AI Powered Telegram Sales Automation

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1. Introduction

The current increase in artificial intelligence and automation techniques has led to the creation of intelligent representatives of artificial agent-based systems that can simplify complex workflows and make the processes more efficient (Terrin Pulikottil et al., 2023). The study within this context had a collaborative team project in designing and developing a Telegram-based AI assistant to operate to a small bakery business Heavenly Cakes UK. The goal was to develop a complete sales automation system, which could handle customer communication, take cake orders, check the stock and create secure links to obtain payment, and to update record of orders in an efficient way.

The toolkit primarily consisted of no-code and API-based platforms, such as n8n, a workflow orchestration framework, Open AI and GPT-4 to work with natural language, Google Sheets to keep track of inventory and orders and PayPal REST API to complete secure payments. Telegram acted as the main user interface, through which customers and the AI helper were communicating without any difficulties.

2. Task 1 – Portfolio of Evidence

2.1 Project Context & Overview

The project was idealized to convert the old manual process of ordering cakes whereby the customers get to order the cakes manually to a digitally automated workflow to increase efficiency, accuracy, and customer experience. The business client of this solution was the Heavenly Cakes UK that is a boutique bakery. The main aim was to come up with an AI automated system that would be in a position to answer customer questions and process customer orders making a secure payment with limited human involvement.

It was created as a combination of modern tools and platforms, such as n8n to automate workflows, the Telegram API as the customer portal, GPT-4 (OpenAI) to provide smart conversational support, Google Sheets to manage orders and inventory upon instant updates, and PayPal API to integrate seamless payments fluidly. The initiative sought the solution to the issue of introducing AI agents to address a real-life business case to provide an automated end-to-end application that performs its sales and customer interaction application (Tuomela, 2025).

2.2 My Key Contributions

2.2.1 Designing the End-to-End Workflow

The key part was the development and execution of the Plan of the overall automation process using n8n, a low-code automation platform that made it possible to orchestrate multilevel processes without coding. The modular nodes formed the workflow and encompassed Telegram message triggers, parsing of JSON, Google Sheets query inventory validation, and conditional routing of a request to PayPal payment requests.

The definition of logical steps was based on visual programming aspects including the use of drag-and-drop node configuration and flow mapping. The decision-making was possible based on user input through flow control mechanisms such as If conditions and switch nodes (Mueller-Bloch et al., 2022). Moreover, the process of the integration of webhooks was applied to allow the communication with external services in real-time, e.g., accepting the updates of the payment status on PayPal.

It all ran through one logical automation flow leading to the moment when a customer makes a question, order is confirmed, and payment status is updated. This design meant that the system was possible to make self-governing whereby reliability and accuracy were maintained. The flow was also modular which means it could be quickly debugged and scaled in the future.

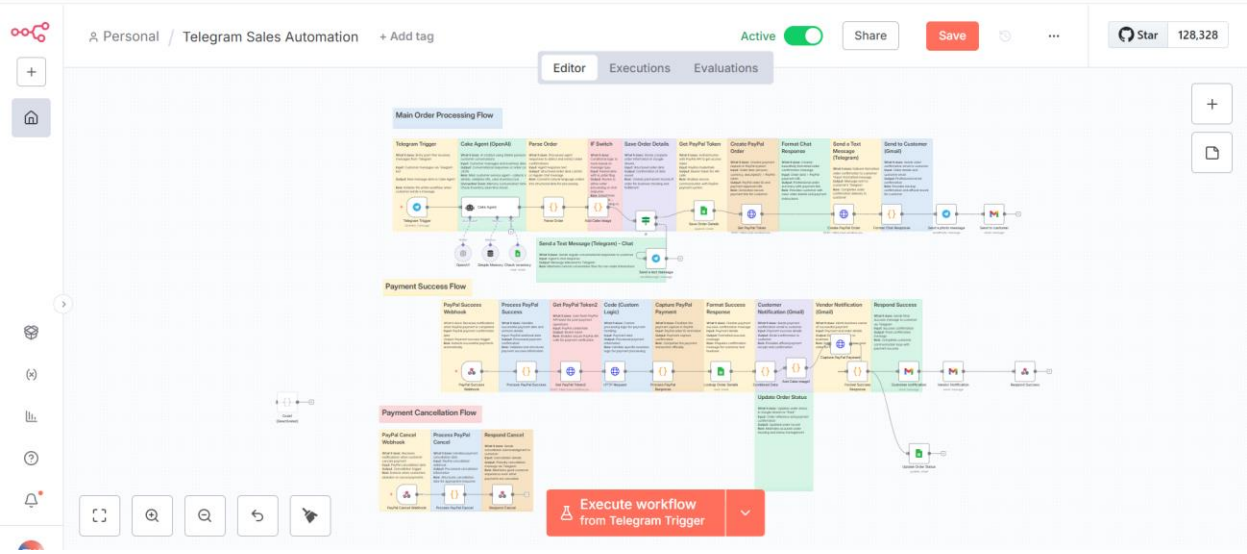


Figure 1: Full sales automation workflow

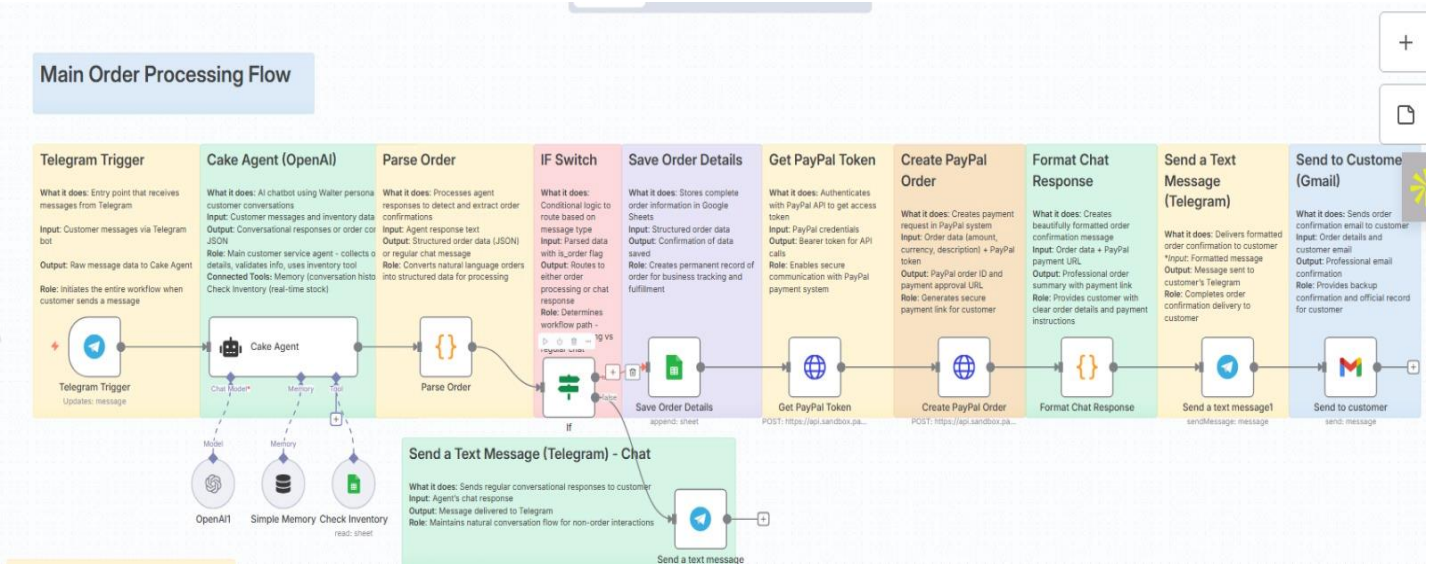


Figure 2: Main Workflow Diagram

Figure 2: Main Workflow Diagram illustrates the full logic flow of the sales automation system within the n8n interface.

2.2.2 Telegram Bot + GPT-4 Integration

The other important aspect was combining Telegram Bot API with the OpenAI GPT-4 and creating a smart chat-based AI or a conversational assistant (Olivier Caelen and Marie-Alice Blete, 2024). It was a bot that was to navigate through the whole process of handling the customers including menu navigation, product recommendation, and order taking.

