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MGI

Master's Degree Program in
Information Systems and Technologies Management

**Developing an AI-driven RPA bot using UiPath and OpenAI
platforms to automate and improve internal communication at
Lunatec**

In cooperation with Lunatec GmbH

By Tereza Lohynska

Work Project

presented as partial requirement for obtaining the master's degree Program in Information Systems and Technologies
Management

Institut of Statistics and Information Management

NOVA University of Lisbon

Instituto Superior de Estatística e Gestão de Informação

Universidade Nova de Lisboa

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By Tereza Lohynska

Project Work presented as partial requirement for obtaining the Master's degree in Information Management

Supervisor: *Prof. Vitor Duarte dos Santos*

September, 2023

STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration. I further declare that I have fully acknowledge the Rules of Conduct and Code of Honor from the NOVA Information Management School.

Lisbon, 03.12.2023

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To my dearest family and close friends, your presence has been a source of motivation and strength during my whole academic career. Your belief in my abilities, even during moments of doubt, has pushed me forward. Your understanding, your words of encouragement when I faced challenges, and your celebrations of every milestone have been a driving force. Thank you for being my source of strength.

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ABSTRACT

The digital world continues to grow continuously and rapidly, especially in the area of automation. New tools are constantly being developed, especially with artificial intelligence's continuing development and integration. A major challenge is maintaining knowledge and remaining updated with these developments. As a result of recognizing this, Lunatec wanted to improve its internal communication system to help its workers stay informed and engaged with the latest developments. Additionally, the company was interested in focusing on intelligent automation through integrating UiPath with the OpenAI platform. To address these objectives, the idea for a weekly newsletter, created using Robotic Process Automation and integrating ChatGPT prompts, emerged. The solution was developed in this work project, and it showed its effectiveness in saving both time and costs overall. According to empirical data, switching to an automated newsletter is more advantageous after just 107 days than using human labor to create one. Although this innovation has been effectively applied internally, it has the potential to be applied externally for clients, promising many benefits.

KEYWORDS

Robotic Process Automation; Intelligent Process Automation; Artificial Intelligence; UiPath; Process Automation

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1. INTRODUCTION

1.1. ACADEMIC CONTEXT

This work project was written as the final project of Master of Information Management degree, with a focus on Information Systems and Technologies Management. The program's goal is to educate professionals, who serve as the link between a company's business requirements and its IT. To encourage innovation and boost process efficiency, business information must be easily understood. One of the main focuses is to gain knowledge in improving organizational efficiency through the creation and design of business processes and create and develop information systems and technologies that meet organizations' information needs. This is also the focus of this final project.

Business processes are key to accomplishing work in organizations (Dumas et al.,2018) and Intelligent Automation can deliver improvements in its performance (Coombs et al, 2020). Automations services free humans from monotony and repetitive tasks, make things easier, faster, better (Madakam et. al, 2019) and present an opportunity for companies to increase their business value (Coombs et al, 2020). Using automation services in companies lead also to more enriching and satisfying work (Millman & Hartwick, 1987).

According theoretical and practical knowledge was supported by the program in following courses:

Course	Semester	Description
Business Process Management	1st	BPM concepts, fundamentals, methods, and strategies required for managing holistic end-to-end business processes. It focuses on the application of conceptual methods and software tools to design, analyse, transform, monitor, and control business processes and improve their performance using information technology in organization from private and public sector. Practical team project in Bizagi.
Information Systems	1st	Knowledge about information systems (IS) is essential for creating successful, competitive firms, for adding business value, and for providing useful

Management		products and services to customers.
Information Systems Development	1st	Main questions associated with the development of information systems and Software Engineering. Key technologies and the main models of software development processes.
Data Management and Storage	1st	Use of appropriate data management or database technologies for the success of their business processes. The process of database modelling and normalization, the implementation of a relational database using SQL language (theoretical and practical)
Digital Transformation	2nd	Main scientific digital transformation drivers and how they can be interconnected to contribute to competitiveness of organizational businesses. Introduction to the new Technologies, tools, and future directions.
Information Project Management	2nd	General concepts of project management and the main project planning processes. A practice work within a project plan submitted by a contractor
Big Data Analytics	2nd	Big Data fundamentals, standard data analytics architectures and the tools that are part of the Ecosystem. A practical experience with PySpark, developing modern Big Data Analytical Solutions.
Architectures for Information Systems	2nd	Analysis of architectures of Information Systems, separating the technological aspects from the organizational and management aspects. Developing an architecture of processes and information systems
Research Methodologies	3rd	Prepare students to conduct the different stages of a research project, which include the planning of the proposed work, the definition of objectives and methods and the preparation of final the report

1.2. ORGANIZATIONAL CONTEXT

As discussed in the class of Digital Transformation, integrating such a new technology into companies is a necessary step to keep up with the changing environment. This work project is written in collaboration with a company Lunatec. Lunatec is a leading automation service provider in Germany established in 2017 that focus on Automation, Artificial Intelligence and Process Mining. This company consists of automation engineers with a business background, who create an automation strategy that shapes the automated world. This IT consulting company enables to make an impact with cutting-edge Intelligent Automation and design and implement technologies in the automated world with reduced complexity and increased satisfaction. The company's services include Consulting, Engineering, Training, Cloud Services and Software Licensing. Their consulting services offer state-of-the-art technologies in combination with individual consulting. With their business background and technology skills, they ensure high-quality implementation without complexity.

Lunatec introduces technological solutions, creates a vision, implements, or unlocks new automation skills to their customers. The service includes a support in all phases according to the full-cycle approach from strategy to implementation and maintenance.

The area of interest is especially in Robotic Process automation (RPA) and Intelligent Process automation (IPA). This work will be supported by the company's Head of Automation and will focus on developing and optimizing automation services. The goals of the work project are applying the obtained academic knowledge in the business world, learning to work on platform such as Power Automate and UiPath, building and executing automations in UiPath, applying Artificial Intelligence tools, and successfully finishing given automation project. The work project focuses on the internal automation in the Lunatec company.

The technological development moves with a very fast pace and to keep all employees up to date with the latest trends and news in the automation world an idea has been raised by the Head of Automation. This idea is to create a fully automated newsletter with the most important news from past week and send it to each employee. The employees should get a summary of each article, an option to click at hyperlink, and read the whole article when interested. Also, a LinkedIn post for each article will be prepared. This should keep the company informed, up to date with the newest technology and trends, and supports its agility.

Further, a connection with new technology from OpenAI is explored. An API connection from Uipath Studio to OpenAI ChatGPT is build.

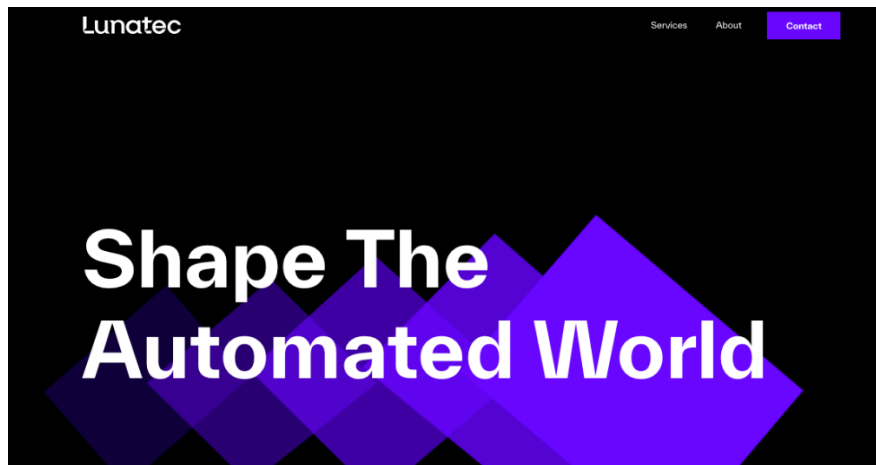


Figure 1: Lunatec Website

Retrieved from: <https://lunatec.de/>

1.3. OBJECTIVES AND MOTIVATION

The main objective of the automation projects is to increase the business value (Coombs, C., et al, 2020), limit human error and move with the future. Human factors are often misunderstood and neglected in system design (Sheridan, 2002). The promise of RPA is not only to reduce costs, but also to eliminate the problems with management and miscommunication (Asatiani & Penttinen, 2016).

The automation project's main objective is to apply RPA and IPA wherever it benefits the company. The goal of all projects is to reduce complexity and increase satisfaction, using intelligent automation to make a difference in the most simple and scalable way. The vision of the company is to redefine the way people work. The company grows and needs an automation team supporter with an academic background in management and information systems who will contribute to the company development. Contribution to the projects should be especially with the academic background, technical skills, young perspective, creative thinking, and motivation.

By the end of project, I expect to gain a practical experience in the whole process of applying RPAs in real life scenario. The work project should contribute to the academic world in showing how the theories, frameworks and methodologies align and are applied in real business world. The work project focuses on the internal automation of the company.

2. WORK PLAN

This chapter will explain the work plan, introduce the project's stages, and describe the tools that will help the project evolve as well as the suggested chronogram.

2.1. PROJECT MANAGEMENT

The main purpose of this project will be accomplished through six project development stages, and it will conclude with a conclusion stage when the results will be evaluated and discussed. These phases align with the BPM lifecycle, which is described in chapter 3 and was developed by Dumas, La Rosa, Mendling, and Reijers (2018).

2.1.1. Phase 1: Initiation -Design

The Kick-off stage consists of understanding the need of the business to develop this automation bot. This happened in a meeting with the supervisor who came up with the idea to create an automated weekly newsletter to improve internal communication and knowledge base. The goal of this stage is to understand why we should build it and how it could look like.

2.1.2. Phase 2: Planning - Modelling

In the second stage the proper training, needed to develop a bot, and research of the literature which supports the knowledge for creating an RPA project, is done. In this stage the planning starts, and the ideas and concept of the newsletter are discussed and prepared. Further, a research about current trends and ideas is performed.

Since the results of this phase will support the choices made throughout the project, this phase will continue to evolve alongside the project.

2.1.3. Phase 3: Execution

In the third stage, the development is taking place. The scope of the bot is clear and now it is time to execute. This stage is mostly done in UiPath studio where the automation bot is built. The development is supported by weekly meetings with a supervisor where feedback is exchanged.

At the end of this stage the project is presented to all employees and executed. After this presentation each employee receives their first newsletter. The feedback and ideas that came up during the presentation are considered and processed.

2.1.4. Phase 4: Monitoring

This stage is very important for the quality of the automation bot. The bot is monitored each week and improved. As the quality of the newsletter depends on AI, it is very fragile. Errors and incomplete data are occurring. During this stage a rebuilding of the bot is taking place. The monitoring and testing are taking few weeks before it can be executed as an unattended robot.

2.1.5. Phase 5: Optimization - Closure

After testing the finalization of the project is taking place. The project is evaluated and is prepared to offer as a product for clients. In this stage we compare the human and robot work and show the advantages and disadvantages of this automation bot.

2.2. TOOLS

2.2.1. UiPath

Software robots, commonly referred to as "bots," can be created, deployed, and managed by users using the automation software package UiPath. These bots are capable of carrying out a range of duties, including data entry, report generation, and other monotonous jobs that are often done by human employees.

The flexibility of UiPath to integrate with other software tools and systems is one of its main advantages. Popular software programs like Microsoft Office, SAP, and Salesforce as well as additional automation solutions like Blue Prism and Automation Anywhere can all be coupled with UiPath. Users may now automate whole business processes rather than just specific activities, which will save them a lot of time and money.

