Automated Linkedin Analysis to Determine Psychometric Characteristics of a Client

Vasily Kashkin[1] & Valeriya Paliy[2]

[1] American University of Phnom Penh, Cambodia

[2] Rostov State University of Economics, Russia

Correspondence: Vasily Kashkin, American University of Phnom Penh, Cambodia. E-mail: kashkin@kashkin.com.cn

Vasily Kashkin Orcid: orcid.org/0000-0002-7568-6188; Valeria Paliy Orcid: orcid.org/0009-0007-4959-1154

Abstract

The purpose of this paper is to study programs for identifying the psychometric characteristics of a client based on his LinkedIn profile, test these programs and compare their functionality. We studied 52 programs for analyzing profiles of the social network LinkedIn. Only two of these programs have the functionality of psychometric personality analysis. In-depth testing of both programs was carried out. The article presents a comparison of the results obtained by two psychometric analysis programs and provides conclusions about the reliability of the assessments. We can not only determine psychological qualities, but also understand what model of behavior our potential client has, what decisions and how prefers to make, what qualities sympathizes with in others. This approach can be simplified and automated for business thanks to programs based on artificial intelligence. The use of programs that allow you to identify the psychometric characteristics of a client based on his profile on the LinkedIn social network will make it easier to study the target audience, build a communication strategy and promotion strategy, and will be useful for any business.

Keywords: personality AI, artificial intelligence, personality type, personality type assessment model, psychometry, computational psychometry, psychological qualities.

1. Introduction

The most convenient and fastest way to conduct audience research is online research, without special surveys, based on existing user data on social networks. When we communicate with a buyer through correspondence, we cannot always independently determine what approach is needed to him/her - this requires time, meeting with the client in different situations, and a long study of his/her behavior. In real situations this is practically impossible. Moreover, most often it is the first e-mail to a potential buyer or candidate that determines whether the person will respond to it at all, whether he/she will continue communication or will become a client of the company. In this regard, it is necessary to determine personality type before the first meeting or the first message with the interlocutor. For this purpose, technologies based on artificial intelligence are used.

Personality AI technology is designed to analyze large amounts of information online to identify the personality profile of any person based on his pages on social networks, posts, texts, completed personality profile tests, resumes, etc. The application profile of the technology is wide - thus, determining the psychological characteristics of a person can be useful in marketing, sales, recruiting, and team building. The fact is that Personality AI is able to determine a person's natural psychological tendencies, predict his behavior, values, past experiences, which ultimately influences how a person behaves in life and how he makes decisions.

In this study, we focused on LinkedIn analytics programs. Automated psychometric analysis is not limited to LinkedIn, however, it is the LinkedIn network that is of particular interest for such analysis, since it presents a person's resume and main achievements. This allows a more complete assessment of personality than, for example, just text analysis.

The purpose of this study is 1) to study the LinkedIn social network analysis programs available on the international market; 2) to determine their functionality; 3) to identify advanced functions of psychometric analysis of LinkedIn profiles; 4) to test the functions of psychometric analysis programs for LinkedIn and

compare them.

2. Theoretical Reference Framework

The framework of this study is based on three hypotheses that complement and develop each other: 1) automated text analysis can give us valuable insights about human psychological traits; 2) a person's social networks, including digital texts on social networks, can say a lot about a person's psychological qualities; 3) social networks that best reflect digital traces, for example, LinkedIn, can help create a psychological portrait of a person. Thus, in our study we test the hypothesis that profile data on the social network LinkedIn, thanks to automated text analysis and automated assessment of a person's qualities, can provide insight into the psychological portrait and personality type. Therefore, we will briefly summarize some of the research in these areas.

First of all, it should be noted that psychological traits influence human behavior, including consumer behavior. This is discussed in the article by Ou, C.-C., & Chuang, S.-H. (2023). James Pennebraker, a distinguished professor of psychology, author of numerous psychological studies, and co-creator of LIWC, automated natural language analysis program, has focused his research on the relationship between natural language use, personality, and social behavior. For example, in the chapter *What do we know when we LIWC a person? Text analysis as an assessment tool for traits, personal concerns and life stories* of the book *The SAGE Handbook of Personality and Individual Differences*, he, together with Chung, argues that any psychological characteristic, any values and interests of a person have a certain verbal marking when a person uses certain words more often than others (Chung & Pennebaker, 2018). Thanks to reverse analysis, it is possible to extract such frequently repeated words from a person's text and determine psychological characteristics. The fact that automated text analysis helps determine people's behavior is also stated in the book *Measurement in Social Psychology* (Chung & Pennebaker, 2018).

