamurugan Balusamy, eds. *The Role of HR in the Transforming Workplace: Challenges, Technology, and Future Directions*. CRC Press, 2024.
2. Chaudhary, Abhishek, Akash Kumar Singh, and Gaurav Kumar Singh. "Digital Gateways to Employment: An In-Depth Analysis of Online Job Platforms." (2024).
3. Nouman Aziz, G. P. H. R. *JOB HUNTING IN COVID-19 ERA:* "Ultimate toolkit for job searching". Nouman Aziz.
4. Amberkar, Sharwari, Saket Chandorkar, Mithilesh Dalvi, Amisha Gawand, and Mimi Cherian. "Survey on Virtual Recruitment System." In 2023 5th Biennial International Conference on Nascent Technologies in Engineering (ICNTE), pp. 1-5. IEEE, 2023.
5. Nisha, B., V. Manobharathi, B. Jeyarajanandhini, and G. Sivakamasundari. "HR Tech Analyst: Automated Resume Parsing and Ranking System through Natural Language Processing." In 2023 2nd International Conference on Automation, Computing and Renewable Systems (ICACRS), pp. 1681-1686. IEEE, 2023.
6. Artajaya, Hansen, Jose Giancarlos, Jurike V. Moniaga, and Andry Chowanda. "Job Recommendation System based on Resume using Natural Language Processing and Distance-based Algorithm." In 2024 IEEE International Conference on Artificial Intelligence and Mechatronics Systems (AIMS), pp. 1-6. IEEE, 2024.
7. Saharan, Teena. "3 Reinventing HR in the Era." *Transforming Management Using Artificial Intelligence Techniques* (2020): 23.
8. Krishnasamy, Kiruthika. "Exploring students' perspectives on AI-based recruitment processes: Challenges and job readiness." (2024).
9. Banerjee, Anshika. "Text and voice-enabled chatbot enhancing the user experience in career counselling domain." PhD diss., Dublin Business School, 2019.

10. Michailidis, Maria P. "The challenges of AI and blockchain on HR recruiting practices." *Cyprus Review* 30, no. 2 (2018): 169-180.
11. Chaudhary, Abhishek, Akash Kumar Singh, and Gaurav Kumar Singh. "Digital Gateways to Employment: An In-Depth Analysis of Online Job Platforms." (2024).
12. Capuano, Angelo. "Automated Candidate Screening, Algorithms and Artificial Intelligence in Recruitment." In *Class and Social Background Discrimination in the Modern Workplace*, pp. 150-176. Bristol University Press, 2023.
13. Ongarbayev, Bauyrzhan. "Using ICT tools and AI for the social and financial integration of migrants into local societies." Bachelor's thesis, University of Twente, 2024.
14. Chafiq, Nadia, Imane Elimadi, and Mohamed Ghazouani. "Metaverse for the Recruitment Process: Towards an Intelligent Virtual Recruiter." In *Engineering Applications of Artificial Intelligence*, pp. 287-304. Cham: Springer Nature Switzerland, 2024.
15. Ch, Raja Kamal, and Surjit Singha. "A Strategy for Conducting Sentiment Analysis Using AI in Human Resource Management." In *AI in Business: Opportunities and Limitations: Volume 1*, pp. 491-501. Cham: Springer Nature Switzerland, 2024.
16. Jeffares, Stephen, and Stephen Jeffares. "The non-public encounter: Self-service and the ephemoralisation of public service." *The Virtual Public Servant: Artificial Intelligence and Frontline Work* (2021): 125-150.
17. Azizi, Sharifah. "Digital Marketing as a tool to integrate immigrants in Finland: Case Company StartUp Refugees." (2023).
18. KR Sowmya, Poonkuzhali Sugumaran, J Jeyalakshmi, "Sentiment Classification of Higher Education Reviews to Analyze Students' Engagement and Psychology Interventions using Deep Learning Techniques", *Smart Trends in Computing and Communication - ICTCS SmartCom 2023*, Published in Springer LNNS Series, vol.396, pp: 257-265(SCOPUS) Print ISBN: 978-981-16-9966-5, Online ISBN: 978-981-16-9967-2
19. Oksanen, Reija. "New technology-based recruitment methods." Master's thesis, 2018.
20. Marwan, Akram. "Impact of artificial intelligence on education for employment:(learning and employability Framework)." (2020).