Additionally, UiPath has a number of features that let users manage and keep an eye on their bots. A centralized dashboard included in the product shows real-time data on bot performance, including execution times and mistake rates. Additionally, users can program bots to run at particular intervals or to be triggered by particular circumstances.

Numerous industries, including finance, healthcare, and manufacturing, make extensive use of UiPath. Leading research and advisory companies like Gartner and Forrester have acknowledged the product as an industry leader in robotic process automation.

This tool consists of three main products: UiPath Studio, UiPath Robot and UiPath Orchestrator.

2.2.1.1. Uipath Studio

UiPath Studio enables users to build bots without any prior coding knowledge. By dragging and dropping actions, such as "click" "type into" and "read PDF" users of this interface can design automated processes. Then, users can connect these actions with one another to build a workflow that automates a particular process. A wide range of pre-built activities, or things that bots can do, are also included in the program, including data scraping, text editing, and email automation. Additionally, UiPath Studio has a sizable user and developer community that produces and shares customized activities.

Studio offers a wide variety of tasks that let users automate a variety of complex processes, including data extraction, image recognition, and web automation. These tasks are arranged into activity packs that are simple to download and set up. Also, the Studio features a variety of testing and debugging tools as well, giving users the ability to troubleshoot and optimize their operations. Before the workflow is deployed, users can step through it, find any errors or issues, and fix them using these tools.

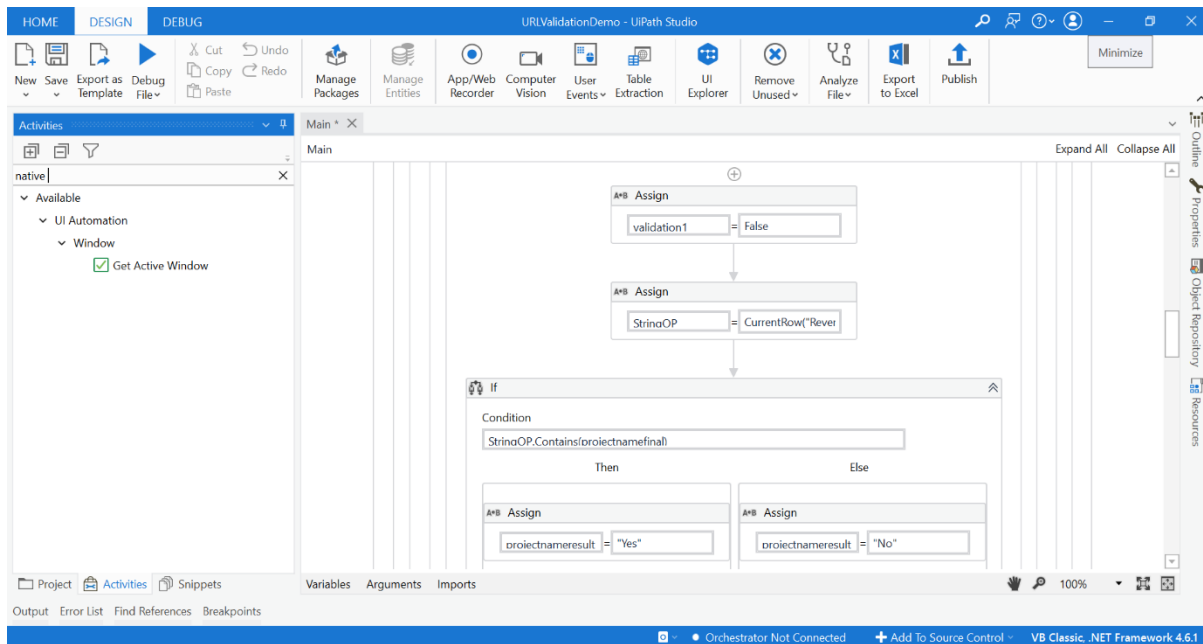


Figure 2: UiPath Studio

Retrieved from: <https://www.uipath.com/blog/product-and-updates/introducing-uipath-studiox>

2.2.1.2. UiPath Selectors

A selector in UiPath is a group of characters that is used to specify a particular user interface element in an application or web page. In order for robots to interact with the user interface and automate numerous operations, selectors are a fundamental part of UiPath workflows.

A user interface element is uniquely identified by a selector, which is made up of a set of properties and values. These attributes contain things like the element's name, type, and screen location.

UiPath uses the selector to find the element and perform operations on it, such as pressing a button

or entering text into a text box. Utilizing the "Indicate on Screen" function of UiPath Studio, selectors can be generated automatically. Users can use this functionality to choose a specific element on the screen, and UiPath will produce a selection for it. By choosing the relevant characteristics and values for the element, users can easily manually create selectors.

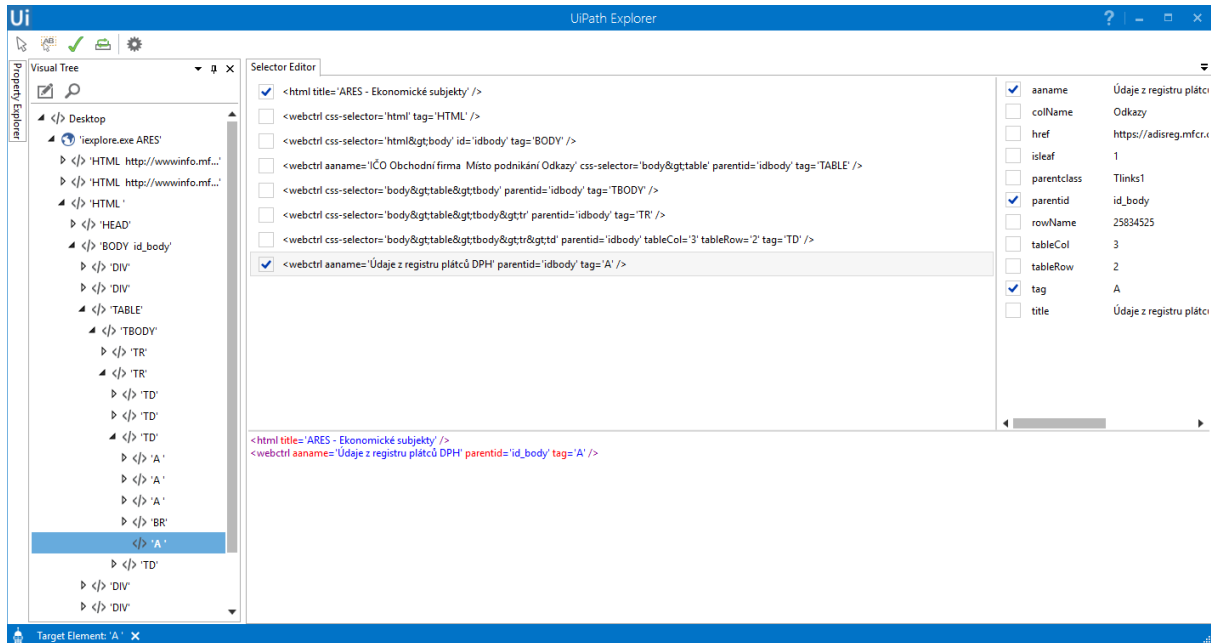


Figure 3: UiPath Selector

Retrieved from: <https://forum.uipath.com/t/cannot-find-ui-element-according-to-selector/13586>

2.2.1.3. UiPath Orchestrator

The automation platform from UiPath is not complete without UiPath Orchestrator, which gives businesses a central location for organizing, controlling, and deploying robots at scale. It is a web-based platform used to scale up the deployment, management, and monitoring of UiPath robots. It acts as a hub for all UiPath robot management, offering a single point for control for robot scheduling, monitoring, and performance.

Queues are used in UiPath Orchestrator to maintain a list of items that need to be handled by UiPath robots. Tasks, orders, or any other data that has to be handled by a robot can be placed in a queue. In the Orchestrator web interface, queues can be created, changed, and managed.

For controlling robot processes, UiPath Orchestrator's queues are advantageous due to a number of characteristics. For instance, Orchestrator can order queue items according to their priority or urgency. Additionally, robots can be assigned to particular queues, ensuring that they only handle tasks that are important to their position or area of expertise.

UiPath Orchestrator also offers a feature called assets in addition to queues. Assets are key-value pairs that can be used to store data that is accessible by robots. Usernames, passwords, and API keys can all be stored in assets. Additionally, assets can be encrypted to guarantee the security of sensitive data.

Dispatcher is the process responsible for adding items to a queue, and Performer is the process responsible of processing those items.

2.2.1.4. Robotic Process Framework

Using UiPath Studio, end-to-end business automation processes can be created using the UiPath Robotic Enterprise Framework (REFramework). The framework offers a standardized format for creating automation workflows that may be easily scaled throughout an organization.

The REFramework is made to help developers overcome problems they frequently run into when creating automation workflows. These difficulties include managing transactional data, addressing exceptions, and ensuring data integrity. It is simpler for developers to construct powerful automation processes because to the framework's built-in features that address these difficulties and other typical situations.

Five primary components make up the REFramework:

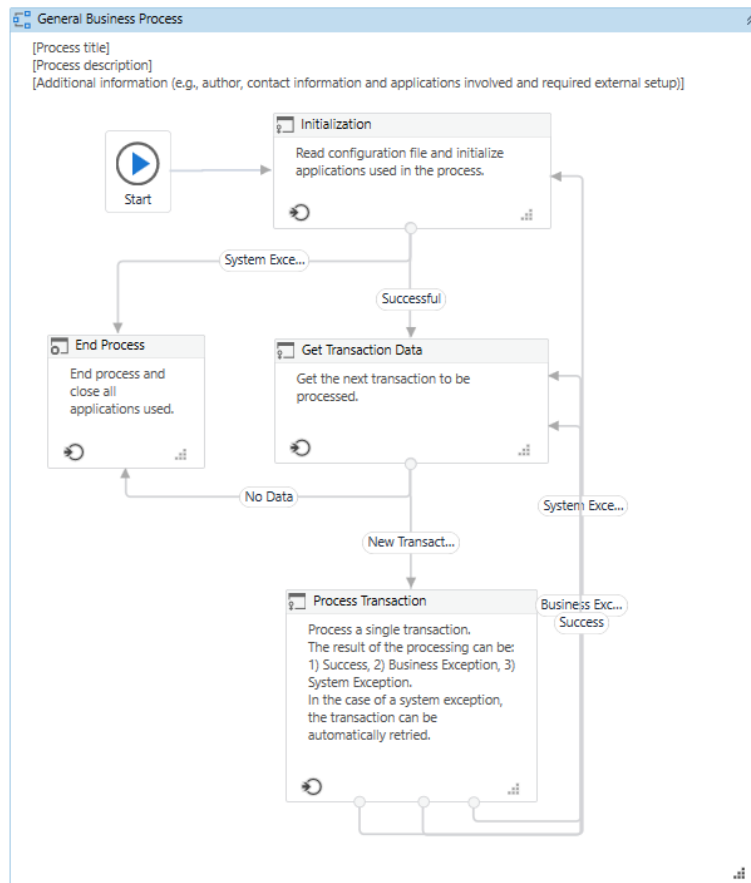


Figure 4: Framework

Retrieved from: <https://www.soais.com/reframework-in-uipath/>

Initialization: The environment is set up and variables are initialized using this component.

Get Transaction Data: This component retrieves data for the robot to process.

Process Transaction: This component processes the transaction data, and the framework handles any potential exceptions.

End Process: This component is used to complete the transaction and carry out any necessary cleanup procedures.

Framework Exception Handling: This part is in charge of managing any exceptions that may come up during the automation process.

Additionally, the REFramework includes built-in logging and error handling capabilities.

2.3. CHRONOGRAM

The following figure describes the planned chronogram of the work project. It consists of its phases, milestones, and deliverables.