Using automated text analysis programs, you can extract insights about the emotional content of the text (Date, Sonkamble & Deshmukh, 2023). The study *How social media expression can reveal personality* was aimed at analyzing social media texts and showed that, thanks to a machine learning model, insights about personality can be extracted from social media texts (Han et al., 2023). The paper *Automated Text Analysis for Consumer Research* states that the bulk of texts are in digital format: discussions on the Internet, product reviews, press releases. It is these texts that are used for automated analysis and "can be used to examine psychological and sociological constructs in consumer-produced digital text by enabling discovery or by providing ecological validity" (Humphreys & Wang, 2018).

According to the paper *Indexing of Social Network Texts for Psychometric Model of Academic Success Prediction*, there is a relationship between information from social networks and elements of models of psychological personality types. Thanks to texts and data on activity on social networks, psychological traits can be learned (Prokopyev, Vakhitov, & Ustin, 2020).

Finally, several studies have shown that LinkedIn profile data can be used to automatically assess people's skills, personality, and cognitive abilities through the use of various indicators, including how people describe themselves in their profiles. Such studies were carried out by authors such as Roulin (2018, 2022), Levashina (2018), Fernandez, Stocklin, Terrier and Kim (2021).

Various psychological tests can be used to analyze a person's psychological type. For example, the authors Nuraeni, Limakrisna, N., Hartoyo, H., & Diana. (2023) used The Big Five Personalities test in their study.

3. Initial Selection of Programs for Research

We studied 52 programs that work with LinkedIn, the most extensive social network for finding and making business contacts, which is used by companies and entrepreneurs not only to find employees, but also to find clients. The analyzed programs and their main functionality are presented in Table 1.

Table 1. Programs for working with LinkedIn

№	The name of the program	Main functions
	Sales planning software	
1.	Sales Navigator & Sales Insights	Lead generation, analytics and sales planning
	Programs for audience search and targeting	

2.	HG LinkedIn Connector (HG Insights)	Search for target audience and targeting
3.	Leadspace	Audience segmentation, targeting
4.	Detective.io	Search for target audience and targeting
Programs for audience analysis and social listening		
5.	SproutSocial	Account management, demographic analysis of subscribers, social listening
6.	Meltwater	Analysis of profile statistics about subscribers, social media monitoring, social listening
7.	Talkwalker	Social listening
8.	Brand24	Online reputation management, social listening, influencer search
9.	BuzzSumo	Search for trends, analysis of content and statements, search for influencers
10.	Brandwatch	Audience analysis and segmentation, social listening
Programs for searching and retrieving information		
11.	Datanyze	Extracting contact information from LinkedIn profiles
12.	Wiza.co	Export a list of prospects and their contact information from LinkedIn search
13.	LinkedIn Lead Extractor	Export a list of prospects and their contact information from LinkedIn search
14.	LinkedIn Company Extractor	Export a list of companies and information about them from LinkedIn search
15.	Linked Helper 2	Extracting contacts of first-level connections
16.	Lead Delta	Search for profiles, work with connections/links and export information from profiles
17.	PhantomBuster	Search and export connections and connections, profile information, lists from search
18.	Prospectss	Finding groups with high levels of engagement and extracting information about them
Profile analytics programs		
19.	Oktopus	LinkedIn profile analytics, automated lead generation
20.	SocialPilot	Planning and publishing posts, page analytics
21.	Inlytics	Performance analytics, profile statistics
22.	Datapine	Monitor and report on important profile metrics
23.	Dripify	Profile statistics and subscriber engagement analysis
24.	SocialInsider	Performance analytics, profile statistics, analysis of campaigns of existing influencers
25.	Rank Ranger	LinkedIn KPI analysis, audience demographics, reach monitoring, and post performance
26.	Klipfolio	Analysis and visualization of profile metrics
27.	Whatagraph	Analysis and visualization of profile metrics
28.	DrumUp	Content management
29.	ReportGarden	Generating marketing statistics reports
30.	Hootsuite	Social media monitoring, influencer search, content planning and publishing
31.	Databox	Analysis and visualization of profile metrics
32.	Shield	Analysis of content and audience metrics
33.	Sisense	Analysis and visualization of profile metrics
34.	Elementary Analytics	Performance analytics, analysis and visualization of profile metrics
35.	Iconosquare	Social media analytics, content management and planning, performance analytics
36.	Buffer	Content management and planning, performance analytics
37.	Netbase	Social media analytics including content
38.	Sendible	Management and planning of publications, analytics
39.	Khoros	Multichannel publishing, analysis of profile metrics and audience engagement
40.	Keyhole	Profile analytics, search for influencers and analytics of their profiles