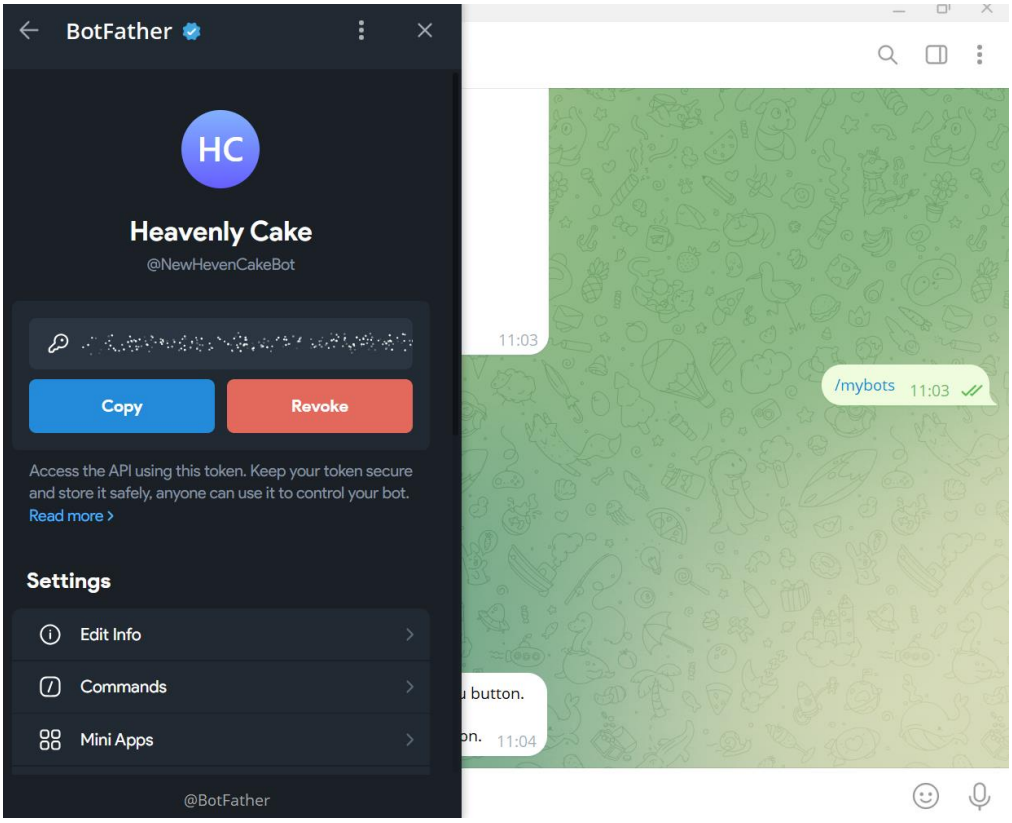


Figure 3: Telegram API generation

Telegram was connected to GPT-4 with a webhook trigger that sent the messages that a user sent to Telegram through an API of GPT-4. The agent was instructed as to uphold contextual grasp through a memory buffer and this enabled multi-turn conversation that was analogous to human communication. This was critical in recording details of orders and providing personalized customer support. The Telegram key was created using Telegram BotFather.

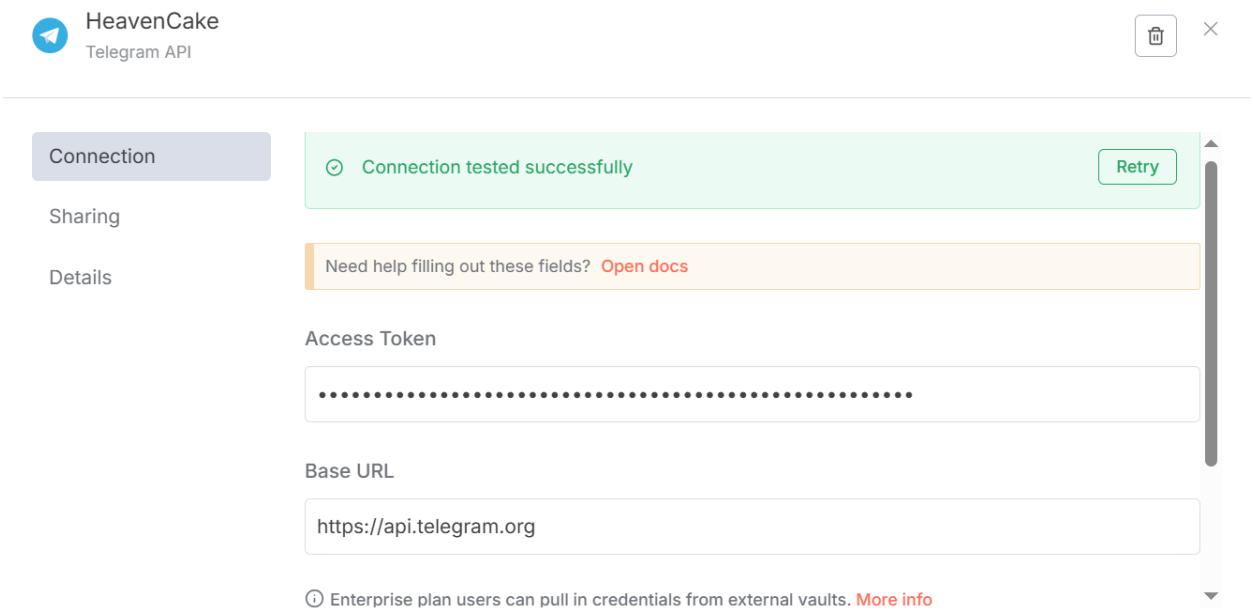


Figure 4: Telegram API connection

Besides normal talking, The AI agent was set up to respond to structured JSON information within the user responses. This data involved choosing cakes, size, number, delivery details and accompanying contact details of the customers and these data were subsequently verified and forwarded into automation pipeline to be run further (Hsieh, 2023).

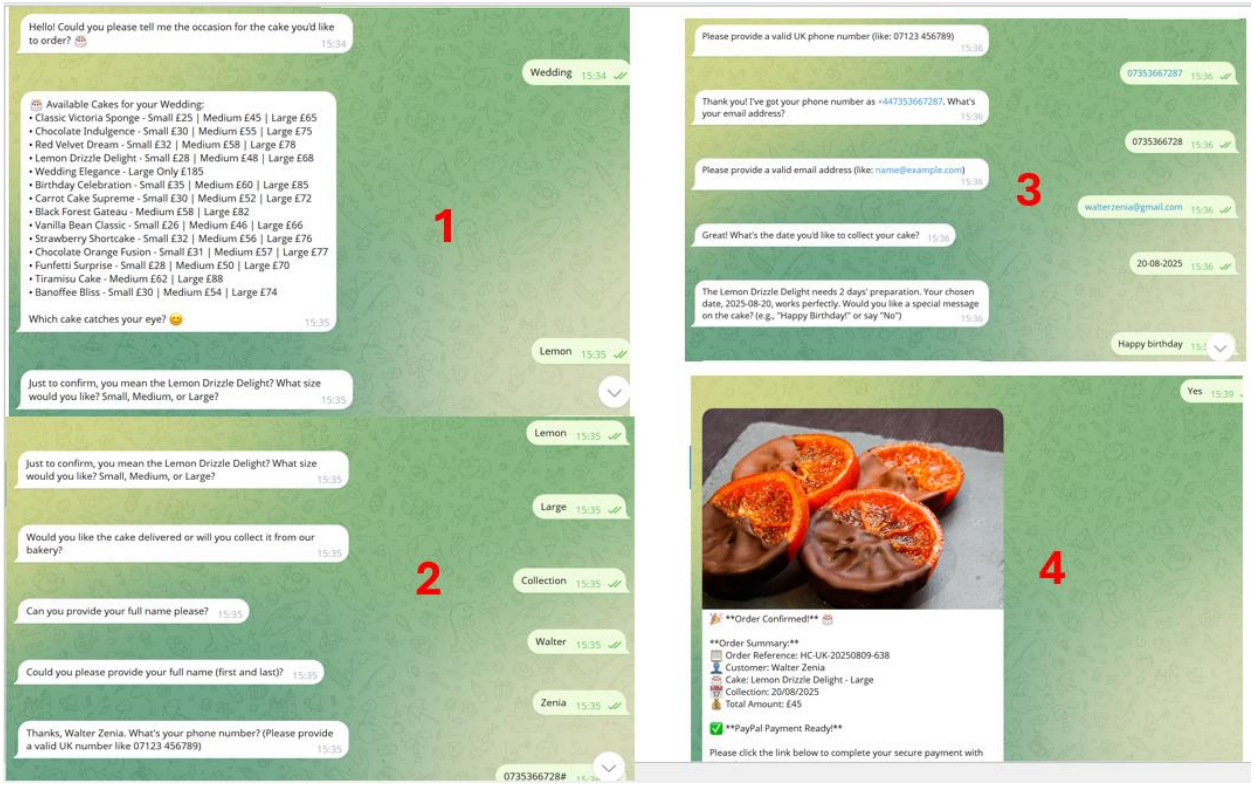


Figure 5: Heavenly Cake Chat Flow

Figure 5: The Agent Chat Flow illustrates how regular the interchange between the customer and the AI assistant is, and how the highly structured, but loose, conversational interface is presented.