The beginning of the project started with a project proposal which is followed by literature review and focusing on a theoretical part of the work project. Following months, a UiPath Academy was completed where I gained the needed knowledge, skills and practice for the project. The following certificates were obtained: RPA Developer Advanced, Process Mining Developer, Test Developer Foundation, UiPath Business Analyst.

After the methodology, the practical part of the project started and lasted from May to July. After completing the project, the discussion and result and final adjustments followed. The delivery date was set up to November.

		2023											
Phases	Activities	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	
1	Project Proposal	■											
2	Literature Review		■	■	■								
3	UiPath Academy			■	■	■	■						
4	Methodolgy						■						
5	Practical Part						■	■	■				
6	Results and Discussion									■			
7	Final Adjustments										■		
8	Delivery											■	

Figure 5: Chronogram

3. THEORETICAL FRAMEWORK

3.1. DIGITAL TRANSFORMATION

In recent years, the concept of digital transformation has been increasingly important in the literature on business and information systems. It's frequently defined as the incorporation of digital technology throughout all business functions, which has a fundamental impact on how the company operates and provides value to consumers (Besson & Rowe, 2012). It is believed that digital transformation would increase competitiveness, efficiency, and effectiveness. It also has the ability to disrupt established business models and start a new growth prospect (Weill & Woerner, 2017).

But despite the increased focus on it, there is still disagreement on what digital transformation entails and how it can be successfully executed (Hausberg et al., 2019). According to some authors, it is only a buzzword that is used to characterize any type of technology advancement or digital innovation (Hund et al., 2021). Others claim it marks a fundamental shift in the way business' function, necessitating a total rethink of traditional business models and processes (Besson & Rowe, 2012).

3.1.1. Concepts

According to Jeyaraj & Sabherwal (2015) digital transformation is a multidimensional concept that includes both technological and organizational change. The adoption and integration of digital technologies like big data analytics, the Internet of Things (IoT), and cloud computing are examples of technological development. To effectively utilize the potential of these technologies, an organization's structure, methods, and culture must change. This is referred to as organizational change.

According to Besson and Rowe (2012) digital transformation calls for a comprehensive strategy that considers both the technical and human components of a business. To ensure that the workforce is capable of using these technologies successfully, this requires not only the adoption of new

technologies but also the upskilling and reskilling of the workforce. To benefit from the efficiencies and insights offered by digital technologies, it also entails the creation of new business models and a re-evaluation of conventional procedures.

The importance of leadership in driving digital transformation inside an organization has also been underlined by several other studies. According to a 2013 study by Bharadwaj et al., strong leadership is essential for establishing a vision and promoting the adoption of digital technology. Similar to this, another study done in 2020 by Wrede et al., discovered that effective leadership is essential to navigating the organizational adjustments and cultural transformations that are frequently necessary during the process of digital transformation.

3.1.2. Challenges and Opportunities

Organizations have benefited from digital transformation in several ways, including higher productivity, improved customer experiences, and increased competitiveness (Verhoef et al., 2021).

Digital transformation improves efficiency. Digital technologies can automate and streamline a variety of business processes, lowering the need for manual labour and the possibility of mistakes (Attaran, 2004). Using artificial intelligence and machine learning algorithms, for instance, can help firms process massive amounts of data more quickly and correctly than they could by using human labour (Van Der Aalst et al.,2016).

Organizations can increase the speed and volume of their activities by implementing digital technologies, which will increase productivity (Attaran, 2004). For instance, adopting cloud computing can help businesses extend their operations fast and inexpensively (Jeyaraj & Sabherwal, 2015) Businesses may improve the consumer experience by using digital technologies to personalize and customize their products and services (Hund, 2021). For instance, using customer data analytics can assist businesses in understanding and predicting the demands and preferences of their customers (Van Der Aalst et al.,2016).

Also, organizations can outperform their competitors by adopting digital technologies. For instance, using digital platforms can help businesses reach new markets and customers (Jeyaraj & Sabherwal, 2015).

3.1.3. The Role of Process Management

Organizations aiming to enhance their operations and procedures are starting to turn to digital transformation as a key approach. Digital technologies that have the ability to radically change established business models and open up new economic prospects for enterprises include cloud computing, big data, and the Internet of Things (IoT) (Davenport & Short, 1990). However, companies must have a clear grasp of their current processes and how they may be streamlined or redesigned to take use of digital capabilities in order to properly leverage these technologies (Weill & Woerner, 2018). Process management can help in this situation.

Process management involves the creation, implementation, evaluation, and enhancement of business processes (Davenport & Short, 1990). Because it enables businesses to match their processes with their digital capabilities and objectives, it is essential to the digital transformation (Baiyere et al., 2020). Traditional business operations have been significantly impacted by digital technologies (Weill & Woerner, 2018). Process management has become more crucial as digital technologies continue to undermine established business structures (Weill & Woerner, 2018). Organizations can assess, create, and improve their processes using the framework provided by process management considering digital technology (Davenport & Short, 1990). Additionally, it helps firms recognize areas for growth and better understand how different processes interact with one another (Baiyere et al., 2020).

By establishing a framework for organizations to match their processes with their digital capabilities and goals, process management plays a crucial role in the digital transformation of businesses (Baiyere et al., 2020). Process innovation, process optimization, and process automation are all included in this (Weill & Woerner, 2018). Utilizing digital tools to automate repetitive work liberates staff to concentrate on more strategic responsibilities is known as process automation (Baiyere et al., 2020). Process analysis and redesign are part of process optimization, which aims to increase processes' effectiveness and efficiency (Davenport & Short, 1990). Process innovation involves the creation of new processes to take advantage of digital technologies and create new business opportunities (Weill & Woerner, 2018).

3.2. BUSINESS PROCESS MANAGEMENT

Business Process Management (BPM) is a systematic approach to improve the efficiency, effectiveness, and agility of an organization's business processes (Davenport, 1993). Businesses aiming to enhance their operations and procedures are increasingly turning to BPM (Davenport & Short, 1990). The design, implementation, monitoring, and improvement of business processes are all part of BPM (Davenport & Short, 1990). It is a comprehensive strategy that seeks to raise an organization's processes' effectiveness and efficiency (Weill & Woerner, 2018). It is commonly acknowledged that BPM is a crucial tool for helping firms achieve operational excellence and a competitive advantage (Baiyere et al., 2020). BPM is a management strategy that seeks to increase an organization's processes' effectiveness and efficiency (Davenport & Short, 1990).

3.2.1. Concepts

Process modelling, process improvement, process governance, process performance measurement, and process innovation are among the fundamental concepts that BPM literature has highlighted as being essential to the field (Davenport, 2013).

For the purpose of understanding and evaluating business processes, graphical representations of those processes, such as flowcharts or BPMN diagrams, are referred to as process modelling. Identifying bottlenecks, inefficiencies, and chances for improvement is possible thanks to this crucial step in the BPM process (van der Aalst et al., 2016).

The management of processes to ensure compliance to corporate policies and regulations is known as process governance. This can involve defining roles and responsibilities, establishing standards and norms, and keeping an eye on performance (Lacity et al., 2021). Data on process performance are gathered and analysed for the purpose of evaluating and enhancing it through process performance measurement. Metrics like process speed, cost, and quality can be a part of this (Davenport, 2013).

Process innovation is the adoption of new or enhanced processes by a company. This may involve implementing new technologies or utilizing innovative business strategies (Lacity et al., 2021).

3.2.2. BPM life cycle

A framework known as the BPM life cycle helps organizations plan, implement, monitor, and optimize their business processes (Kettinger et al., 1997). Each stage of the BPM life cycle has its own goals, difficulties, and best practices. Stakeholder involvement in the design, an organized approach, and the use of appropriate modelling languages and tools are recommended practices for all the stages (Dumas et al., 2018).

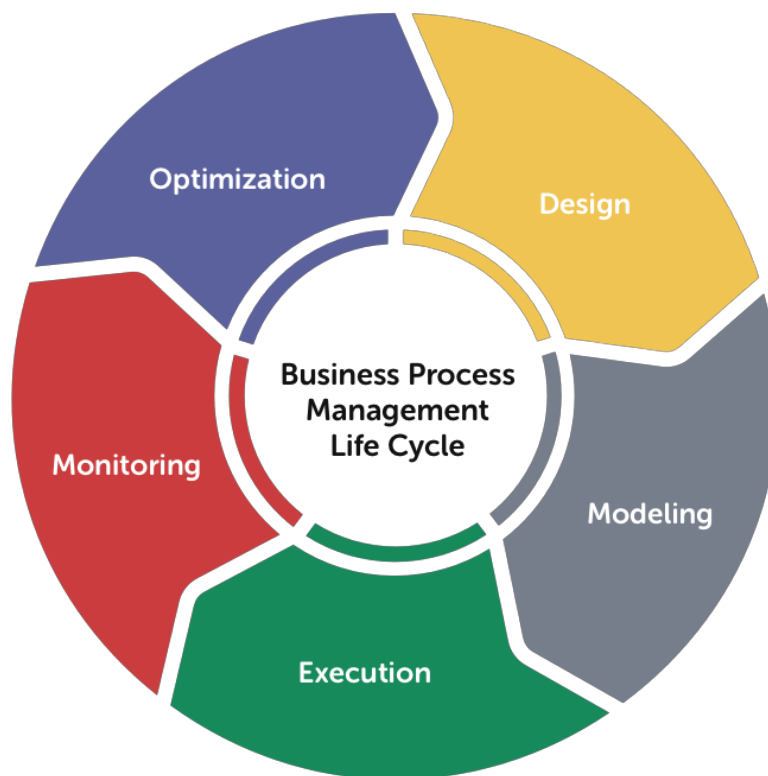


Figure 6: BPM

Retrieved from: <https://www.happyfox.com/what-is-business-process-management/>

Process design is the first stage of the BPM life cycle (Kettinger et al., 1997). A detailed design of new or enhanced business processes is created during the process design stage of the BPM life cycle

(Kettinger et al., 1997). The goal of this step is to create new or better processes that are in line with the strategic goals of the organization and address the problems found during the process identification stage (Rosemann & vom Brocke, 2010). Making sure the process design is feasible and can be implemented within the organization's limits is one of the challenges of this stage (Dumas et al., 2018).

The creation of a visual representation of an organization's current business processes occurs during the process modelling stage of the BPM life cycle (Kettinger et al., 1997). This phase's goal is to recognize and comprehend the organization's current business processes so that improvements can be made (Rosemann & vom Brocke, 2010).

Process implementation is the third stage of the BPM life cycle (Kettinger et al., 1997). The goal of this stage is to put new or better business processes into place (Rosemann & vom Brocke, 2010). Making ensuring the procedures are being employed as intended is one of the challenges of this stage (Dumas et al., 2018).

The process of tracking and evaluating the effectiveness of the implemented business processes occurs throughout the process monitoring(executing) stage of the BPM life cycle (Kettinger et al., 1997). This stage's goals are to make sure that the processes are operating at the desired performance levels and to spot any deviations from those levels (Rosemann & vom Brocke, 2010). Making ensuring the right metrics are chosen to evaluate the effectiveness of the processes is one of the challenges of this stage (Dumas et al., 2018).

The goal of the BPM life cycle's process optimization stage is to continuously enhance business processes based on the findings of the monitoring stage (Kettinger et al., 1997). During this phase, businesses can discover areas for improvement and introduce adjustments to boost productivity, effectiveness, and flexibility (Rosemann & vom Brocke, 2010). Making sure the changes are sustainable is one of the challenges at this stage (Dumas et al., 2018).