Automated lead generation programs		
41.	ProspectIn	Sending messages and sending requests to be added to contacts
42.	Salesflow	Sending messages and sending requests to be added to contacts
43.	Waalaxy	Sending messages and sending requests to add to contacts, sending emails
44.	LeadIn	Sending messages and sending requests to add to contacts, sending emails
45.	Zopto	Automatic lead search, targeting and profile viewing
46.	We-connect	Automated lead generation
47.	Dux Soup	Automatic visits to profiles, sending requests to add to contacts, messages
48.	Expandi	Creating smart chains of actions, sending requests to add to contacts, sending emails, subscribing to profiles, sending messages
49.	Meet Alfred	Automatic message sending
50.	Linked Fusion	Sending messages and sending requests to add to contacts, analytics
Psychometric analysis programs		
51.	Crystal Personality Insights	Testing clients, determining personality type based on profile, personalizing letters
52.	Humantic AI	Determination of personality type by profile and text, personification of letters

Source: developed by the authors.

The analyzed programs most often have the functions of content management, analysis of subscriber statistics, analysis of profile metrics, and use automated lead generation tools. Unfortunately, this approach to finding a client and establishing relationships is not individual enough and does not take into account psychological characteristics. Among the programs studied, only two programs were identified that provide psychometric analysis, which we will consider in depth, since other functions are already better known.

4. Methods

The identified Personality AI-based software solutions for social network analysis are **Crystal Personality Insights** and **Humantic AI**. Both programs are designed to analyze LinkedIn profiles, resumes and texts and allow you to determine a personality type using DISC, OCEAN (Big-5) methods, predict a person's behavior and offer options for communicating with him/her.

To understand and compare the operating features of both programs, we will test them by choosing **one of the top managers of a leading IT company in China** as a potential interlocutor.

5. Results

5.1 Testing Crystal Personality Insights

Crystal uses Personality AI technology to predict a personality type by analyzing text on social media profile, resume, and more. The accuracy of such forecasts is on average 80% (Crystal. n.d., a). During the analysis, a combination of publicly available information in the LinkedIn profile is considered, incl. position, skills, interests, work experience and much more. The analysis process identifies strong positive and negative cues and maps them to the well-validated personality structure, DISC (Crystal. n.d., b). Each job title, skill, and industry correlates to some degree with one of the factors in the personality type assessment model. The combination of such correlation coefficients makes it possible to determine a personality type based on the profile in a social network. Crystal also offers personality tests that average 97% accuracy (Crystal. n.d., a).

To use the first method we just need to add a link to the profile of the person you are interested in to the registered personal account of the program or install the program extension in Google Chrome and go to the profile of the intended interlocutor on LinkedIn. The program analyzes a potential interlocutor using the DISC method - this is a four-factor personality model that allows you to group people into four categories based on their behavior patterns. Each of the four categories consists of subtypes. Most of the sixteen subtypes are a combination of the two main types, which can provide a more complete picture of them. Dividing into such subtypes helps to more accurately determine personal motives, strengths and weaknesses of a person, and understand how a person thinks and acts. The characteristics of the main four categories are presented in Table 2.

Table 2. Characteristics of personality types according to the DISC method

Category	Decoding	Personal Description
D	Dominance	Reflects how focused a person is on achieving goals and objectives, and his ability to achieve results, no matter how demanding the circumstances may be.
		People with a high score are straightforward, assertive, independent and decisive.
I	Influence	Reflects the extent to which a person chooses to work by influencing or persuading others.
		People with high scores tend to be confident, attractive, and extremely approachable.
S	Steadiness	Reflects the degree to which a person is likely to focus on cooperation, support, and communication. People with a high score are reserved, seek like-minded people, are supportive, consistent and loyal in their relationships.
C	Conscientiousness (Calculativeness)	Reflects the degree of caution, systematicity and analyticalness of a person. People with a high score are prone to deep analytics, gravitate towards rules, hierarchies, rigid structures and order.

Source: developed by the authors.

The personality type of the top manager in question according to the DISC method, determined by the program, is presented in Figure 1.
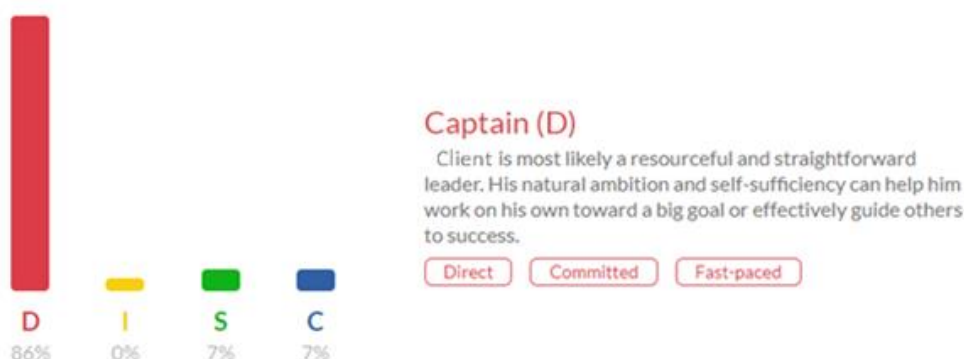

Figure 1. Personality type of the selected manager according to the DISC method, defined by Crystal
Source: Crystal, based on the profile analysis specified by the authors.