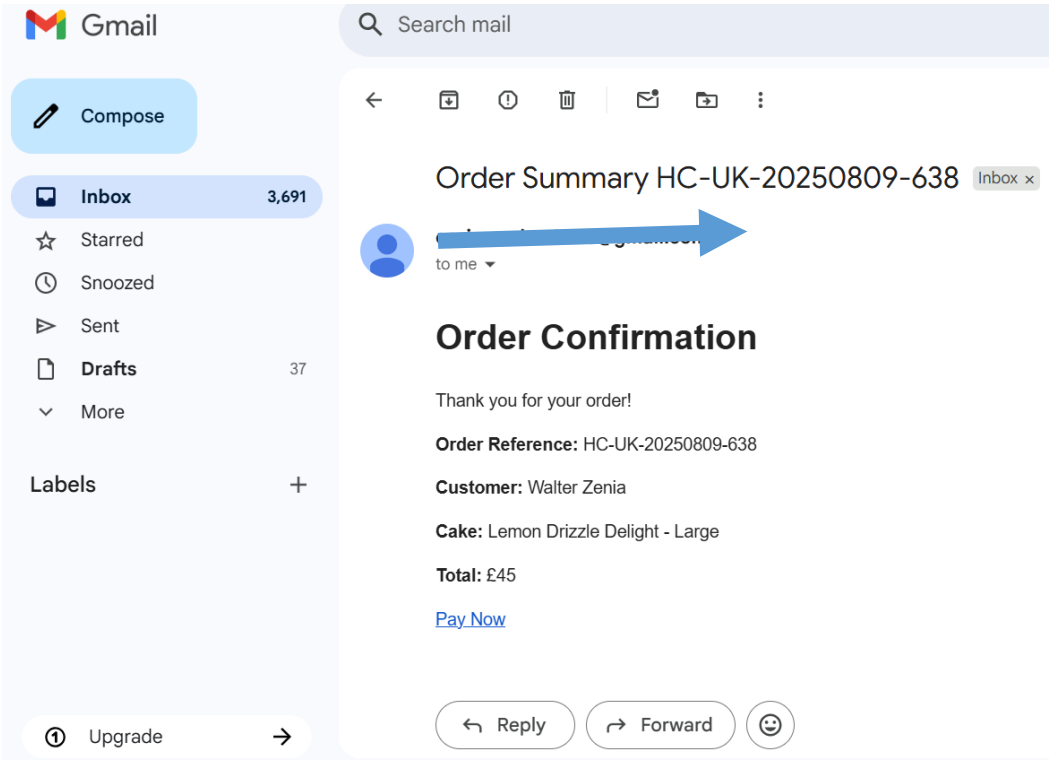


Figure 6: Order confirmation

2.2.3 PayPal Payment Gateway Integration

The system also involved PayPal REST API with OAuth 2.0 authentication to include secure and smooth financial processes. The integration promoted automation of the deposit payment on PayPal as a way of PayPal payment and guaranteed security in all the payment engagements.