3.2.3. Process improvement

Process improvement is the discovery and application of changes to business processes with the goal of improving their effectiveness (Krajewski & et al., 2013). It entails analyzing and redesigning current business processes in order to improve productivity, cut costs, and improve customer satisfaction (Davenport, 2013). Process redesign, lean methodology, Six Sigma, process automation, and business process management system (BPMS), among other methods, can all be used to improve processes.

Making business processes more effective, efficient, and agile is the main goal of process improvement. This can be accomplished through reducing waste, improving speed, lowering errors, and raising quality (Rosemann & vom Brocke, 2010). This means that businesses may save time and money and provide their customers better products and services (Krajewski et al., 2013). Additionally, process improvement can assist businesses in being more competitive by enabling them to react to market developments more quickly (Krajewski et al., 2013). Process redesign, lean methodology, Six Sigma, process automation, and business process management system (BPMS) are just a couple of the approaches, methods, and techniques used for process improvement.

In the BPM life cycle, Business Process Redesign (BPR) is a crucial technique for process improvement (Dumas et al., 2018). The goal of BPR is to increase an organization's business processes' effectiveness, efficiency, and agility (Davenport, 1993). The BPR stage of the BPM life cycle is frequently referred to as the "Continuous improvement" stage since it enables firms to iteratively improve their processes based on performance monitoring and analysis (Dumas et al., 2018).

Process modelling, as explained above, is one of the fundamental BPR strategies (Rosemann & vom Brocke, 2010). The Business Process Model and Notation (BPMN), a process modeling standard that offers a clear and standardized method of communicating process information, is a commonly used process modeling tool (Dumas et al., 2018).

Process simulation, which involves simulating a business process' behavior using a computer-based model, is another key BPR technique (Krajewski et al., 2013). Organizations can test the revised process using process simulation before putting it into use, allowing them to spot possible issues and make the required corrections (Dumas et al., 2018). The potential performance enhancements of the revised process, such as cost savings, enhanced customer service, or increased efficiency, can also be estimated using this method (Kettinger et al., 1997).

A Change management, which is the process of managing the transition from the present process to the redesigned process, is another crucial BPR method. Participating in the redesign process with stakeholders is a crucial BPR best practice (Dumas et al., 2018).

By reducing waste and enhancing value for consumers, the lean management style seeks to boost efficiency and effectiveness. The lean management approach is based on the principles of the Toyota Production System (TPS), which was developed by Taiichi Ohno in the 1950s (Womack & Jones, 1996). Overproduction, excess inventory, defects, waiting, overprocessing, wasteful motion, and unused talent are just a few examples of waste. Organizations may improve productivity, cut expenses, and improve customer satisfaction by detecting and eliminating these types of waste. The flow of information and materials is yet another crucial tenet of lean management. This principle

attempts to make sure that goods and information move through the organization quickly and effectively, from the suppliers to the end users. This can be accomplished by utilizing strategies like value stream mapping, which enables businesses to spot waste and inefficiencies in the value stream (Womack & Jones, 1996). Organizations may decrease lead times, improve productivity, and improve customer satisfaction by improving the flow of goods and information (Dumas et al., 2018).

Another crucial component of lean management is the idea of continuous improvement. Finding and implementing tiny, ongoing changes is a technique known as continuous improvement (Womack & Jones, 1996).

Six Sigma is a process improvement methodology with the goal of enhancing the effectiveness and quality of business operations (Pyzdek & Keller, 2003; Pande et al., 2000). Six Sigma's roots can be found in the industrial sector, where Motorola originally created and applied it in the 1980s (Pande et al., 2000). Applying statistical techniques to measure and evaluate data is one of the core principles of Six Sigma. This includes utilizing instruments like design of experiments (DOE) and statistical process control (SPC) (Pyzdek & Keller, 2003). Using the DMAIC (Define, Measure, Analyse, Improve, Control) structured problem-solving process is another vital aspect of Six Sigma (Pyzdek & Keller, 2003). The following steps make up the DMAIC approach, which is used to identify and address the source of difficulties in a process:

Define: Identify the issue and set improvement objectives.

Measure: Gather information and examine it to determine how well the process is performing right now.

Analyse: Using statistical techniques, determine the issue's root cause.

Enhance: Put solutions in place to eliminate the issue's underlying causes.

Control: Implement measures to prevent a future recurrence of the issue

(Pyzdek & Keller, 2003)

Business Process Management Systems (BPMS) are software systems that support the design, execution, monitoring, and management of business processes (van der Aalst et al., 2016; Rosemann & vom Brocke, 2010). The usage of BPMS as a process improvement tool to boost the effectiveness and efficiency of business processes is growing (van der Aalst et al., 2016; Rosemann & vom Brocke, 2010). Process modeling, which enables businesses to create and express business processes in a visual way, is one of the BPMS's core characteristics (van der Aalst et al., 2016).

Process execution, another crucial component of BPMS, enables businesses to automate and execute activities. This may result in enhanced compliance, more productivity, decreased errors, and increased efficiency (Rosemann & vom Brocke, 2010). Additionally, BPMS offers process monitoring and analysis features that enable businesses to analyse the effectiveness of their processes and spot any problems or bottlenecks (van der Aalst et al., 2016). Finally, BPMS also offer tools for process improvement, such as process optimization, simulation, and redesign (Rosemann & vom Brocke, 2010)

Another Process Improvement tool is considered to be Process automation. Process automation is a tool for process optimization that uses technology to automate time-consuming, repetitive, and manual operations. By minimizing human participation, process automation seeks to improve the efficiency and effectiveness of business processes (Plattfaut & Borghoff, 2022).

3.3. PROCESS AUTOMATION

3.3.1. Concepts

The automating of repeated operations is one of the fundamental ideas of process automation. This refers to the application of technology to repetitive operations like document management or data entry. Automating these processes can greatly reduce the time and effort needed to perform them, freeing up staff to work on more important projects (Plattfaut & Borghoff, 2022). This may result in more output and lower costs for the business (Rosemann & vom Brocke, 2010; van der Aalst et al., 2016).

The idea of using automation to increase accuracy is a crucial one in process automation. Automating manual processes can lower the chance of mistakes and increase adherence to rules (Stoddard &

Jarvenpaa, 1995) By avoiding fines and reputational damage, this could result in cost savings (Rosemann & vom Brocke, 2010; van der Aalst et al., 2016).

Scalability is an important notion in process automation. Organizations can easily and quickly adapt to changes in quantity or complexity by automating processes (Stoddard & Jarvenpaa, 1995). This may be particularly crucial for businesses that go through quick growth or seasonal changes (Rosemann & vom Brocke, 2010).

The use of automation to enhance data collecting and analysis is another key idea in process automation. Automated data analysis and collecting can replace manual data entry, which can be labour-intensive and error-prone (Stoddard & Jarvenpaa, 1995). This may result in more trustworthy and accurate data that can be used to make wise business decisions (van der Aalst, 2016).

Automated data analysis can find patterns and trends that manual analysis might miss (Stoddard & Jarvenpaa, 1995). Data governance and compliance can also be enhanced through process automation. Compliance with laws and corporate rules, such as those relating to data privacy and security, can be ensured by automated data collecting and analysis (Plattfaut & Borghoff, 2022).

Data input and document processing are examples of repetitive, manual processes that can be automated via workflow automation (Millman & Hartwick, 1987). Workflow automation can also be used to control how tasks and activities move through a business process. This can improve process visibility, enabling businesses to spot bottlenecks and inefficiencies and take wise decisions (Plattfaut & Borghoff, 2022). Furthermore, workflow automation can be used to enhance internal cooperation and communication. To ensure that activities are performed on time and lower the possibility of delays, automated workflows can send warnings and alerts to the right people or teams (Millman & Hartwick, 1987).

3.3.2. RPA

Through the use of software robots, robotic process automation (RPA), a fast-developing technology, enables enterprises to automate monotonous operations and procedures. Numerous operations, including data entry, customer support requests, and invoicing, can be automated with RPA (Plattfaut & Borghoff, 2022). In a range of corporate activities, the technology has the ability to greatly increase.

Efficiency improvement is one of RPA's primary advantages. RPA can help firms save time and lessen staff workload by automating repetitive processes (Willcocks et al., 2017). As a result, production

may increase and expenses might be reduced (Asatiani & Penttinen, 2016). Additionally, by automating operations that are prone to human error, RPA can lower the likelihood of errors (Goswami et al., 2019). This may result in more precise and high-quality business operations.

Despite the potential advantages of RPA, there are a few difficulties and restrictions to take into account. The initial expense and time needed to establish RPA systems are a problem (Asatiani & Penttinen, 2016). Additionally, since RPA has the ability to automate some tasks, there may be worries about how it can affect employment (Plattfaut & Borghoff, 2022). It is crucial that businesses give these problems significant thought and collaborate with staff members to find solutions.

In the years to come, RPA technology is anticipated to continue to advance and get better. The incorporation of AI and machine learning capabilities into RPA systems is one potential advancement ((Willcockset et al., 2017). This might make RPA systems smarter and more flexible, which might improve corporate operations' efficiency and accuracy even further.

3.3.3. IPA

RPA bots are unable to process unstructured data or make decisions (Zhang, 2019). Intelligent Process Automation (IPA) uses cutting-edge technology like machine learning and artificial intelligence to automate jobs that call for a higher level of decision-making skills. Without human assistance, IPA systems can analyse data and make judgments using that data. This makes it possible to automate operations that are more intricate and flexible, such fraud detection and compliance management (Berruti et al., 2017).

IPA is described as "the application of modern technologies such as machine learning, natural language processing, and robotic process automation to automate and optimize end-to-end business processes" by (Kotlarsky et al., 2018). Organizations are now able to automate and improve operations that were previously thought to be too complicated or time-consuming to automate using conventional RPA techniques. IPA can find patterns and trends in data using machine learning algorithms, giving them insights that can be utilized to enhance and optimize operational processes (Berruti et al., 2017).

Using IPA, for instance, can speed up and lower the cost of manually entering data by automating the process of finding and extracting pertinent information from medical records (Zhang, 2019). The ability of IPA to increase the precision and uniformity of corporate procedures is another advantage. IPA can discover and repair problems in real-time by utilizing machine learning algorithms to evaluate patterns in data, lowering the chance of human error and enhancing the process's overall quality (Berruti et al., 2017). Additionally, IPA can be used to automate compliance-related duties, like spotting and notifying any regulatory violations, assisting firms in avoiding expensive fines and penalties (Zhang, 2019). The adoption of IPA, however, also comes with difficulties. The requirement for a high level of technical skill to design, implement, and maintain the systems is one of the key problems.

For businesses, especially small and medium-sized firms (SMEs), this can be a considerable entry barrier (Berruti et al., 2017).). Furthermore, IPA systems can be expensive to implement, particularly if businesses need to buy new hardware and software. Potential job displacement is another difficulty. While IPA can automate tedious and manual processes, it can also result in job losses, especially in sectors like finance and healthcare where a lot of people work in administrative and data entry positions. Therefore, when implementing IPA, firms need to take into account the potential impact on employees and create plans to minimize any negative impacts (Zhang, 2019).

3.4. ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) is a branch of computer science that deals with the creation of intelligent agents capable of simulating human cognitive abilities. AI systems have the ability to think, see their surroundings, learn from past mistakes, and make decisions on their own (Russell & Norvig, 2016). The idea of AI has its roots in myths and legends from ancient times, but real development only started in the 20th century (Turing, 1950). Important turning points include the Dartmouth Workshop in 1956, which officially launched AI as a discipline of study. Foundational AI theories were made possible by the works of early pioneers like John McCarthy or Alan Turing (McCarthy et al., 1955).