Thus, this leader is 86% straightforward and assertive, 7% supportive and loyal, 7% deeply rational and analytical. Thanks to understanding the distribution of these qualities in percentage terms, we can call the personality type of the selected leader - Captain (D). He/she is likely to be a resourceful and straightforward leader, and the natural ambition and self-sufficiency help him/her work independently to achieve goals and effectively lead others to success. The program identified the following qualities of a top manager: devoted to the idea, direct, impetuous. Tends to take an intensive but systematic approach to work and is efficiency-oriented.

In addition, Crystal, in the process of analyzing the profile, was able to determine character traits (Figure 2).

Thus, the chosen leader is risk tolerant rather than risk averse; sufficiently skeptical, pragmatic and impetuous. He/she is practical and expressive in almost equal measure, prone to independence and dominance.

The personality type defined by the program is characterized by certain behavior patterns, strengths and weaknesses, motivating and depressing factors. These are the ones that need to be taken into account when communicating and encouraging action. These characteristics were also identified by Crystal (Table 3).

Crystal not only determines a personality type and psychological characteristics, but also, as an assistant, offers communication options and behavior patterns that will be most pleasant to the interlocutor and will allow to win his/her favor (Table 4).

Figure 2. Personality Traits of the Selected Leader as Determined by Crystal
Source: Crystal, based on the profile analysis specified by the authors.

Table 3. Psychological qualities identified by the Crystal program

Motivation	Demotivation
1. Be a group leader	1. People who blindly support others
2. Get results	2. Skip deadlines
3. Compete and win	3. Getting distracted by things unrelated to the main conversation
4. Achieve goals	4. Open up emotionally

Strengths	Weaknesses
1. Motivate others with ambitious challenges.	1. Making changes quickly and decisively that negatively affects the work of others
2. Defend your point of view	2. Be critical of other people's decisions
3. Pursue important goals with persistence.	3. Having difficulty supporting people
4. Work independently	4. Refuse to think about how other people feel.

Source: Crystal, based on the profile analysis specified by the authors.

Table 4. Crystal Recommended Behaviors

Situation	Advice
Make a good first impression	Be persistent and straightforward
Gain trust	Be direct when you disagree
Product Demonstration	Anticipate possible rejection and be prepared to confidently defend your claims.
Negotiation	Gain control over information
Discussion of prices	Show how he can save more money in the future
How to get your interlocutor to act	Indicate what you will prepare in advance
Following actions	Ask one-word (yes/no) questions about your current status
	Avoid tightening
Writing a letter	Express yourself confidently and accurately
	Be direct

Source: Crystal, based on the profile analysis specified by the authors.

Based on the advice provided, the program also provides suggestions for writing an effective message to the interlocutor. Thus, the program highlights weak points in the text that we originally wanted to send and suggests replacing some phrases, taking into account the qualities that the interlocutor sympathizes with (Figure 3).
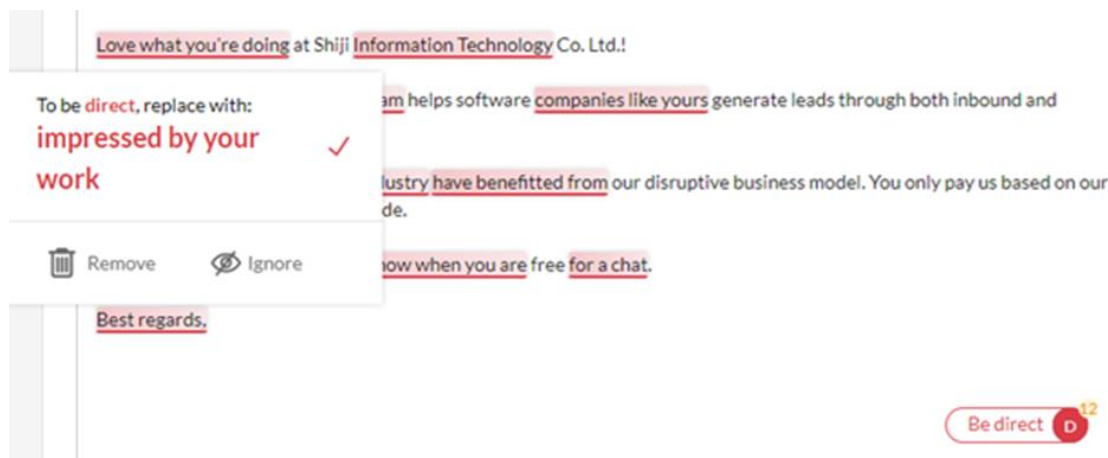

Figure 3. Crystal Writing Assistant tool
Source: Crystal, based on the profile analysis specified by the authors.

