

Analysis of methods and existing software implementations for automatic resume generation

Vasyl Ivanochko

*Department of Information Technology
Vasyl Stefanyk Precarpathian National University
Ivano-Frankivsk, Ukraine*

Abstract—This research is intended for evaluation and analysis of existing programs that allow to automatically generate a resume based on the data entered by the user for subsequent submission as a response to a vacancy. Criteria will be formed that will check the program for compliance with standards of use and convenience for evaluation in the research.

Keywords—Research, Resume, CV, Analysis, Candidate, Vacancy, Recruitment.

I. INTRODUCTION

A resume is very often called CV. CV is an abbreviation of the Latin word "curriculum vitae" which translates as "life path" [4]. A professional resume gives a brief overview and a good idea of a person's life. The major information about experience, education, skills, completed courses, etc., is placed in the resume. That is all the information that can be useful for a potential employer.

That is why CVs are extremely popular. Now, in fact, for every vacancy, recruiters require a resume file sent in response from the candidate. However, not everyone wants to do it, spends a lot of time on it, and not everyone knows how to do it correctly. The ability to export DOC or PDF requires a paid membership. The monthly subscription fee for this program is \$25.

Given the aforementioned information, several programs allow you to create your CV using the given data. We shall now discuss them.

I carried out this study to fairly assess and contrast the current applications of this subject. The outcomes of which will be the standards for assessing programs on this subject and putting them to use in actual implementations.

II. ANALYSIS OF LATEST RESEARCH AND PUBLICATIONS

The past research is about methods of creating or generating CVs from some external tools. For example, in the "Automatic Generation of CVs from Online Social Networks"[1] research about a method of creating a tool for the generation of resumes from the information that is placed on public storage, such as social networks.

Another research mentioned that existing templates for automatic generation of resume is very expensive. "It has been calculated that the generation of a CV takes an average 3-hour period and that an automated system could save at least \$25,000 per 100 generated CV's." wrote in the "Intelligent Agents and Apache Cocoon for a CV Generation System,"[2]. Also here is mentioned that existing implementation are hard to use for non-developer user. "For example, it is hard to imagine a standard Philosophy Ph.D. student typing an XML file and applying a XSL transformation to it" [2].

Both publications talking that this technology is a very in demand because of rapidly developing technologies. So, I decided to create a criteria for evaluating an implementation for automation resume generation.

III. CRITERIA AND THEIR DESCRIPTION

- *Ability to add and edit previous work experience*

Employers undoubtedly pay the greatest attention to this characteristic than any other. Of course, this choice will be available on every application, but it is still important to consider the focus on the resume, the possibility of including a description, and the order of the list of prior experience components. It is well recognized that the order of the list should be established from most pertinent to oldest positions.

- *The presence of tips for the correct resume for the user*

Not every applicant is adept at properly structuring a resume and adding information to it.

- *Ability to add and customize skills*

The second-most crucial component of the resume, from which the interviewer might infer information about the applicant during the CV review stage. It's critical that the software accurately depicts a potential employee's degree of skill proficiency in addition to simply confirming that talent is there on their résumé.

- *Adding education data*

Education is a crucial factor for the organization since, frequently, a person might enroll in standard courses and regard himself as an expert without developing skills like the capacity for research, cooperation, gaining additional information in numerous sectors, and broadening his views. The order used here must be analogous to experience, going from more recent to older. Additionally, consider if the reader is paying attention to the expertise rather than the location or date of gaining the specialism.

- *Adding data about courses and certifications*

Outside of academic institutions, a wide variety of courses, educational programs, and certificates are offered.

- *Add and customize a short description about yourself*

This area allows the applicant to quickly introduce himself, explain who he is, why he is.

- *The section for adding information about which languages the candidate speaks*

Knowledge of languages like German, French, or another is a huge bonus when deciding between two applicants because it frequently occurs that the client on the project is a foreigner (not necessarily an English-speaking one).

- *Adding a photo and the ability to hide it*

It is commonly known that to prevent acts of racism, sexism, or other discrimination against the applicant, it is illegal in several nations to include a photo, gender, or marital status on a resume.

- *Adding link data and contact methods*

Various communication techniques could be employed in various nations, or even in the same. It's also crucial to realize that various occupations could call for references to various online accounts. Here, it's important to consider both the types of communication that may be added to the CV in the software and how they are presented on the resume.

- *Resume templates*

The option to pick from the program's current templates the one you like most and the one is best suited for the chosen position. The diversity and quantity of templates offered by the application.

- *Choosing the main color of the resume*

Not essential, but a pleasant aspect of the requirements. The option to select the color that will serve as the resume's primary hue. This argument is significant for businesses who produce staff resumes for clients using a conveyor-style template. The hue must also match the company's color scheme, which is crucial.

- *Adding personalized sections to your resume*

It is impossible to predict which portions and pieces of information the hiring team will find most crucial regarding an applicant.