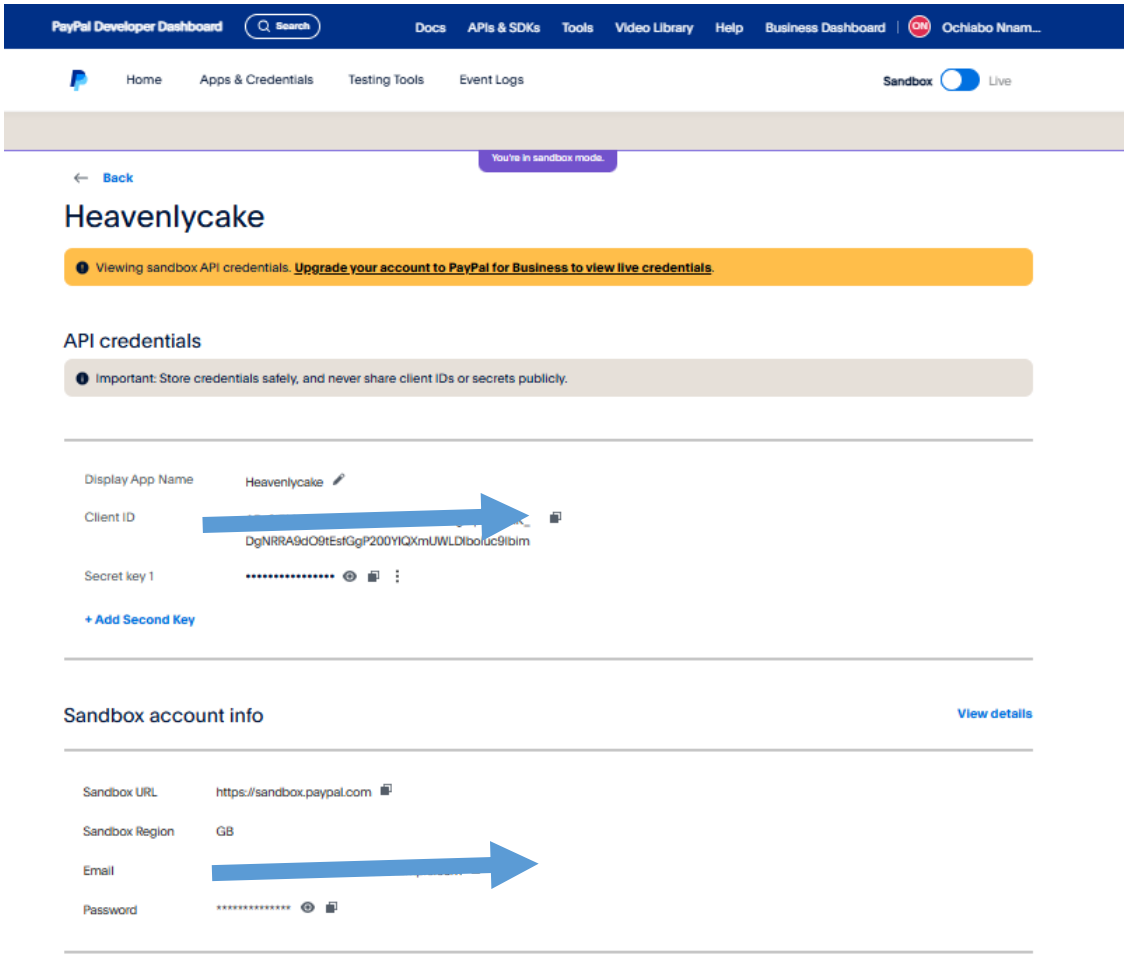


Figure 7: Paypal API key

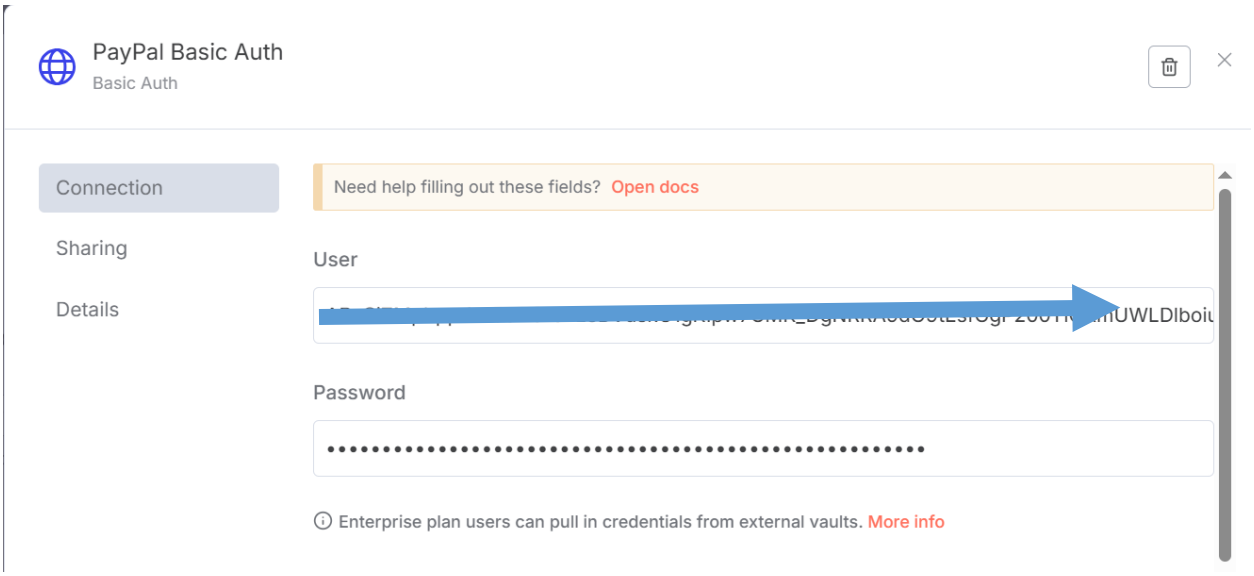


Figure 8: Paypal Basic Auth

PayPal was connected to n8n by setting up a Basic Auth credential with the required API username and password. An HTTP Request node was used in the workflow, configured with the appropriate PayPal API endpoint sandbox. The credential was linked to the node, allowing n8n to automatically handle authentication. This setup enables secure, authenticated requests to be sent to PayPal without the need for manual header configuration.

When the system receives confirmation of order status by the customer, the PayPal API based dynamic payment link is created by the system, and the customer immediately receives it through Telegram and email. When an order is received via email, the customer is directed to complete the full payment through PayPal. The total amount calculated automatically based on the parameters entered in Google Sheets is deducted from the customer's PayPal account during the transaction.

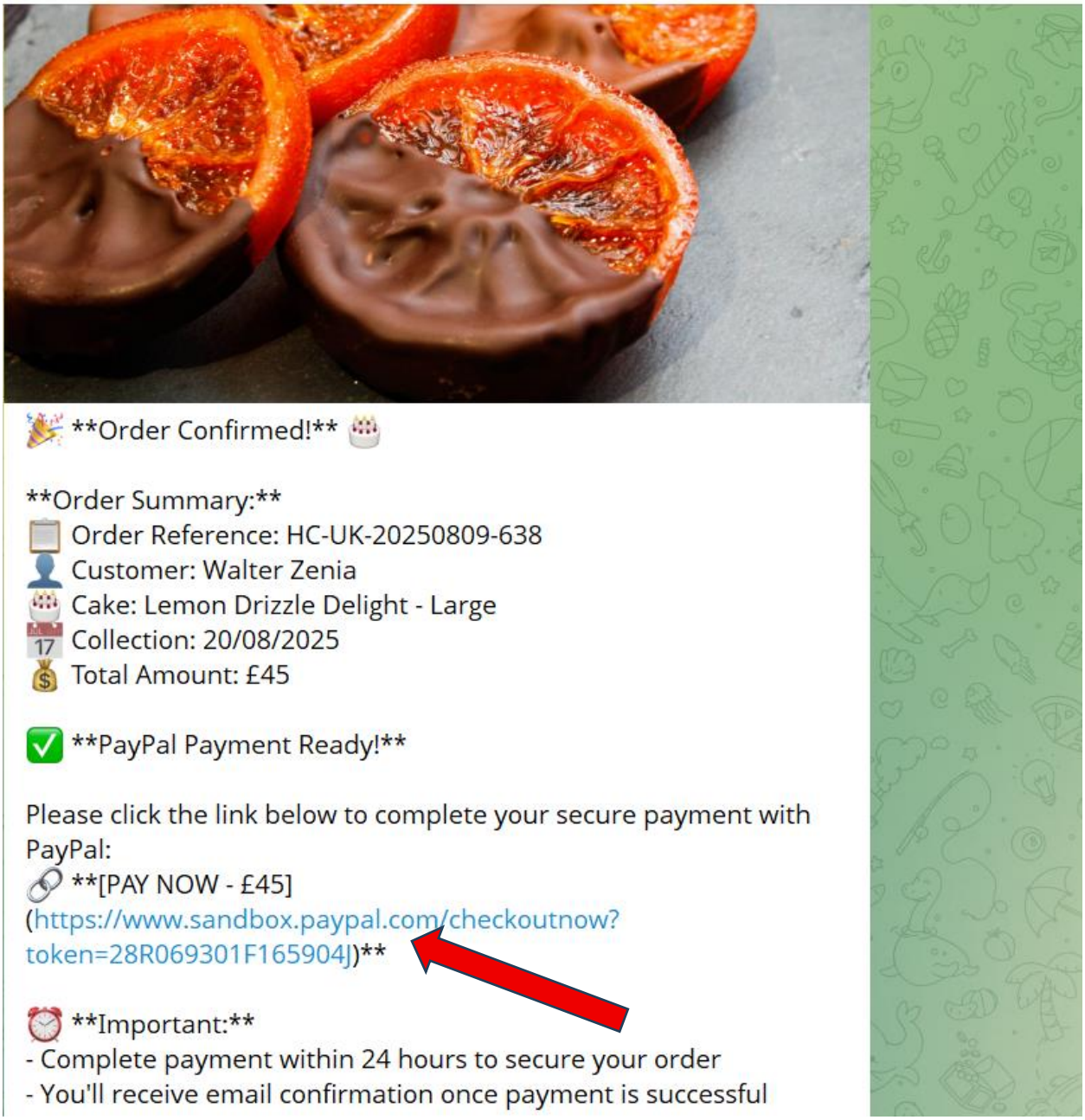


Figure 9: Paypal link generated

Webhook callbacks were also used in the system to identify and react to events on the payment process. Once paid the workflow would amend the Google sheets order record and send confirmations to the customer and the business. When pay is cancelled, a cancellation flow was activated to record the failed payment and inform the consumer of the same.

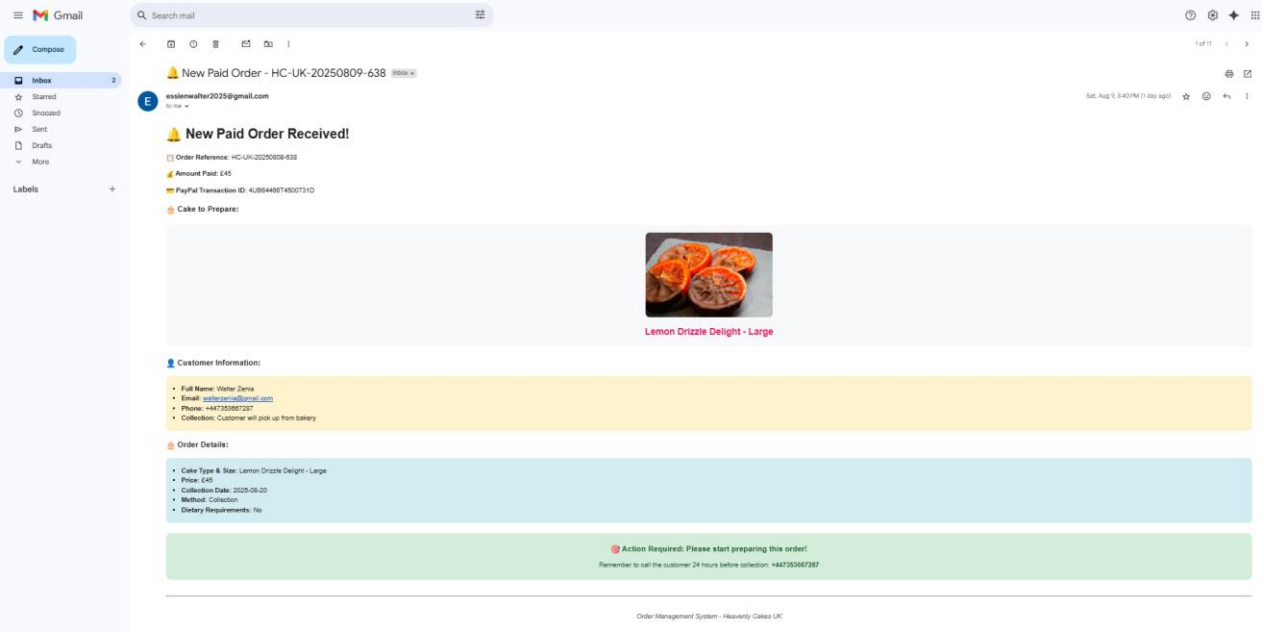


Figure 10: Order confirmation

Upon successful completion of payment, a comprehensive order confirmation is sent directly to the email address provided during checkout. This confirmation includes all relevant details such as the cake type, size, collection or delivery method, and scheduled date. Once confirmed, the preparation process begins promptly to ensure the cake is crafted to specification, using fresh ingredients and adhering to the selected preferences. The finished order will be delivered or made available for collection on the chosen date, ensuring a smooth and timely experience from payment to pick up.