For example, in the presented text, the program suggests replacing the phrase "love what you`re doing" with "impressed by your work" so that the text is more accurate and business-like.

5.2 Humantic AI testing

Humantic AI is a pioneer in the field of predictive assessment of human behavior. The platform combines machine learning and artificial intelligence with social psychology, computational linguistics and psycholinguistics. Psycholinguistics is defined as the science of studying the relationships between language and psychological aspects. Linguistics, as an independent tool, can quite reliably determine a personality, but it faces two key problems: for a reliable result, a large volume of text written by the person being studied is required; or the text may actually have been written by someone else, which undermines the reliability of the study. Computational psychometrics addresses both problems (Humantic AI, n.d., a).

Computational psychometrics combines psychometrics, cognitive science, and artificial intelligence applied to large volumes of data. It relies not on the language itself, but on other signals - activity patterns, profile information, metadata, etc. An example of computational psychometrics would be a model showing the correlation between a person's agreeableness and openness and the number of LinkedIn recommendations someone makes (Humantic AI, n.d., a).

In order to reduce the impact on the final result of text that could be written by someone else, Humantic AI uses the following measures: increasing the significance of content that is most likely to be written by the person (reposts, comments); the relevance of each type of content is determined; the role of linguistics in artificial intelligence is limited to <50%. In addition, Humantic AI does not provide a result if its reliability is less than 40% (Humantic AI, n.d., a). In this way, both problems of psycholinguistics are solved, and the result of the study conducted using the program is more than reliable (over 85%) (Humantic AI, n.d., a).

The Humantic AI program works as an extension in the Google Chrome browser. In order to start analyzing a person's profile, you need to go to the person's page on LinkedIn and launch the program extension. Humantic AI analyzes a person's profile, his description, posts, interests and automatically determines a personality type and behavioral patterns. So, the program determined the following correlations of character traits using the DISC method (Figure 4).
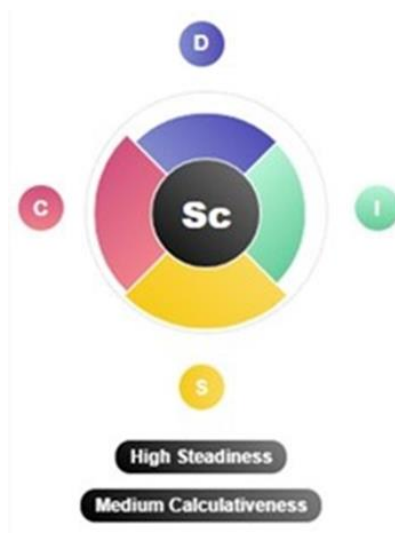
Figure 4. Personality type of the selected manager according to the DISC method, determined by Humantic AI program

Source: Humantic AI, based on the profile analysis specified by the authors.

So, according to the diagram, the top manager has developed stability and prudence to a greater extent, he/she is consistent and calm, glad of the opportunity to cooperate and can sometimes be indecisive or overly compliant. At the same time, the correlation of character traits forms such a type of personality as the Planner.

The program also represents a personality type according to the OCEAN method. The characteristics of each of the personality traits included in this model are presented in Table 5.

Table 5. Personality characteristics according to the OCEAN method

Category	Decoding	Description
O	Openness	Reflects the degree of intellectual curiosity, the desire to seek new experiences and a preference for novelty and variety. Those who score high tend to be creative, curious and open to trying new things, while those who score low tend to be consistent, cautious and more realistic in their approach.
C	Conscientiousness	Reflects the degree of self-discipline, focus on doing everything as planned and acting obediently. Those who score high tend to be efficient, organized and focused, while those who score low tend to be easy-going, spontaneous and at times unreliable.
E	Extraversion	Reflects the degree of self-confidence and sociability that an individual exhibits. People who score high on extraversion tend to be outgoing, energetic, and talkative, while those who score low tend to be reserved, quiet, and thoughtful, especially in social settings.
A	Agreeableness	Reflects the degree of compassion, cooperation and general friendliness in a person. Those who score high are generally level-headed, pleasant and easy to persuade, while those who score low tend to challenge and question things and are more likely to have the opposite attitude.
N	Emotional Stability	Reflects the degree to which a person can easily experience unpleasant emotions such as anger, anxiety, etc. Those who score high tend to be calm, stable and not easily angered, while those who score low tend to control their impulses, especially under stressful circumstances.