AI incorporates several core concepts, including computer vision, robotics, natural language processing, and machine learning. Machine learning is crucial because it enables AI systems to get

better at what they do through experience and data (Russell & Norvig, 2016). Numerous industries, including healthcare, banking, transportation, and entertainment, have adopted AI applications. The important area is the ethical AI deployment and development. The ethical issues of biases, transparency, privacy, and responsibility have become more prominent as AI grows (Jobin et al., 2019)

3.4.1. Use of AI in RPA

As discussed in chapter 3.3.2 and 3.3.3 RPA has become a transformative technology that automates monotonous activities and workflows across many industries. Organizations can advance automation by integrating AI into RPA systems, giving robots the ability to carry out challenging cognitive tasks and adapt to changing surroundings.

For RPA systems to learn from data, recognize patterns, and make data-driven decisions, machine learning (ML) algorithms are essential. With labeled training data, supervised learning algorithms help automate activities, but unsupervised learning makes process exploration and improvement easier. By learning from experiences and feedback, reinforcement learning improves RPA's capacity for adaptation (Ribeiro et al., 2021).

RPA bots can communicate and understand human language thanks to NLP, enabling more complex interactions and data processing. NLP enables RPA systems to process unstructured data from emails, documents, and customer interactions through sentiment analysis, information extraction, and text categorization (Kedziora & Hyrynsalmi, 2023). Furthermore, RPA bots are given the ability to "see" and decipher photos, videos, and graphical user interfaces thanks to computer vision technology. This capacity is essential for automating operations in a variety of industries that involve image identification, optical character recognition (OCR), and object detection (Mendling et al., 2018).

Also here is a big potential for application in various industries. AI-powered RPA automates compliance, fraud detection, and invoice processing processes in the finance industry. Additionally, ML algorithms can forecast financial trends and help evaluate risks, enhancing the decision-making process (Mendling et al., 2018). Through NLP-based chatbots, AI-enhanced RPA systems can manage consumer inquiries and complaints more effectively. Sentiment analysis helps in determining consumer satisfaction and enables quick reactions to raise quality of service (Ribeiro et al., 2021). Furthermore, the digitalization of medical records, claims processing, and drug discovery are made easier by RPA, which is also supported by AI. Improved healthcare services are made possible by

machine learning models that help in the diagnosis of medical disorders and the prediction of patient results (Kedziora & Hyrynsalmi, 2023).

RPA must handle sensitive data with caution because of the incorporation of AI. To protect information, organizations must establish strong security measures and comply with laws and regulations. A competent workforce capable of creating, implementing, and maintaining these systems is needed for AI-driven RPA. To fully utilize this technology, businesses need to engage in employee training and skill development (Ribeiro et al., 2021).

3.4.2. OpenAI: ChatGPT

The ChatGPT by OpenAI is a variation of the GPT (Generative Pre-trained Transformer) series that uses unsupervised learning to comprehend and produce language that resembles that of a human. The ChatGPT design draws from the Transformer neural network architecture and the original GPT models. It uses numerous levels of self-attention methods to digest input text concurrently and effectively store contextual information. Pre-training on a large amount of freely accessible text is used to train the model, and fine-tuning is done on customized datasets for particular purposes (OpenAI, 2022).

Since its first release, ChatGPT has undergone several improvements. To increase its performance in conversational tasks, it integrates developments in training data selection, model architecture, and fine-tuning procedures. Notably, ChatGPT has the capacity to carry on logical and contextually appropriate conversations on a variety of subjects. It has proven effective in a variety of real-world contexts, including customer service, educational support, and creative writing (Brown et al., 2020).

Despite its improvements, ChatGPT still has issues with responses that are biased, the potential for spreading false information, and a lack of inherent comprehension. For ChatGPT to be used ethically, responsible deployment and issue mitigation are still crucial. Powerful language models like ChatGPT are being employed, that represent ethical questions about data privacy, false information, and AI ethics (Brown et al., 2020). By establishing usage guidelines, modifying the model's behavior, and participating in public discourse, OpenAI has tried to reduce these worries (OpenAI, 2022)

4. WORK PROJECT

4.1. INITIALIZATION

The preparation for the project started with learning how to build workflows in UiPath. The following courses in the UiPath Academy were completed: RPA Developer Advanced, Process Mining Developer, Test Developer Foundation, UiPath Business Analyst. After completing these courses, the project started.

During a meeting with the Head of Automation, the reasons for the project were discussed. Currently there is no internal information or knowledge channel which would be updated frequently.

Employees are currently left to do their research of the news and happenings related to work topics on their own. It is especially important for automation consultants to know the market well. But staying up to date with the development is quite challenging. Technology develops nowadays very fast, and it's predicted to even speed up in the future (Wolff, 2021)

Furthermore, with the raising importance of AI and its connection to RPA (Ribeiro et al., 2021), it is important to keep up with development. There are unexplored ways in the company of connecting AI chatbots to UiPath workflows. By establishing the connection, more intelligent automation can be created. The IPA increases the overall process quality and can adapt in real-time (Berruti et al., 2017).

This creates a possibility to sell this solution as a product. It is important to create a product which can be easily adapted to different clients in different industries. This process is usually done manually and is a task of an employee. With this solution, the process can be fully automated and saves time and costs of the company.

The project will be built in UiPath and an automated prompting to OpenAI will be developed. The result of this workflow should be a data table where we will have a title of an article, summary (done by OpenAI) and URL link in case a person is interested in reading the full article, and a LinkedIn post.

From the beginning, there was the idea of sending a summary of the news to employee emails as that's a channel every employee checks regularly. As this is a process that started from zero, there was no AS-IS model to be improved. Anyway, process modelling was important to do.

4.2. PLANNING

In this stage a lot of research was done. In order to gather inspiration, see what the trends on the market are, which tools are possible to use, and if there is some similar project on the market. During this stage it was decided how the end solution will look like. A weekly newsletter in an email form with the company logo and a table where all the articles are listed.

As mentioned in the theoretical part of the project, process modelling is a crucial step in BPM (van der Aalst et al., 2016). In this stage the knowledge gained at the university BPM course helped me to understand the processes better. Thanks to a university project where we modelled processes with Bizagi I could easily model and prepare the process that will be build. The process was modelled with the help of online tool LucidChart.

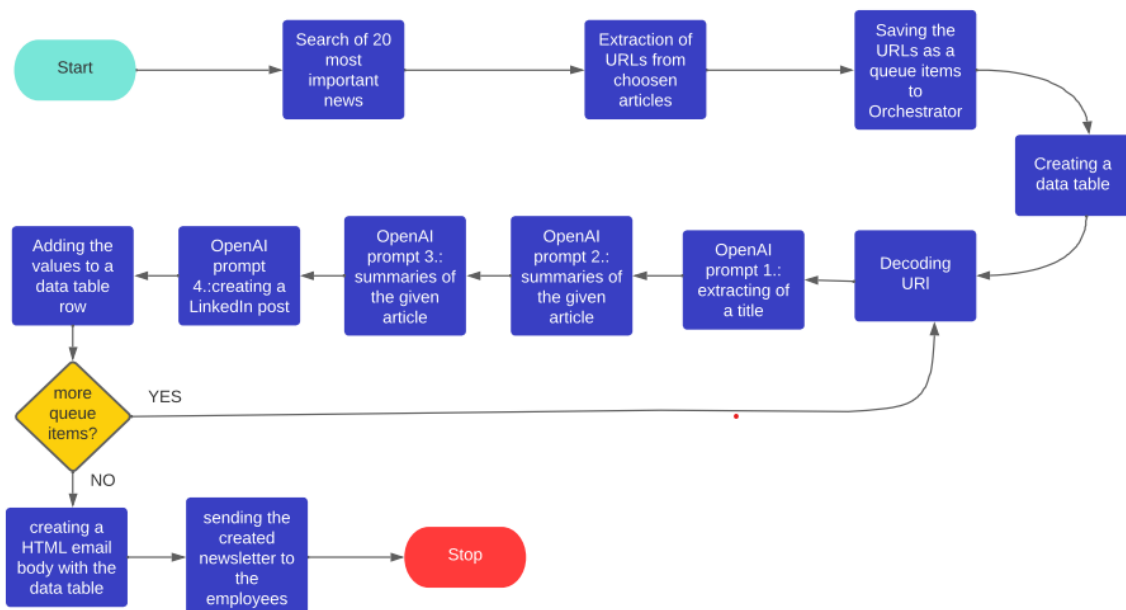


Figure 7: Process Modelling

Firstly, the Dispatcher workflow in UiPath Studio will be build. The purpose of the Dispatcher is to gather the news and save them as queue items in Orchestrator. In this stage we had to examine what news channel is the best. We were testing different search engines and using different keywords. Each engine uses different algorithm and delivers different results. Every time the search is set up to filter news just from past week.

We started with using Bing News search engine and keywords “Robotic Process Automation OR “Automation Market”. During the project this was changed and adapted, and we ended using Google News search engine and following keywords: “Robotic Process Automation” OR “Intelligent Process Automation” OR “process Automation”. Testing of the search was done in the Monitoring stage and it was important this will be easy to change and adapt.

As shown in the Figure 7., the activities in the first line are part of the Dispatcher workflow. Starting with the search of 20 most relevant news, following with extraction of each URLs to a data table and finishing with storing them as a queue item in Orchestrator.

Secondly, the Performer workflow will be built. That is where the main process is happening. Here each queue item which we will be extracted from our Orchestrator queue is processed. Also, the connection with OpenAI is set up. Besides Queues, the OpenAI keys are stored in UiPath Orchestrator as Assets.

Further, a data table which consist of four columns will be build (Title, Summary, URL, and LinkedIn post). Then the following workflows are invoked. Firstly, the URL gets decoded as it got extracted in encoded form and we want the readers to see the source directly. After that, the ChatGPT prompting starts. The first prompt returns the article’s title. The next prompt will return the summary of the article and the last prompt will prepare a LinkedIn post based on special requirements.

4.3. EXECUTION

Projects in UiPath are written in VB.Net code. As mentioned above, for this project the REF Framework is used. Further the most important workflows will be described. Firstly, we adjust the frameworks workflows such as InitalSetting.xaml, InitAllApplication.xaml and SetTransactionStatus.xaml.

The Config file is adjusted, where the data and settings are stored.

Name	Value	Description
OrchestratorQueueName	News	Orchestrator queue Name. The value must match with the queue name defined on Orchestrator.
OrchestratorQueueFolder	My Workspace	Folder name. The value must match a folder defined in Orchestrator and queue specified as OrchestratorQueueName should be created in this folder. For classic folders leave the value field empty.
logF_BusinessProcessName	Newsletter	Logging field which allows grouping of log data of two or more subprocesses under the same business process name
in_GoogleNewsURL	https://news.google.com/home?hl=en-US&gl=US&ceid=US:en	
Keywords	"Robotic Process Automation" OR "Intelligent Process Automation" OR "Process Automation"	

Figure 8: Config file

The folders, queue and assets name are set up. Also, the arguments are handled here. The Keywords and URL of the News source are saved in Config file, so they can be easily changed anytime.