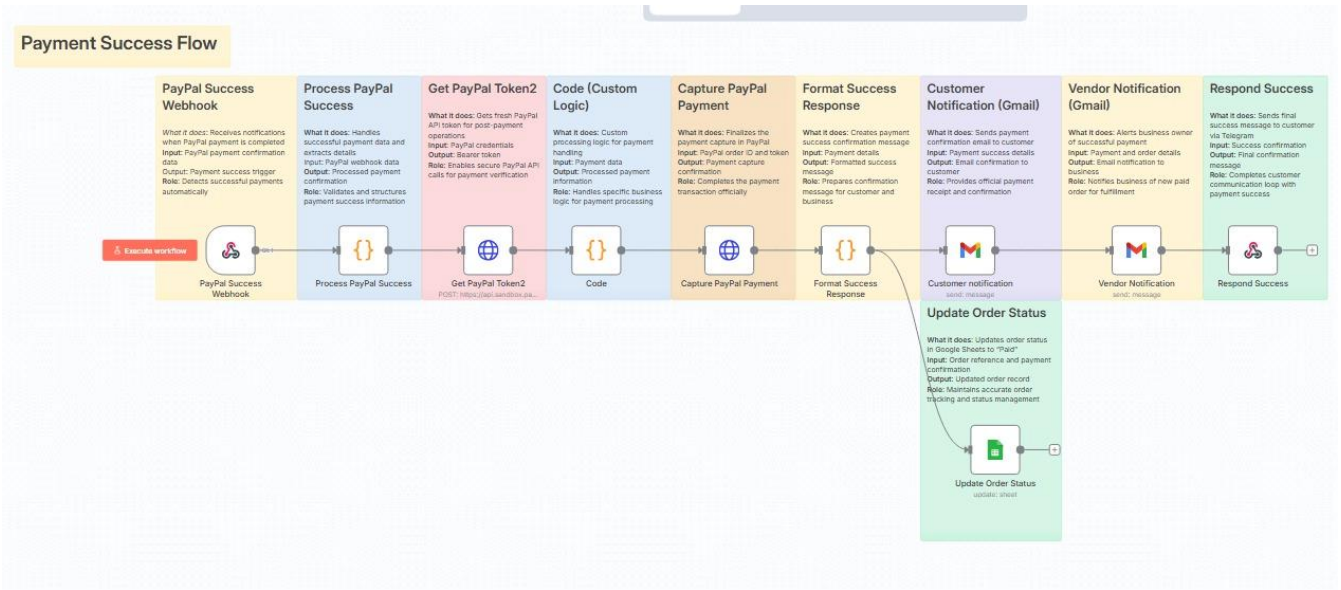


Figure 11: Payment Success Flow

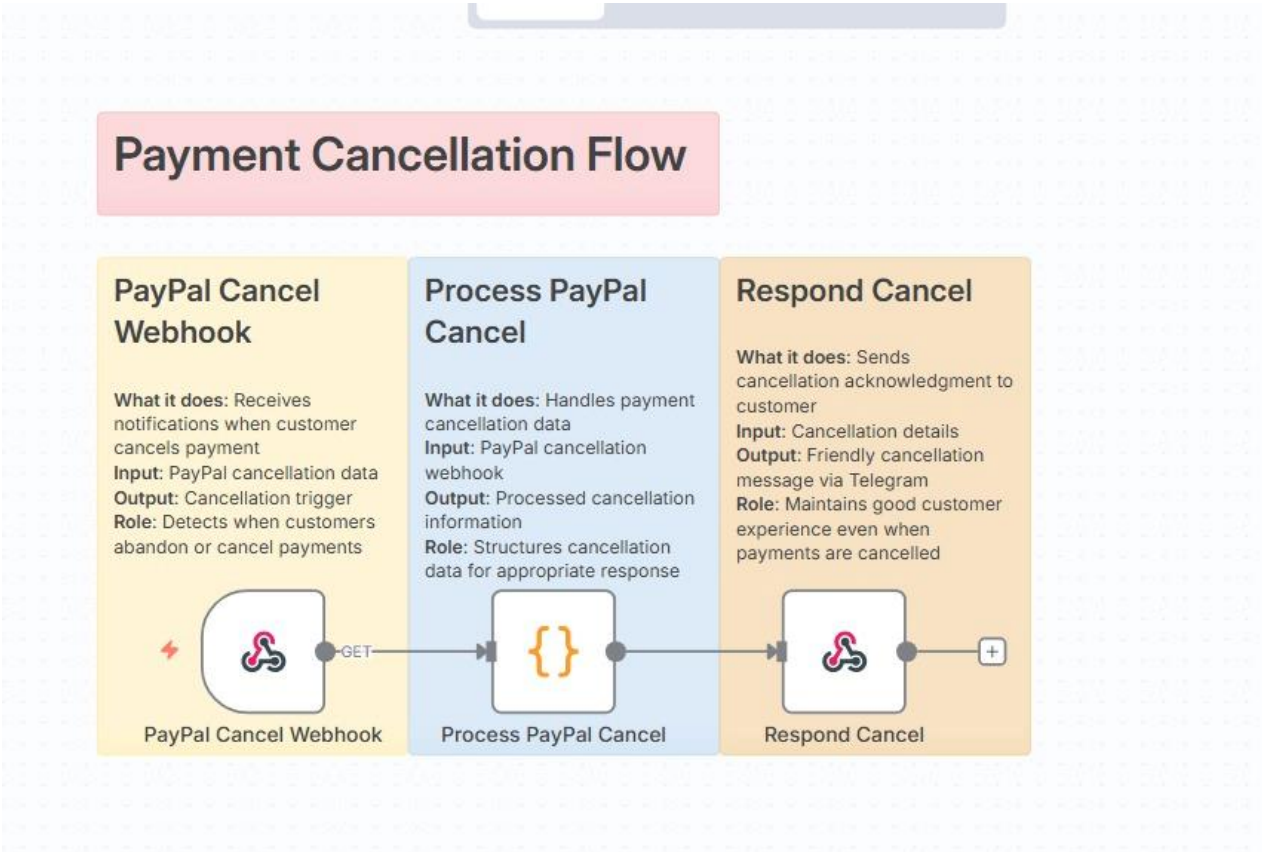


Figure 12: Payment Cancellation Flow

Figure 11: Payment Success Flow and **Figure 12:** Payment Cancellation Flow allows the visual representation of the outcome and the respective processing by the system.

2.2.4 Google Sheets as Database

The core automation data was stored in Google Sheets where inventory, customer orders, customer pricing, and history of transactions were maintained. This option was free, easy to reach, synchronized in real-time, and supported other automation systems, like n8n.