Source: developed by the authors.

The profile of the selected manager according to this methodology is presented in Figure 5.
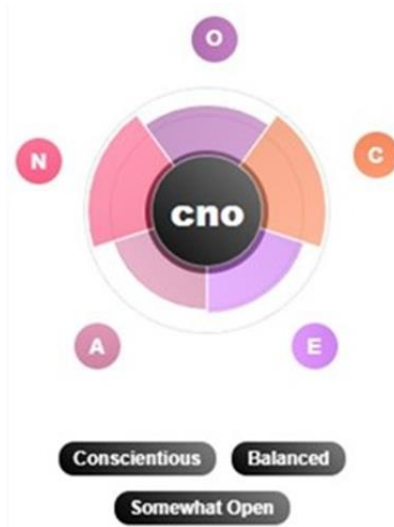

Figure 5. Personality type of the selected leader according to the OCEAN methodology, determined by Humantic AI program

Source: Humantic AI, based on the profile analysis specified by the authors.

According to the diagram above, this top manager is to a large extent emotionally stable and conscientious, and openness may also be moderate in behavior. Combining both methodologies, the program determined the following personality description for the manager in question: "Deliberate, inflexible, analytical and cautious. Does not like to take risks and in the end chooses proven options. Observant. He/she is quite aware of needs and limitations, so he/she is unlikely to overpromise." The reliability of the presented personality type prediction is 85.5%.

However, the reliability of the forecast can be increased by adding text to the program that was written by this manager - a few lines of text from a blog, resume, letter, etc. We add to the text input window all interviews and series of questions and answers found in the public domain, letters in English and Chinese, and we get another result, the reliability of which is higher - 96.3% (Figure 6).
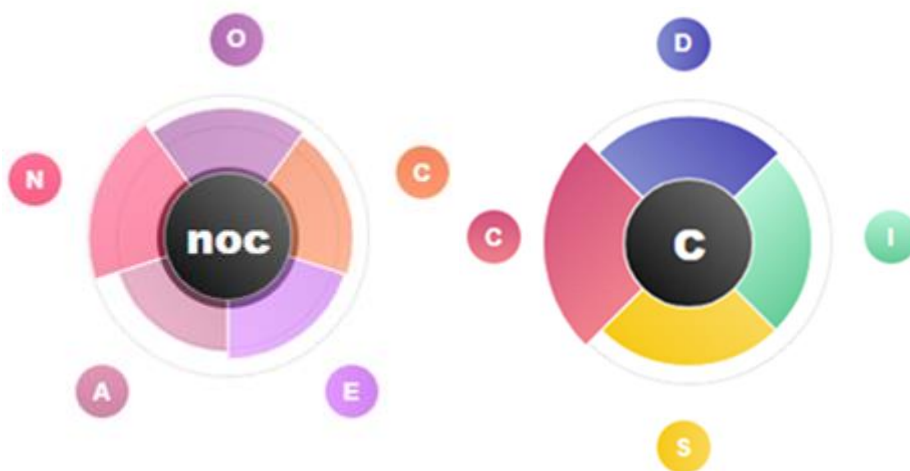

Figure 6. Personality types identified by Humantic AI with 96.3% confidence

Source: Humantic AI, based on the profile analysis specified by the authors.

So, according to the recalculated result, this leader is a Critic, likes to work alone and does not rely on others very often. Prefers to conduct logical analysis and values evidence over emotions. Does not like to exaggerate

and embellish if it is not supported by facts. The top manager has well-developed prudence and systematicity, he/she is highly emotionally stable, prudent and sufficiently open to people. The program also highlights the following qualities: criticality, accuracy, focus on increasing the return on investment in the work. Does not make quick and rash decisions, but at the same time does not take too long. In addition, can accept the risk if he/she is sure that it is justified.

Like Crystal, Humantic AI also provides recommendations for communicating with your intended interlocutor (Table 6).

Table 6. Recommended behavior models proposed by the Humantic AI program

Situation		Advice
When prospecting	Do this to create a winning conversation	1. Don't forget to mention how you compare to your competitors in both features and price.
		2. Be prepared for insightful questions and critical analysis of your presentation.
		3. Be prepared to answer many questions requiring clarity and requests for information.
	Don't do this, you will lose their trust	1. Do not give superficial answers, they will easily infuriate you.
		2. Don't try to give too many examples of other users, they like to make their own decisions.
		3. Avoid undue pressure to involve other stakeholders unless it is critical.
When negotiating and closing a deal	The secret to getting closer quickly	What matters most to them is strong evidence of ROI, effective pricing and verified data.
	Do you ever get a clear answer from the other person?	It is not very difficult for them to say "no" if they are not sure about the decision they have made.
Writing a letter	Letter subject	Purpose of the letter
	Subject length	2-3 words
	Greetings	Yes (something normal)
	Using titles (Mr., Miss, Mrs.)	No
	Using bulleted lists	Recommended
	Conclusion	Logical summary or question
	Using the final formula of a letter (With respect; Sincerely yours)	Absent or formal
	Tone of words	Objective, informational
	General message	Focuses on eliminating doubt and reassuring ROI
	Letter length	Short

Source: Humantic AI, based on the profile analysis specified by the authors.