- *Section editing*

Programs may refer to the same sections differently. Sometimes it's vital to refer to a section as "Employment History" rather than "Experience," for instance. Additionally, it is essential to be able to manually modify the section name in the relevant language if the application lacks the option to alter the language.

- *The ability to preview resumes*

The user must view the resume as it is created to comprehend how it will seem with the entered data. Additionally, it will prevent any minor or grammatical problems when the template is filled out with data.

- *Confirmation of data deletion actions*

Dialog boxes should be provided to confirm the user's deletion of information to prevent circumstances where the user mistakenly deletes a portion or some of data.

- *Saving entered data and created templates*

The program must be able to save the created resumes, edit them as needed, and export them for the user's data to remain intact.

- *Program usage plan*

Most of the programs on this subject are paid, therefore you must routinely make payments to utilize them. This criterion assesses whether features may be accessed for free and how much it will cost to utilize the application to get the core set of capabilities.

IV. ANALYSIS OF EXISTING SOLUTIONS

The following programs participated in my research:

1. Resume.io [3]
2. cvmaker [4]
3. LinkedIn [5]

All of them are quite similar, and have extremely similar functionality, but they differ in their features. And they are quite different according to the criteria I described.

Let's start with the first program. This is **resume.io**. The program is very easy, convenient, and easy to use. Works quickly and without interruptions. On the user side, everything is easy, uncluttered, and neat.

Table 1. Analysis of **resume.io** by criteria

Criteria	Description
Ability to add and edit previous work experience	The program provides such an opportunity. You can briefly explain the position, the location of work, the time spent in this role, and the requirements and tasks of this employment. When adding a new item, it is not inserted in the typical sequence, however, this may be adjusted manually.
The presence of tips for the correct resume for the user	Tips and recommendations guide the user through the whole resume-creation procedure.
Ability to add and customize skills	It is possible to add skills from the program's existing collection as well as your own. It is also possible to specify the degree of mastery for each talent and, if required, suppress the display of this choice for a certain ability.
Adding education data	The criteria listed above operate flawlessly and fulfill resume management requirements.
Adding data about courses and certifications	The criteria listed above operate flawlessly and fulfill resume management requirements.
Add and customize a short description about yourself	The criteria listed above operate flawlessly and fulfill resume management requirements.
The section for adding information about which languages the candidate speaks	The criteria listed above operate flawlessly and fulfill resume management requirements.
Adding a photo and the ability to hide it	If a photo is included in the template, you can add or delete it, and the template will automatically alter it to match the style.
Adding link data and contact methods	You can include multiple links with personalized signatures, but they are presented as clickable links in the CV, making it impossible to see the link, for example, in print.
Resume templates	About 30 templates are available, with some allowing you to export resumes in PDF and DOC formats both.
Choosing the main color of the resume	The resume color can be set from the complete RGB palette.
Adding personalized sections to your resume	There are various configurable parts, such as "Hobbies" or "Internships," as well as an entirely "Customizable Section."
Section editing	Each area is independently configurable, and section titles can be changed.
The ability to preview resumes	View the resume while working and do a rapid update after adding fresh data.
Confirmation of data deletion actions	A confirmation dialog is displayed before any deletion, a confirmation dialog.
Saving entered data and created templates	Data is promptly stored upon the entry of new values.
Program usage plan	The ability to export DOC or PDF requires a paid membership. The monthly subscription fee for this program is \$25.

The next program from the list is **cvmaker**. The application is designed in the form of a tour. You fill in your data step by step. You can easily return to the previous step without losing data from the current one.

Table 2. Analysis of **cvmaker** by criteria

Criteria	Description
Ability to add and edit previous work experience	You can briefly define the duties and responsibilities of this post as well as the role's responsibilities, working environment, and time commitment.
Adding education data	
Adding data about courses and certifications	
Add and customize a short description about yourself	Similar circumstances involving education, courses, and credentials, together with a succinct explanation Automatic chronological sorting is by default deactivated, although this function may be turned on as soon as a new experience is added.
The presence of tips for the correct resume for the user	When entering new data, the user is advised at every stage and in practically every area.
Ability to add and customize skills	Any skill or degree of skill may be added.
The section for adding information about which languages the candidate speaks	This area is offered as a customized section however, you may add more languages and skill levels.
Adding a photo and the ability to hide it	Although you can upload photos and conceal them, this is not a particularly logical process.
Adding link data and contact methods	Only a phone number, email address, and LinkedIn profile can be entered.
Resume templates	There are nine distinct templates available.
Choosing the main color of the resume	There are 4-5 color options for each template.
Adding personalized sections to your resume	The only field added to a custom section is a text field.
Section editing	Complete section editing, including changing the section headings and how they appear in the resume. One has the option to select which side the part will be on.
The ability to preview resumes	Only at the very end, just before exporting, is there an option for a preview.
Confirmation of data deletion actions	Since there are no dialog boxes, entering data might be accidentally deleted by the user.
Saving entered data and created templates	Once the resume has been exported, an account will be made, and the template will be kept.
Program usage plan	The program has a monthly fee of \$10. Exporting to PDF is not free of charge.