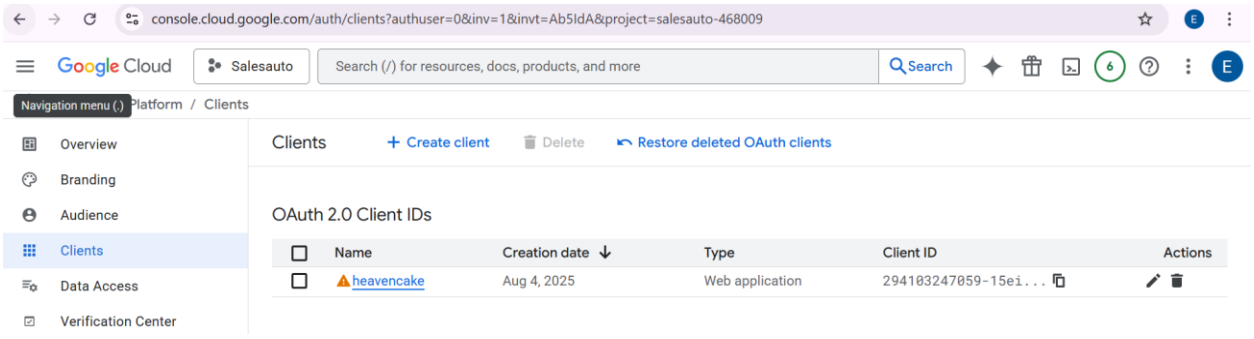
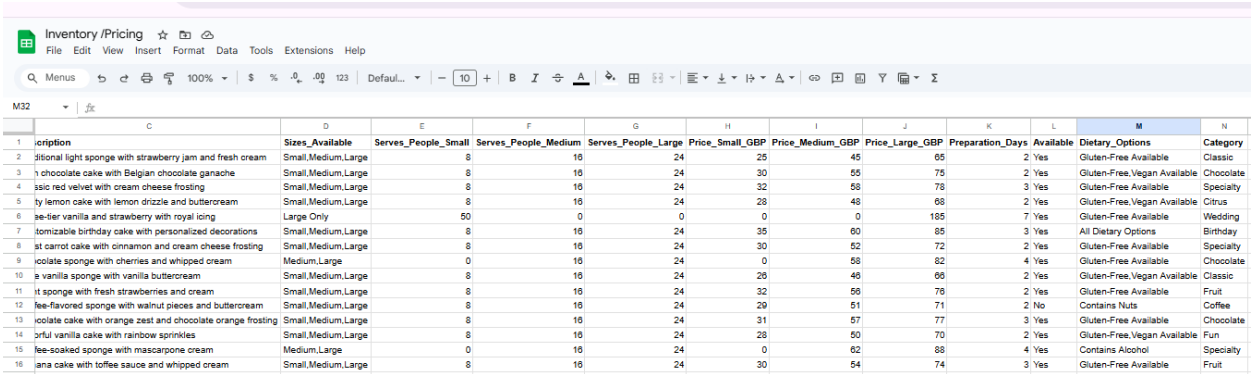


Figure 13: Google Cloud OAuth IDs

In case an order was placed successfully, the organized data retrieved using the Telegram Bot and GPT-based conversation was automatically written down into a predetermined Google Sheets file (Sonnino, 2024). Ensuring that the correct information was applied and that it is current to the customer, ordering process was performed by querying the spreadsheet to ensure product availability and retrieved current pricing.



	C	D	E	F	G	H	I	J	K	L	M	N
1	scription	Sizes_Available	Serves_People_Small	Serves_People_Medium	Serves_People_Large	Price_Small_GBP	Price_Medium_GBP	Price_Large_GBP	Preparation_Days	Available	Dietary_Options	Category
2	ditional light sponge with strawberry jam and fresh cream	Small,Medium,Large	8	16	24	25	45	65	2	Yes	Gluten-Free Available	Classic
3	h chocolate cake with Belgian chocolate ganache	Small,Medium,Large	8	16	24	30	55	75	2	Yes	Gluten-Free,Vegan Available	Chocolate
4	ssic red velvet with cream cheese frosting	Small,Medium,Large	8	16	24	32	58	78	3	Yes	Gluten-Free Available	Specialty
5	ty lemon cake with lemon drizzle and buttercream	Small,Medium,Large	8	16	24	28	48	68	2	Yes	Gluten-Free,Vegan Available	Citrus
6	ee-tier vanilla and strawberry with royal icing	Large Only	50	0	0	0	0	185	7	Yes	Gluten-Free Available	Wedding
7	tomizable birthday cake with personalized decorations	Small,Medium,Large	8	16	24	35	60	85	3	Yes	All Dietary Options	Birthday
8	st carrot cake with cinnamon and cream cheese frosting	Small,Medium,Large	8	16	24	30	52	72	2	Yes	Gluten-Free Available	Specialty
9	colate sponge with cherries and whipped cream	Medium,Large	0	16	24	0	58	82	4	Yes	Gluten-Free Available	Chocolate
10	e vanilla sponge with vanilla buttercream	Small,Medium,Large	8	16	24	26	46	66	2	Yes	Gluten-Free,Vegan Available	Classic
11	t sponge with fresh strawberries and cream	Small,Medium,Large	8	16	24	32	56	76	2	Yes	Gluten-Free Available	Fruit
12	fee-flavored sponge with walnut pieces and buttercream	Small,Medium,Large	8	16	24	29	51	71	2	No	Contains Nuts	Coffee
13	colate cake with orange zest and chocolate orange frosting	Small,Medium,Large	8	16	24	31	57	77	3	Yes	Gluten-Free Available	Chocolate
14	rful vanilla cake with rainbow sprinkles	Small,Medium,Large	8	16	24	28	50	70	2	Yes	Gluten-Free,Vegan Available	Fun
15	fee-soaked sponge with mascarpone cream	Medium,Large	0	16	24	0	62	88	4	Yes	Contains Alcohol	Specialty
16	ana cake with toffee sauce and whipped cream	Small,Medium,Large	8	16	24	30	54	74	3	Yes	Gluten-Free Available	Fruit

Figure 14: Datasheet inventory and price table

After confirming payments, the payment status and the timestamp were added to the sheet, thus allowing tracking in real-time. The tabular organization of the information allowed it to be filtered, sorted, and reported operationally and business-wise within a short period of time.