Based on the proposed recommendations, the program is able to edit the text of the original letter and present a version of the text that will be most pleasant to the interlocutor and encourage him/her to take action. We will offer a version of a standard letter of introduction to a potential client (McKnight, 2023) and see what changes the program makes to the letter (Table 7).

Table 7. Recommended text for the letter suggested by the Humantic AI program

Original text	Edited text
Hi [Prospect],	[Prospect],

[Your name] with [your company]. We're a Y company specializing in [choose either your primary vertical or a vertical you have experience in] to [insert a typical challenge you help clients face].	A Y company specializing in [vertical]. We help clients face the challenge of [challenge].
I'm wondering if you might be open to an initial conversation to gauge a fit?	Would you be interested in discussing the potential for collaboration? We have experience working with similar companies to achieve desired outcomes.
We've worked with companies like [insert 2-3 clients here relative to the vertical] to [insert a typical client goal].	
If you have a minute or two to learn more about us, you can visit us here at [site]. If I don't hear from you, I will reach out to you via phone later in the week.	Visit us at [site] to learn more about us. If no response is received, a follow-up call will be made later in the week.
Thank you,	
[Your Name]	Thank you,
	[Your Name]

Source: Humantic AI, based on the profile analysis specified by the authors.

We see that the program has divided the text into paragraphs to make the text easier to read. The letter has become shorter, clearer and more understandable, which is ideal for a person who likes to systematize. Humantic AI has the ability to manually determine the purpose of the letter - be it getting to know a client or concluding a deal. The program automatically personalizes the text in accordance with the chosen purpose and personality type of the interlocutor.

6. Discussion

Both Crystal and Humantic AI were able to determine the personality type of the selected top manager, but the results were different. Let's compare the main results obtained in each of the programs.

So, according to Crystal, this leader has a more developed dominance, the archetype is Captain (D). The Humantic AI program assessed dominance at a low level, and the potential interlocutor was characterized as a high level, his archetype being Critic (C). Despite the fact that different archetypes were defined by the programs, there are many similarities in personality descriptions. For example, both programs determined in the top manager risk tolerance (but, according to Humantic AI, on the condition that the risk will be justified after analytical conclusions), skepticism, pragmatism, fact-orientation, the desire to work alone and the desire to criticize other people's decisions. When communicating with him/her, both programs advise not to give superficial answers and to be straightforward and moderately formal. This leader has a poorly developed emotionality, and therefore it is not easy for him/her to support others or think about other people's feelings.

A significant difference in determining personality arose only in the percentage of the DISC profile: if in Crystal dominance was rated high and clarity low, Humantic AI rated these categories exactly the opposite. However, both programs simultaneously use other methods for assessing personality type (Big-5, etc.), so as a result the discrepancy is reduced.

A big advantage of the Humantic AI program is the ability to increase the accuracy of the forecast by loading the text of the subject being studied. As we have already seen, this made it possible to completely change the result of the assessment. As a result, the forecast reliability was higher than in Crystal. However, it is worth mentioning the assumption that this reliability indicator was calculated by the developers of both programs only for the English language. While Crystal only supports English, we were also able to upload texts in Chinese to Humantic AI. As a result, we cannot say that this figure for the forecast reliability indicator in Humantic AI is reliable, although on average the forecast accuracy is higher in this particular program.

Thus, the functionality of programs in psychological assessment of personality is similar. Both programs present an assessment using the DISC and Big-5 models (in the paid version of Crystal), give advice on communicating with the interlocutor and personalize e-mails. Additionally, in the Crystal program you can be tested not only using the methods already indicated, but also using the methods of 16 personality types according to Myers-Briggs and the Enneagram. The paid version of Humantic AI is also capable of identifying interests based on a social network profile and assessing behavior.

Despite the similar functionality, the Humantic AI program is currently more popular among users of sales

assistant programs. Figure 7 shows a matrix with such programs: the further to the right the program is located on the matrix, the higher the user satisfaction with it. The higher the program icon, the larger the industry share this program occupies (according to the volume of presence on the Internet, social networks, and the number of reviews from users). Humantic AI is one of the TOP 10 current leaders in the industry (G2 Grid, n.d.).