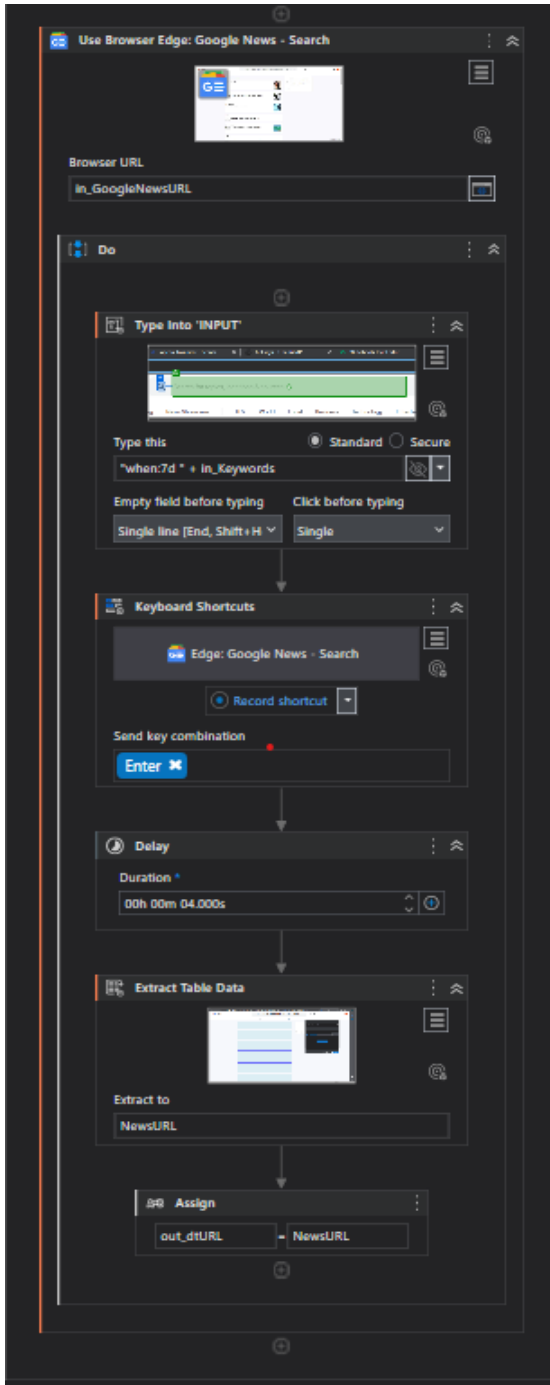
The project is divided into two steps. Firstly, the Dispatcher, which will extract and store the data in Orchestrator and second, the Performer, where the process is performed.

4.3.1. Dispatcher

Besides the REF Framework workflows, two extra ones will be created, GoogleSearch and PopulateQueue.

4.3.1.1. GoogleNews search

The workflow essentially performs a search on Google News using specific keywords, extracts URLs from the search results, and returns those URLs as output. It is designed to automate the process of searching for news articles related to certain keywords and capturing their URLs. The extracted URLs can then be used for further processing.



- Use Browser Edge: Google News - Search: This activity opens the Google News website using the Microsoft Edge browser. It opens the URL which is stored under an argument. It interacts with the browser to perform various actions.

- A Type Into activity enters search keywords into the Google News search bar. The keywords include the phrase "when:7d" (indicating news from the last 7 days) and the provided keywords from the input arguments.

- A Keyboard Shortcuts activity sends keyboard shortcuts to trigger actions in the browser. It simulates the keyboard shortcut "Enter". This shortcut is used to load the Input text from the activity before.

- A Delay activity adds a pause of 4 seconds, to allow the browser to load and process the actions.

Figure 9: GoogleNews search

- An Extract Table Data activity extracts data from the search results page. It targets URLs associated with news articles. This data is stored in a data table variable named "NewsURL".
- Assign: This activity assigns the extracted DataTable variable "NewsURL" to an output argument "out_dtURL", which will be returned to the process.

Name	Direction	Type	Value
out_dtURL	Out	DataTable	dt_News
in_GoogleNewsURL	In	String	in_Config("in_GoogleNewsURL").ToString
in_Keywords	In	String	in_Config("Keywords").ToString

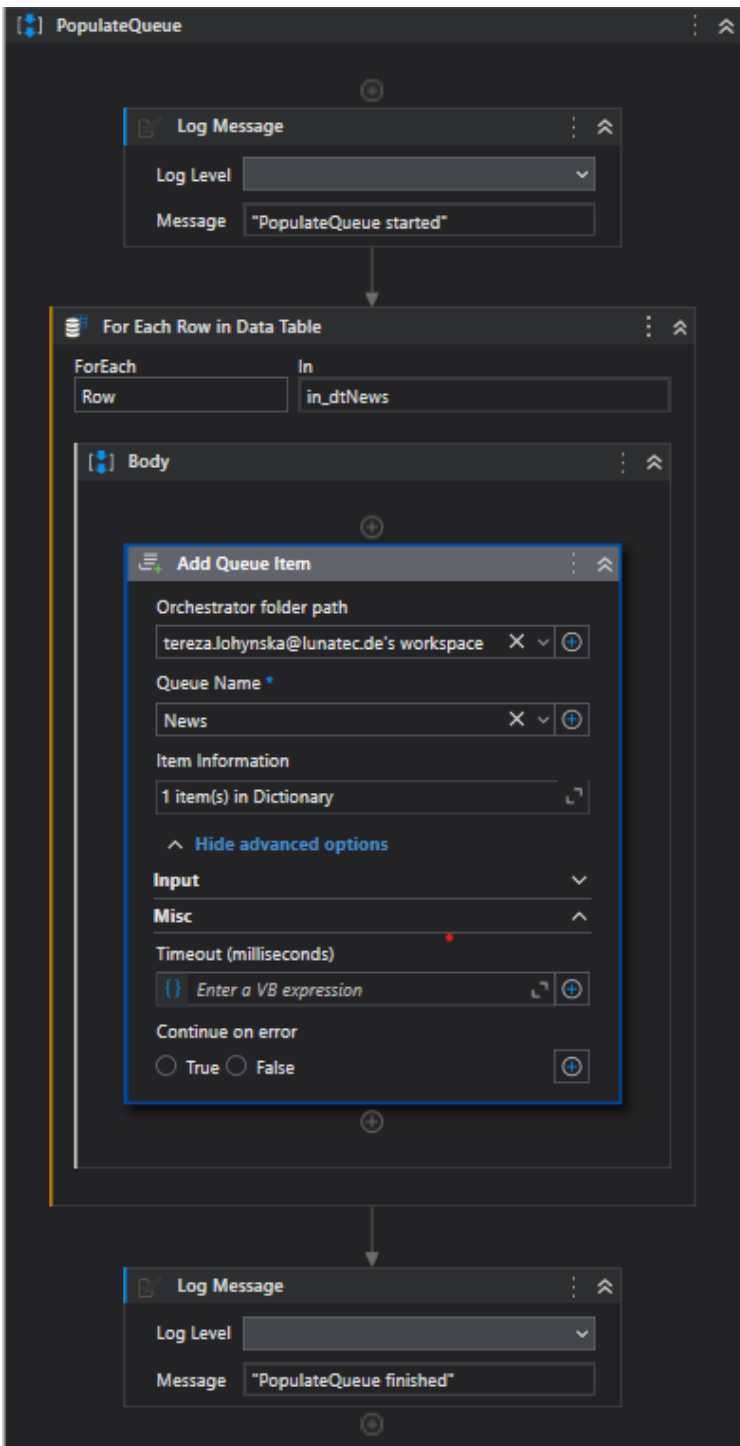
Create Argument

Figure 10: GN arguments

To finalize this workflow, we must update the arguments and assign their values. We assign the variable "dt_News" to our data table with our extracted URLs. This is our only argument which goes out of the workflow, that is why it is an "out" argument. Further we assign to the "in" argument, which bring the value inside the workflow, the values we store in our Config file, with type of String.

4.3.1.2. PopulateQueue

This workflow meant to take a DataTable (in_dtNews) containing news data and add each row as a queue item with its corresponding URL value to Orchestrator. Such a workflows are commonly used as a part of a larger automation process where items are extracted from the DataTable and queued for further processing or actions.



- For Each Row in Data Table:
This activity iterates through each row in the input DataTable (in_dtNews). It performs the following action for each row:

Add Queue Item: This activity adds an item to a queue. The queue is related to a user or workspace named "tereza.lohynska@lunatec.de's workspace". The URL value from the current row of the DataTable is used as the value for the "URL" field of the queue item.

- We use Log Messages to provide visibility to the whole process and signal when the workflow started and ended.

Figure 11: Populate Queue

To finalize the workflow, we update the argument, this time we have just one “in” argument. To use the data from the workflow before “GoogleSearch”, we will use the variable “dt_News” and assign it to our “in_dtNews” argument.

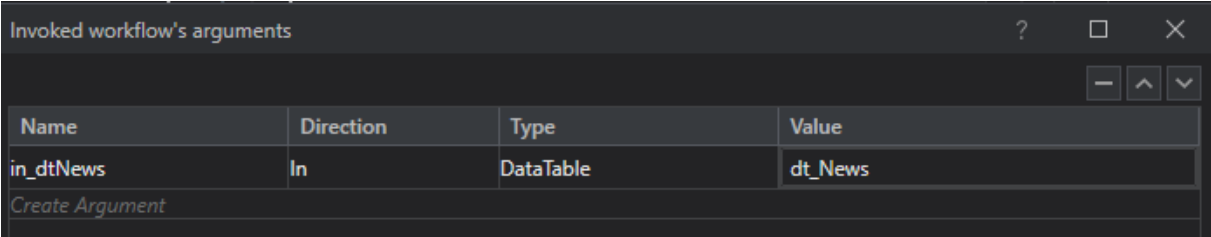


Figure 12: PQ Arguments

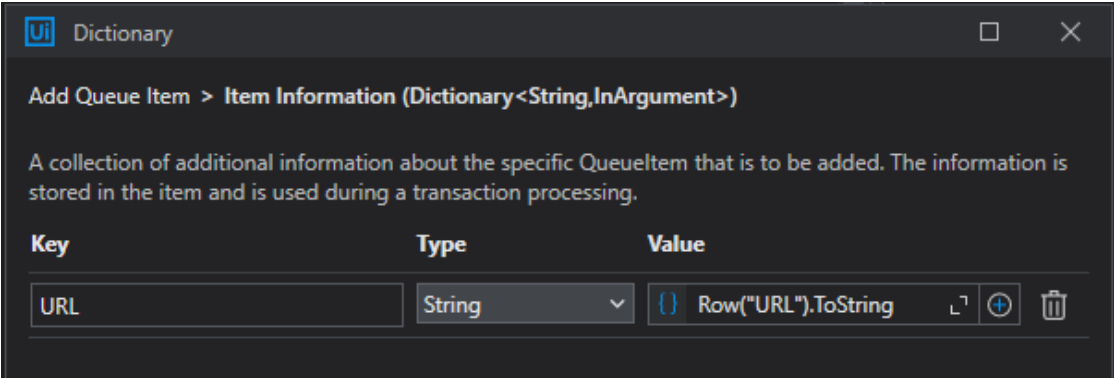
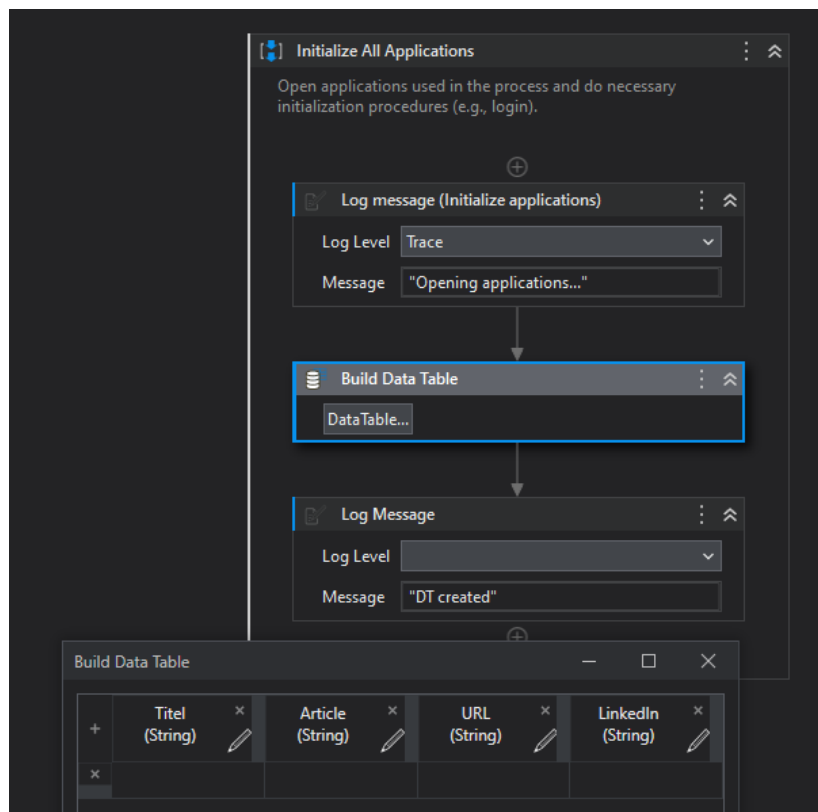


Figure 13: Queue Item

4.3.2. Performer

In the second part we focus on the process. Now, we have the data stored under a Queue in Orchestrator. Under Initialization, the InitAllApplication.xaml file is updated. Here, we build our data table with which we are going to work the whole process. We build four columns with type String. The Title, Article, URL, LinkedIn.