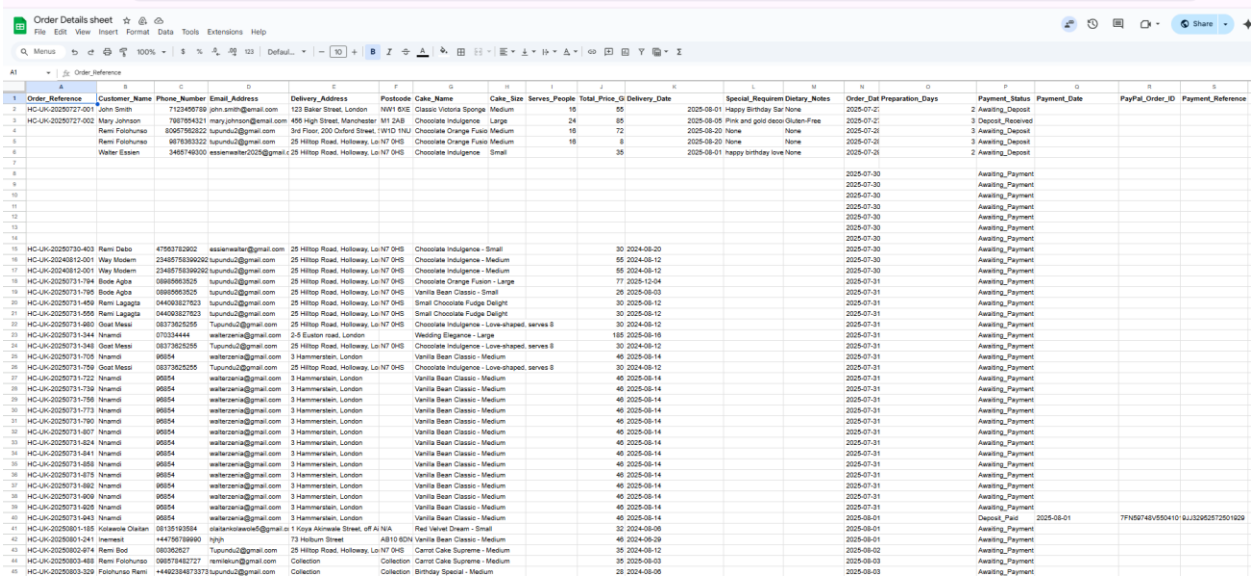


Figure 15: Order details table

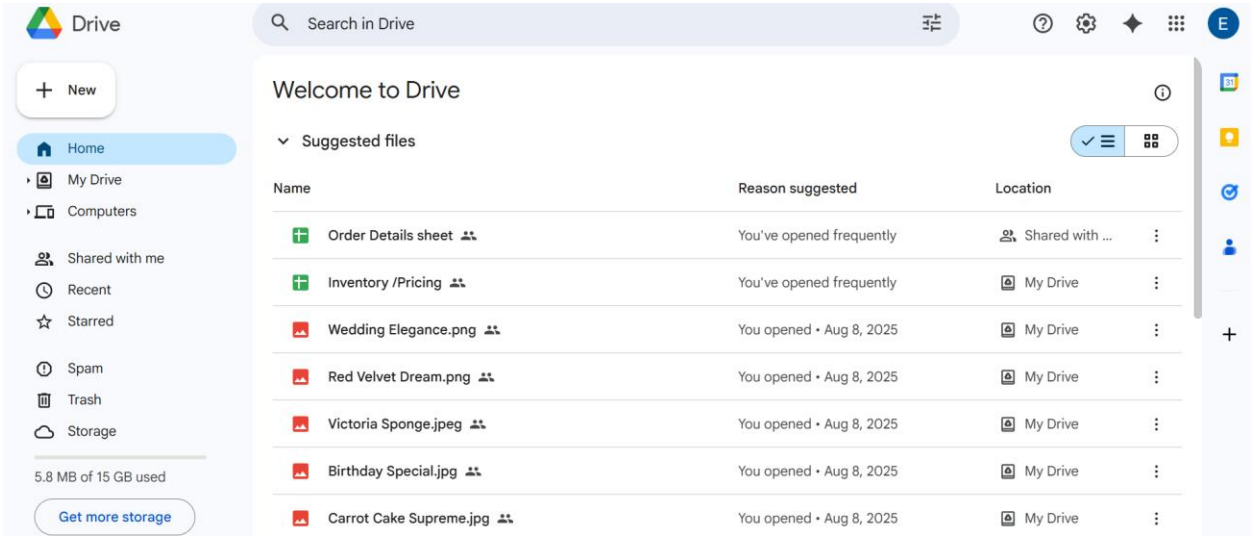


Figure 16: How data is organized in Google drive?

2.3 Teamwork, Communication & Leadership

The project was carried out by five people who did their bit to the aspects they were good at. The author has taken over a technical leadership (design and integration of the core workflow of

automation). This involved the role of overseeing essential integration points with Telegram, the OpenAI GPT-4, the n8n, the PayPal API, and Google Sheets.

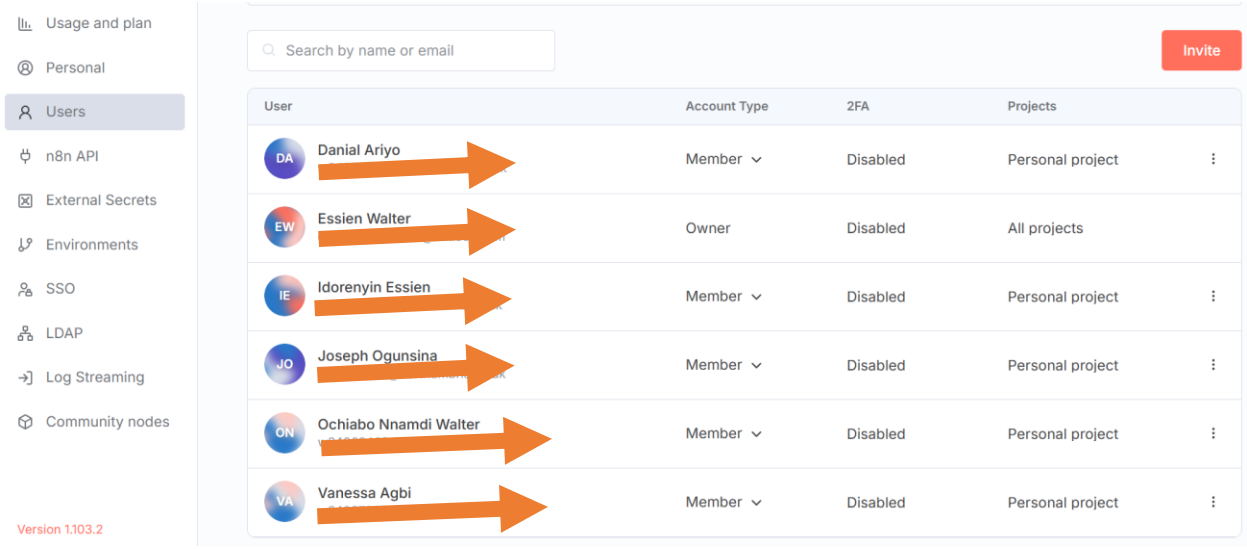


Figure 17: Team members

Successful interaction was needed during the development lifecycle. We used workflow sharing features in n8n to create real-time feedback loops, with the ability of each member to test and review various components of the automation system simultaneously.

The author organized several design meetings, especially regarding the flow architecture, APIs he or she depends on, and system robustness (Gough, Bryant and Auburn, 2021). Particular concern was given to end-to-end customer journey mapping, where conversation logic was divided into decision nodes, webhook processing to get payment status and real time validation of the data.

During the project, a number of technical difficulties appeared. It is worth noting that web hook calls back PayPal sometimes had issues not registering in some cases as a result of latency problems, and parsing Telegram messages had irregularities in parsing that would mismatch data during initial testing. The author proactively because of these problems and fixed it, adding a retry system to failed webhooks responses and improving the order parsing node by making it ungraceful with incomplete or improperly formatted user inputs.

The author ensured its stability, reliability, and overall success by keeping the collaboration high, offering technical advice, and facilitating a seamless integration of the multiple services, which, in its turn, allowed addressing AI-driven sales automation as a solution (Spair, 2023).

Table 1: Role Distribution & Responsibilities

Team Member	Role	Key Responsibilities
Member A *(Walter)*	Workflow Architect & API Integration	Designed end-to-end n8n automation, integrated Telegram and PayPal
Member B (Essien)	AI Prompt Engineer and Database/Google Sheet	Created GPT-4 prompt templates, fine-tuned Agent's conversational logic and Google Sheet
Member C (Joseph)	UI/UX Designer	Drafted Telegram interface flow, created user journey diagrams.
Member D (Vanessa)	Domain Hosting and Deployment (Hostinger)	Drafted the process of hosting and deployment
Member E (Daniel)	Documentation & QA Tester	Compiled technical documentation, conducted user testing and debugging sessions.

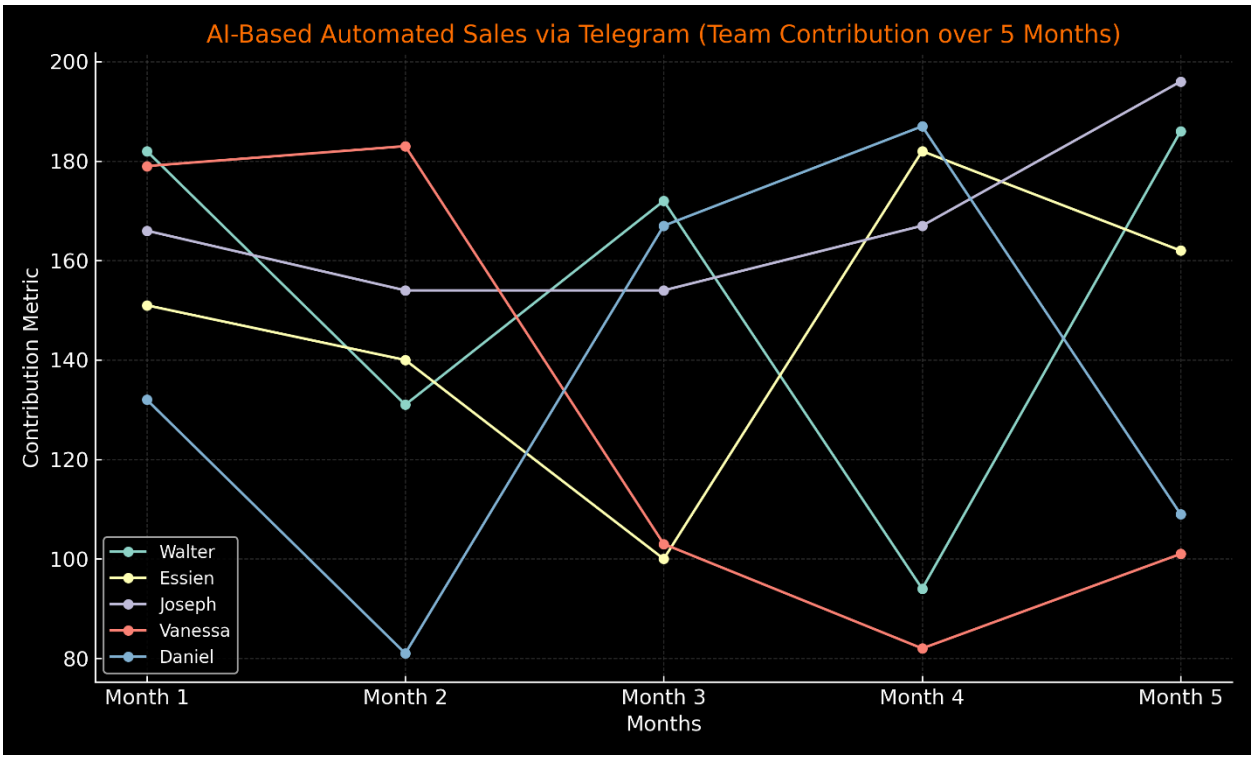


Figure 18: Team contribution metrics

2.4 Technical & Soft Skills Gained

The project helped develop both technical and interpersonal skills. Technically, the author gained strong expertise in n8n, especially in building logical flows using its visual interface. Key achievements included mapping conditions, managing triggers, and integrating multiple services in a no-code environment (Aleksandra Dajerling, 2023). API skills were enhanced through the use of PayPal REST API for payments, Telegram Bot API for real-time interaction, and Google Sheets API for data storage and inventory tracking.