Figure 7. Comparison matrix for sales assistant programs (Sales AI)

Source: G2 Grid.

7. Conclusion

Thanks to programs with the Personality AI function, we can not only determine a personality type and psychological qualities, but also understand what model of behavior our potential interlocutor adheres to, what decisions and how prefers to make, what qualities sympathizes with in others. This knowledge is extremely important in modern business: if people feel a special attitude towards themself, a personalized approach, then they will more easily meet halfway and agree to cooperate, no matter what area or industry the transaction relates to.

This approach can be simplified and automated for any business thanks to programs based on artificial intelligence. Today, their popularity is only growing, predictive abilities are improving, and soon the use of programs such as Crystal and Humantic AI will become natural.

References

Chung, C. K., & Pennebaker, J. W. (2018). Textual analysis. *Measurement in Social Psychology,* 153-173. https://doi.org/10.4324/9780429452925-7

Chung, C. K., & Pennebaker, J. W. (2018). What do we know when we LIWC a person? Text analysis as an assessment tool for traits, personal concerns and life stories. *The Sage handbook of personality and individual difference*, 341-360. https://doi.org/10.4135/9781526451163.n16

Crystal. (n.d., a). *How accurate is Crystal?* Crystal Knows. Retrieved from https://docs.crystalknows.com/how-accurate-is-crystal

Crystal. (n.d., b). *How Crystal Predictions Work?* Crystal Knows. Retrieved from https://www.crystalknows.com/how-predictions-work

Crystal. (n.d., c). Website https://www.crystalknows.com/

Date, S., Sonkamble, K., & Deshmukh, S. (2023). Sentiment Analysis Using Computer-Assisted Text Analysis Tools. *ICAMIDA 2022, ACSR, 105,* 671-679. https://doi.org/10.2991/978-94-6463-136-4_58

Fernandez, S., Stocklin, M., Terrier, L., & Kim, S. (2021). Using available signals on LinkedIn for personality assessment. *Journal of Research in Personality, 93,* 104-122. https://doi.org/10.1016/j.jrp.2021.104122

G2   Grid.   (n.d.).   *Best   AI   Sales   Assistant   Software.*   G2   Grid.   Retrieved   from https://www.g2.com/categories/ai-sales- assistant?utf8=%E2%9C%93&selected_view=grid#grid

Han, N., Li, S., Huang, F., Wen, Y., Su, Y., Li, L., … Zhu, T. (2023). How social media expression can reveal personality. *Frontiers in Psychiatry, 14.* https://doi.org/10.3389/fpsyt.2023.1052844

Humantic   AI.   (n.d.,   a).   *How   Humantic   AI   works.*   Humantic   AI.   Retrieved   from https://humantic.ai/resources/How%20does%20Humantic%20AI%20work.pdf

Humantic AI. (n.d., b). Website https://humantic.ai/

Humphreys, A., & Wang, R. J.-H. (2018). Automated Text Analysis for Consumer Research. *Journal of Consumer Research, 44*(6), 1274-1306. https://doi.org/10.1093/jcr/ucx104

McKnight, L. Jr. (2023). *10 Sales Email Templates to Get & Keep a Client's Attention*. Hubspot. Retrieved from https://blog.hubspot.com/sales/sales-email-templates-to-get-and-keep-buyers-attention

Nuraeni, Limakrisna, N., Hartoyo, H., & Diana. (2023). Cyberloafing Mediation of The Big Five Personalities on the Performance of Generation Z Employees in the South Jakarta Region. *International Journal of Professional Business Review, 8*(6), e02292. https://doi.org/10.26668/businessreview/2023.v8i6.2292

Ou, C.-C., & Chuang, S.-H. (2023). Exploring the Factors that Influence Consumers to Purchase Perfume Products.   *International   Journal   of   Professional   Business   Review,   8*(5),   e01310. https://doi.org/10.26668/businessreview/2023.v8i5.1310

Prokopyev, N., Vakhitov, G., & Ustin, P. (2020). Indexing of social network texts for psychometric model of academic success prediction. *Advances in Social Science, Education and Humanities Research, 437,* 807-812. https://doi.org/10.2991/assehr.k.200509.143

Roulin, N. & Levashina, J. (2018). LinkedIn as a new selection method: Psychometric properties and assessment approach. *Personnel Psychology*, 1. https://doi.org/10.1111/PEPS.12296

Roulin, N. (2022). LinkedIn-based assessments of applicant personality, cognitive ability, and likelihood of organizational citizenship behaviors: Comparing self-, other-, and language-based automated ratings. *International Journal of Selection and Assessment, 30*(3). https://doi.org/10.1111/ijsa.12396

Open access

Copyrights