Figure 14: Build DataTable



Further, we move to the Get Transaction Data. Here It is needed to retrieve the data from Orchestrator Queue and process each by each. This is done in a loop until the transaction item is nothing. This is done by setting a condition to: "out_TransactionItemisNot Nothing".

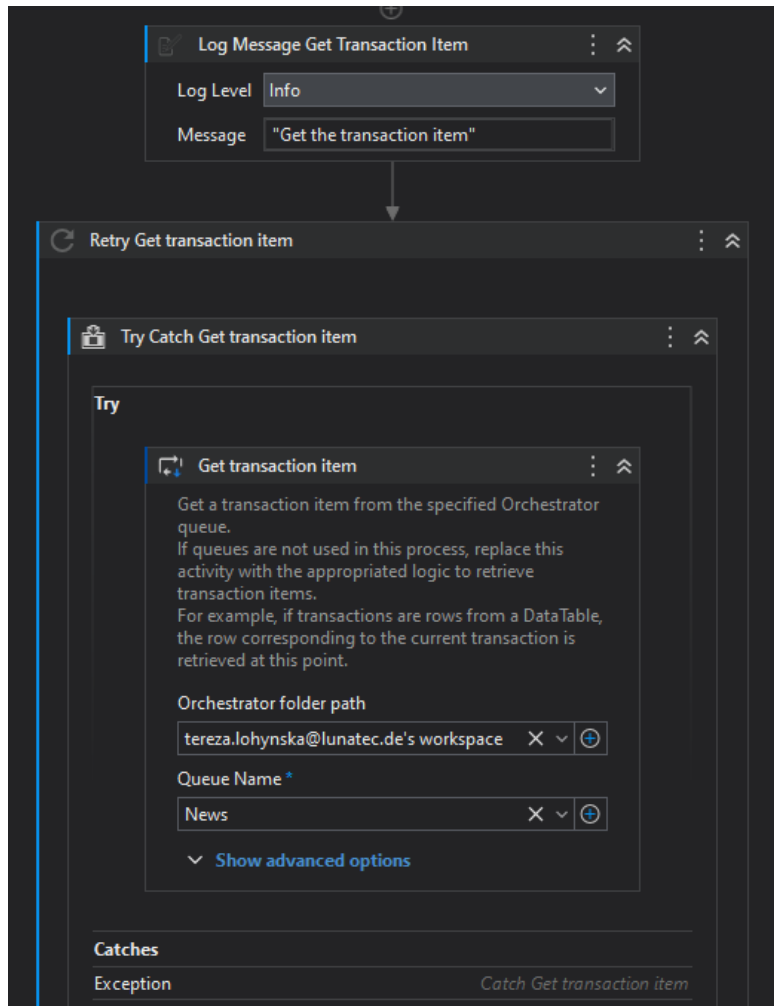


Figure 15: Get Transaction Item

Once we have the Transaction item in process we move to the process.xaml itself. This is the most content part of the whole workflow.

Here we invoke four workflows, each for specific data table column. At the end we add the new values in a row in the data table. This process will be repeated for each item.

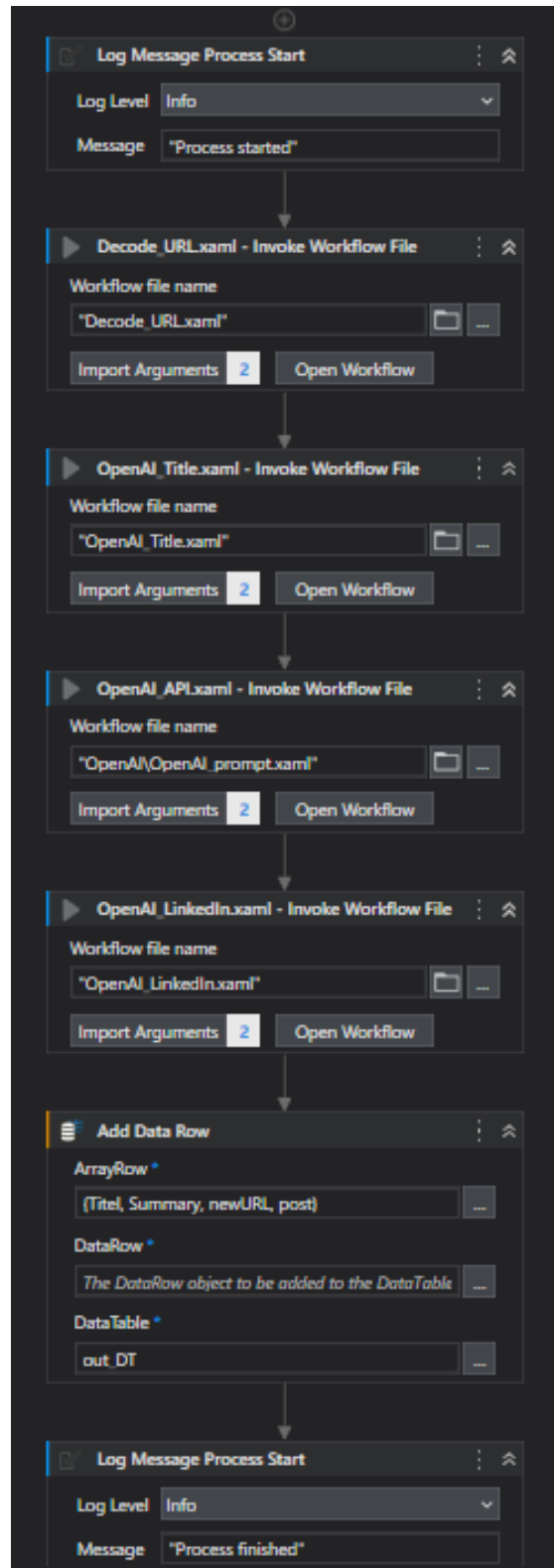
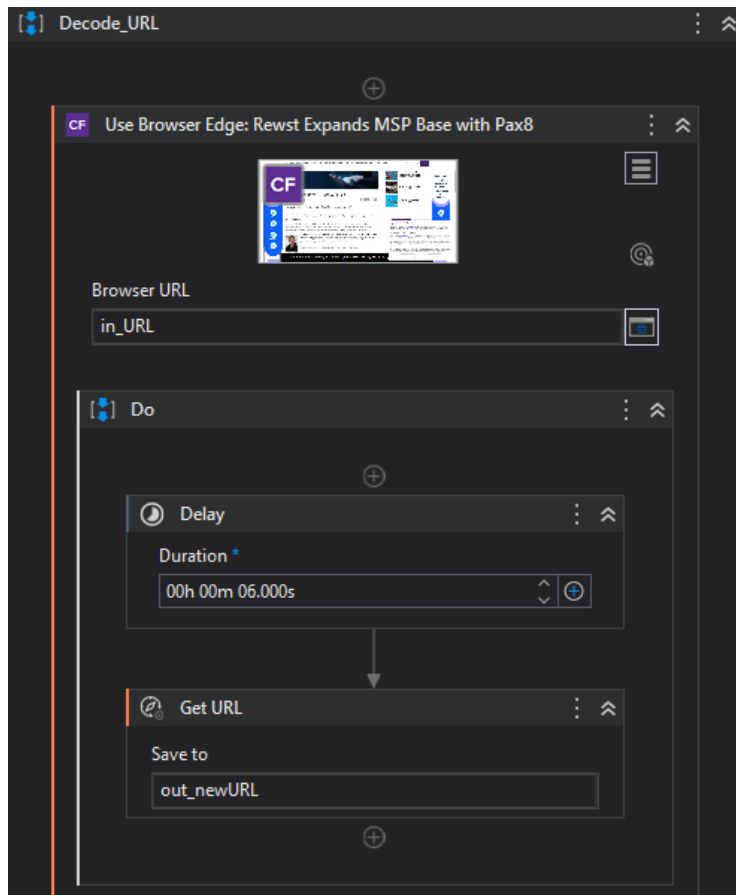


Figure 16: Process

4.3.2.1. Decode_URL

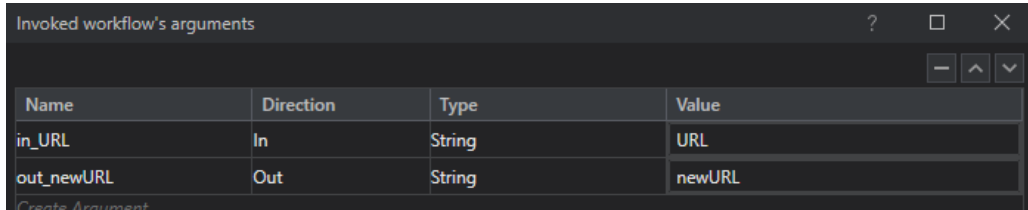
Google News stores its URLs as an encoded value. We want to have the original URL. The readers should see the original source. We had to create a workflow to solve this problem. Unfortunately, there is no activity which would decode or decode. The solution is following:

Figure 17: Decode URL



- UseBrowserEdge: we load the extracted article's page with the argument "in_URL"
- Delay: we let the page to load with a six second delay so that the URL has time to update to its original
- GetURL: we simply extract the loaded URL and save it as an out argument "out_newURL"

To finalize this workflow we update the arguments, both String types. We add value to the “in_URL” from our transactionitem and to our “out_newURL” we assign new variable “NewURL” that will be further used in the process.



Name	Direction	Type	Value
in_URL	In	String	URL
out_newURL	Out	String	newURL

Figure 18: DU Arguments

4.3.2.2. OpenAI_Title

We start with establishing the connection to OpenAI. The workflow is designed to automate the interaction with the OpenAI API for generating completions based on a given question or prompt. Firstly, we create an API key for this prompt and store it under Assets in Orchestrator as this is a secret value.

This workflow retrieves an API key from an asset in orchestrator, constructs a JSON payload for an API request to the OpenAI API, sends a request to the OpenAI API’s endpoint using an HTTP POST request, processes the API response by deserializing it into a JSON object, extracts the generated title from the JSON response and stores it in the “out_Title” variable.