The author also learned error handling and exception routing, particularly for asynchronous webhooks and ensuring workflow stability during issues like payment failures or missing orders.

On the soft skills side, the author contributed effectively to an agile team, using daily check-ins for transparency and flexibility. Time management was applied to meet key milestones, such as payment integration and Telegram logic, within the project timeline (Yana, 2024). Documentation and visual aids like annotated diagrams and screenshots supported team collaboration and review.

Workflow evidence highlights the value of these skills and confirms the author's contribution to the final solution.

Table 2: Summary of Skills Developed

Skill Category	Specific Skills Acquired	Application in Project
Technical	Workflow design in n8n	Built full automation pipeline without traditional coding
	API integration (Telegram, PayPal, Google Sheets)	Enabled real-time communication and payment processing
	Error handling and exception routing	Implemented fallback logic and retry mechanisms
Soft Skills	Agile collaboration	Coordinated via tools
	Time management	Prioritised integration tasks and met all internal deadlines

	Visual documentation and communication	Created annotated workflows and prompt flows for the team

2.5 Application to Future Practice

The project closely aligned with the author's career goals in automation engineering and AI product development, offering hands-on experience in smart workflow design and real-world system implementation. Building the integrated sales automation solution demonstrated how low-code tools, when paired with large language models, can deliver scalable, cost-effective automation. These skills are highly valued as businesses seek to reduce costs while improving responsiveness and customer satisfaction.

AI agents like the one developed are increasingly used in business automation to provide 24/7 service, contextual understanding, and consistent customer engagement (Koskiniemi, 2025). The system's design principles are adaptable to restaurant ordering, e-commerce bots, and inventory management. Repurposing the bot is simple, requiring minimal changes to catalogues and business rules.

Future research could explore multi-agent systems for role-based task allocation, boosting modularity and efficiency. Frameworks like LangChain or AgentGPT may enhance agent reasoning and memory, enabling more complex and adaptive workflows.

Ethical concerns included handling personally identifiable information (PII), requiring GDPR compliance and secure data practices (Nadella, 2024). The assistant was transparent about its non-human nature, helping build user trust and support ethical deployment.

Overall, the project showcased technical expertise while offering insights into the professional, regulatory, and strategic challenges of deploying AI agents in live business environments.

3. Task 2 – Critical Self-Reflection

3.1 Reflection on Personal Learning Goals

The author's personal learning contract focused on three goals: improving team collaboration, gaining real-time automation experience, and deepening API integration skills (Higginbotham, 2021). All were addressed during the project, despite some challenges.

Team collaboration was key, especially in a group of four. Coordinating roles, sharing accountability, and making joint decisions on technical architecture strengthened the author's ability to work in multidisciplinary teams.

Real-time automation was achieved through n8n workflows, enabling dynamic responses to Telegram messages, inventory updates, and asynchronous PayPal confirmations. This enhanced the author's understanding of event-driven systems that operate independently of human input.

API integration skills were developed through hands-on use of Telegram Bot API, Google Sheets API, and PayPal REST API (Silva, Sinnun & Tabrani, 2025). Initial issues like authentication failures and delayed webhook notifications were resolved through testing and documentation, confirming the author's practical API competency.

3.2 Personal Contributions and Challenges Faced

The author was the key figure in technical advancement of the automation system since he had gone to great extent to make the system functional and at the same time he had to overcome numerous obstacles that occurred in the development process. Much of the work of the author was focused on ensuring integration stability and maximizing

the user experiences via enhanced conversational logic.

Telegram webhook failures make up one of the first challenges in the flow as the process would often lose messages and trigger sluggish workflow (Allaham, 2025). By means of the systematic debugging, the author revealed that the webhook was not reliably registering secure handshake responses. The problem could be corrected by changing the bot URL to point to a verified HTTPS endpoint and by adjusting n8n to retry the messages asynchronously.

Another challenge was associated with the cancellation events of PayPal. The author used the webhook system of the PayPal payment processing applying logic to indicate a failed transaction, refresh the order in the Google Sheets, and trigger an update to the user. This made operations transparent and recovery of fault enhanced.

There was also the problem of timing in n8n triggers to fix. Because of the slight delays in data flow among nodes, there were certain workflows that were executed before they were supposed to, or in the wrong order. The author dealt with this by inserting explicitly wait conditions and control nodes to maintain proper sequencing.

At early stages, the AI agent, Walter was shown to have weaknesses in understand the natural language, mostly missing the detail information concerning the orders (Brachman et al., 2023). To address this the author improved prompt formatting, introduced clarifying questions, and introduced memory buffers to maintain scene between different messages. Such enhancements greatly helped Walter to communicate with users effectively and professionally thus leading to a stronger and more responsive system.

3.3 Development as a Team Member

The project also offered a great experience that helped the author to develop as a knowledgeable and cooperative participant. Delegation of the tasks was done earlier in the process as responsibilities were given according to strengths. The author took upon themselves the task of automating the workflow and integrating the backends and the rest of the team was engaged in tasks associated with prompt engineering AI, UI mockups, and documentation (Honarvar, 2024). This was efficient and it contributed to individual contributions of each member of the group.

The assistance to one another was crucial during the development cycle. The team was cross-functional in nature with the group contributing ideas and feedback in various areas on a regular basis. Take, as an example, the author collaborated with an AI prompt maker to make sure that the answers given by Walter matched the data processing needs of the working process.

Multiple leadership moments appeared during the process of system architecture where the author was managing the decisions concerning the structure and logic of the automation flow. It involved the elimination of integration dependencies, the sequencing between network services and the offering of solutions to counteract API constraints (Zimmermann et al., 2022). Such kind of inputs did not only provide technical consistency but also empowered a general working harmony among the group members.

3.4 Lessons Learned and Future Mindset

The experience of accomplishing this project gave rise to a list of important lessons that have defined the technical authority of the author and his or her professional career. Among the biggest learning points, one of them was the fact that we can build very complex automation with low-code platforms, like n8n in this case. The experience also strengthened the confidence of the author in providing functional, scalable solutions without the large amounts of programming thereby expanding the range of involvement in future projects.

This project has also confirmed the essential need to validate the data. Order entries, payment verification, and user information needed to be properly and correctly parsed and processed in order to keep the system in integrity. A minor mistake on the data processing might derail all the efforts and it is necessary to have strict validation procedures and handling of the exceptions (Jeshwanth Reddy Machireddy, 2023).

Besides, the author also understood the importance of user testing more when dealing with AI agents. Simulated discussion and iterative orchestration of conversations exposed edge cases and other ambiguity of language which became quantifiable once prompt development succeeded but prompt discussion became known as beneficial to the conversation.

In the future, the author plans to focus on further detailed frameworks like LangChain, AutoGPT and Dialogflow to provide agents with additional functionality and develop more universal systems that will be based on context. There was also the contemplation of AI trustworthiness of manufacturing, especially the implementation of safeguards, human control and open user communication.

4.Conclusion

The given project allowed the author to realize agent-based automation in a real business scenario, therefore gaining main insights concerning the workflow design, API incorporation, and AI-powered interaction with customers. The solution proved that agentic AI is practical, having impacted the operational effectiveness and user experience. All in all, the experience played a significant role in the growth of the author into an expert in AI automation who has certain relevant capacities in the industry.

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Appendix

t.me/HeavenlyCakeUKBot

https://drive.google.com/file/d/1jGFE4lrQ6fnHHEy_ZRY6rKv1fzIiEF4n/view?usp=sharing