The final software on the list of examined resume export programs is **LinkedIn**. The focus of this program is not resumes. This social network enables you to discover individuals who share your interests in a single or a variety of disciplines. It also enables applicants to look for employers and vice versa. The user's resume can, however, be exported as a PDF from the profile page. This is the only free method that has been discovered, which is why it was used in the study.

Table 3. Analysis of **LinkedIn** by criteria

Criteria	Description
Ability to add and edit previous work experience	The profile of the social network user provides information on these fields.
Adding education data	
Adding data about courses and certifications	
Add and customize a short description about yourself	
The section for adding information about which languages the candidate speaks	
The presence of tips for the correct resume for the user	There aren't any pointers for writing a resume.
Ability to add and customize skills	A user account is used to add talents to the resume. There is no set level of proficiency for the talent. As well as being picked at random, the highest skill.
Adding a photo and the ability to hide it	Even though it is on the profile, the photo is not placed on the CV.
Adding link data and contact methods	Contact options are also developed from user data however, there are relatively few of them available.
Resume templates	You may not pick a color and there are no templates to build.
Choosing the main color of the resume	
Adding personalized sections to your resume	Modification of sections is not available
Section editing	
The ability to preview resumes	Although no preview is accessible, the file is created rapidly.
Confirmation of data deletion actions	
Saving entered data and created templates	The entered data is saved in the profile
Program usage plan	Forming a resume is free

V. RESULTS

As a result, I am attaching a photo of the preview of the formed resumes since I was able to export only from LinkedIn.

The screenshot shows a resume for Vasyl Ivanochko, a Middle Java developer. It includes a profile section with a bio, an employment history section listing roles at EPAM and SoftJourn, an education section for a Bachelor's degree at Vasyl Stefanyk Precarpathian National University, and a courses section for a Java online marathon. Skills listed include Teamwork, Java, OOP, Spring, REST, and Angular. The layout is clean and professional.

Figure 1 – pre-view of resume from resume.io

The screenshot shows a resume for Vasyl Ivanochko with a teal header. It includes a personal section with contact information, a work experience section with roles at EPAM and SoftJourn, an education section for a Bachelor's degree, and a skills section with progress indicators for Java, OOP, Spring, Angular, and REST. The design is modern and uses a color palette of teal and grey.

Figure 2 – pre-view of resume from cvmaker.com.ua

The screenshot shows a generated resume for Vasyl Ivanochko with a dark blue header. It includes a contact section with phone and email, a top skills section listing Java, Core Java, and Scrum, an experience section with roles at EPAM Systems and SoftJourn, and an education section for a Bachelor's degree at Vasyl Stefanyk Precarpathian National University. The layout is simple and clear.

Figure 3 – Generated resume from www.linkedin.com

VI. FUTURE RESEARCH

Future research may be about the norms of standards in different countries. And about whether the programs meet these standards.

Also, it can be investigated in the case of performance and design.

Future research may contain a few more programs and maybe create other criteria.

VII. DISCUSSION

In this research created criteria for evaluation of software implementations for automatic resume generation that can be useful for future research or to evaluate new program candidate for a company.

Also, I have demonstrated an example how to examine programs by criteria on three different cost programs. So we can see that this criteria working with a more widely programs like a resume.io and also, with a little plain programs like a LinkedIn.

VIII. CONCLUSION

I examined and discussed three well-known resume-building programs in my study. I compared them and displayed the rough formation findings. Along with the ones mentioned, I also looked at a few other applications that were comparable, but since they did not differ in any way from the ones mentioned, I did not include them in my research.

As we can see, the programs that are functionally enough and operate reliably and rapidly are quite expensive, while those that are free lack all required functions and inadequately address the demands of the ordinary user.

REFERENCES

- [1] S.M. Dias, A.L. Gancarski and P.R. Henriques, "Automatic Generation of CVs from Online Social Networks," *Communications in Computer and Information Science*, vol. 563, pp 258–263, 2015, doi: 10.1007/978-3-319-27653-3_25
- [2] E. J. Gonzalez et al., "Intelligent Agents and Apache Cocoon for a CV Generation System," *2007 IEEE/ACS International Conference on Computer Systems and Applications*, 2007, pp. 9-15, doi: 10.1109/AICCSA.2007.370858.
- [3] Resume.io. (2022). [Online]. Available: <https://resume.io>
- [4] Cvmaker. (2022). [Online]. Available: <https://www.cvmaker.com.ua>
- [5] LinkedIn. (2022). [Online]. Available: <https://www.linkedin.com>