- Variable Declarations: The workflow starts with the declaration of several variables, such as body, str_APIkey, ResponseContent, ResponseStatus, JsonObject, splitresult, and Response. These variables will be used to store different types of data throughout the workflow.
- GetAsset: This activity retrieves the value of an asset named “Newsletter_Titel” from the specified folder path. The asset’s value is assigned to the str_APIkey variable. This is an API key needed for authentication with the OpenAI API.
- Multiple Assign: This activity is used to assign values to multiple variables simultaneously. The values are assigned as follows: The body variable is assigned an empty JSON object using

New JObject(). The model field in the body JSON object is set to “text-davinci-003”. The prompt field in the body JSON object is set to the value of the “in_question” input argument. The max_tokens field in the body JSON object is set to 120.

- HTTP Request: This activity sends an HTTP POST request to the OpenAI API’s /v1/completions endpoint. It includes the JSON payload from the body variable as the request body. The Content-Type header is set to application/json, and the Authorization header is set to include the API key (str_APIkey). The response content, status code, and other details are captured in the ResponseContent and ResponseStatus variables.
- Assign (JSON Response Deserialization): The Assign activity is used to deserialize the JSON response content (ResponseContent) into a JSON object (JsonObject) using the JsonConvert.DeserializeObject method.
- Assign (Extract Title): Another Assign activity is used to extract the generated title or completion from the JSON response. The value is assigned to the “out_Title” output argument. It extracts the text from the “choices” field within the JSON object and converts it to a string.

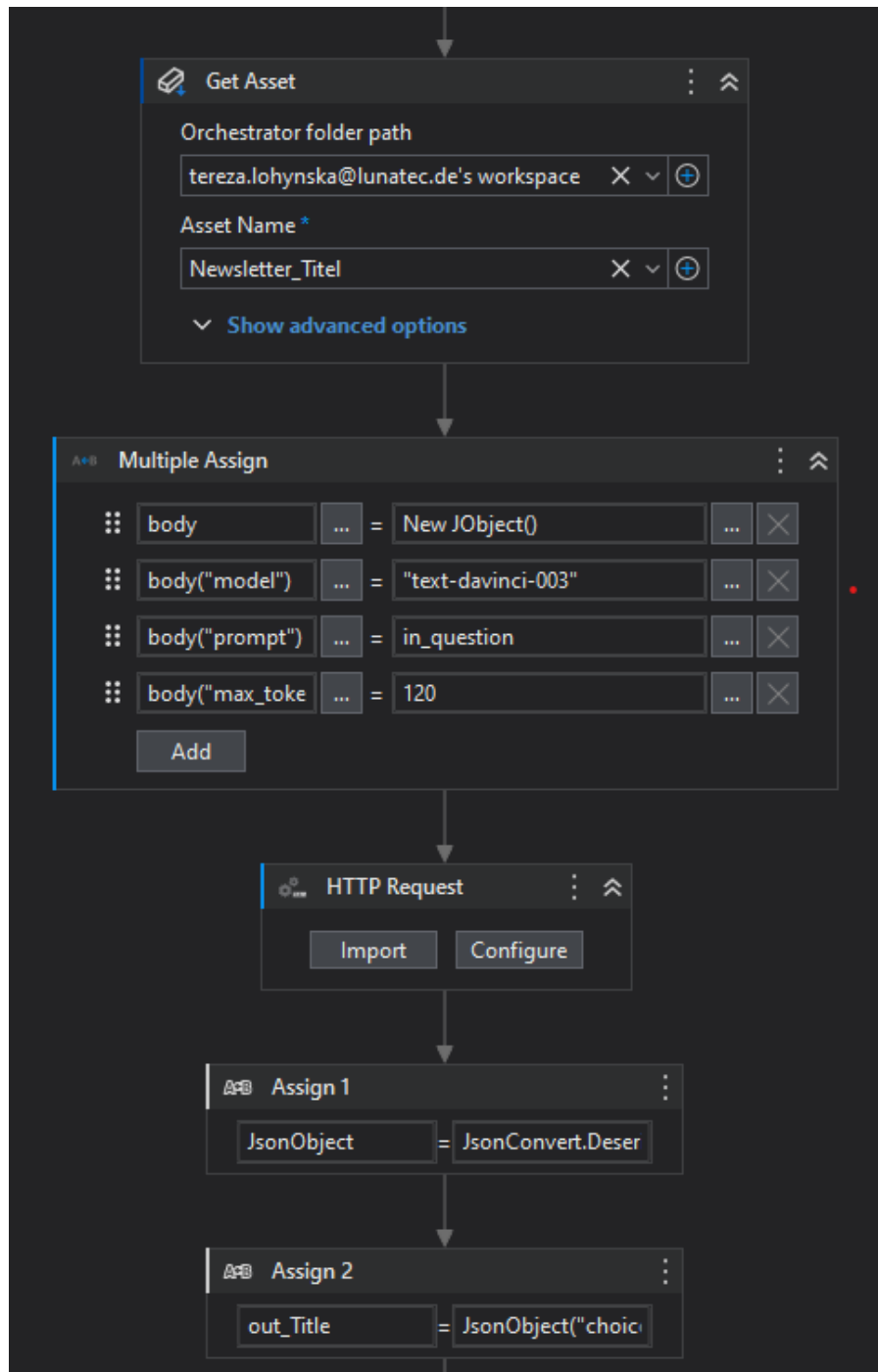


Figure 19: OpenAI

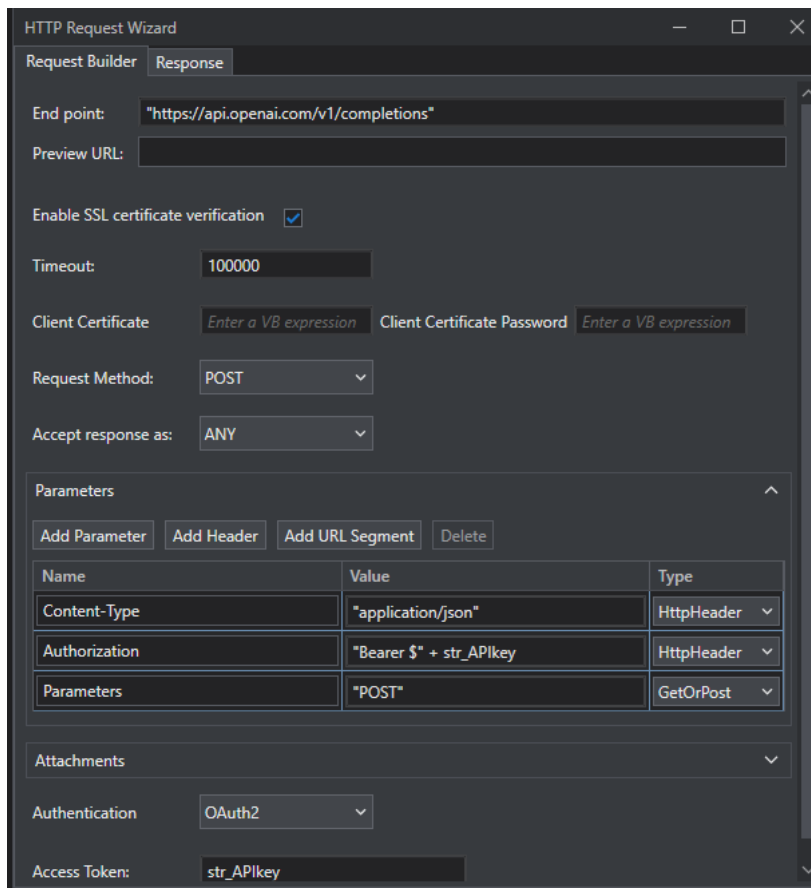


Figure 20: HTTP Request

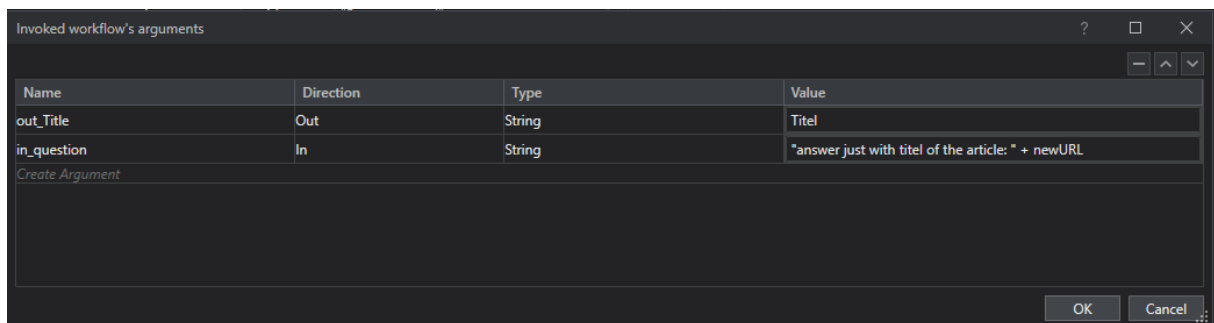


Figure 21: OA Arguments

4.3.2.3. OpenAI_Summary

This is another OpenAI prompt, this workflow is designed to interact with the OpenAI API, sending a text prompt (in_question) and receiving a generated text (out_Text) as a result. The workflow retrieves the necessary API key, constructs the appropriate JSON request payload, sends the request, processes the response, and extracts the generated text for further use within the automation process.

The purpose of this prompt is to make a summary of the extracted articles. Our prompt has following form and is saved in our Config file: *Consider just the relevant text of the article, and write a professional summary, limit the answer on maximum 120 words.*

The steps are very similar to our 4.3.2.2 workflow. The only differences are in variables and arguments.

The output of the workflow is a summary which is saved under out_Text argument. This will be later our second column of our data table.

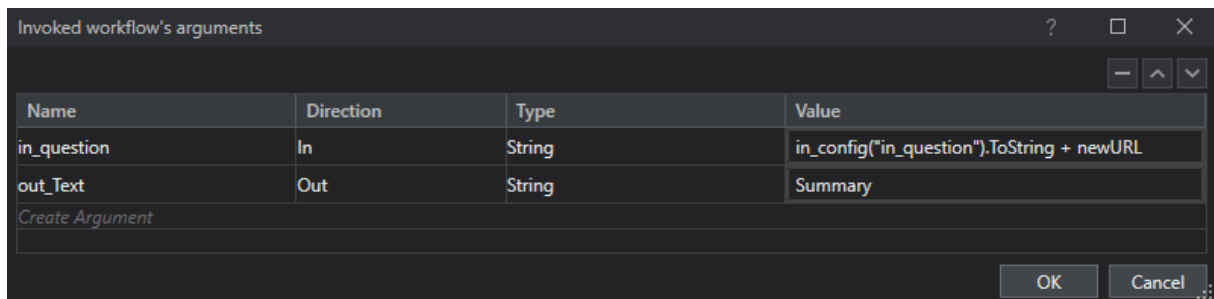


Figure 22: OA Arguments 2

4.3.2.4. OpenAI_LinkedIn

This is the third OpenAI prompt, again with the same structure of the workflow. Here it is about creating a LinkedIn post. The main idea is to prepare a post for the employees in case they liked the article and want to share it on the LinkedIn platform. This would create an interaction and discussion about the topic online. The employees are encouraged to do so.

As consulted with the company internal specialist on LinkedIn, the prompt was tested and finalized. The post must follow rules and structure in order to increase the engagement and popularity on the platform.

Our prompt is saved in a Config file and has following form: *write a linkedin post, start with a statement, that is strong and catcher, and do follow up of that statement in the second sentence, do not start with hashtag, write around 80 words, No emoticons, No call to action necessary, If, then a conversation starter 'what Do you think about ...',max 2 simple hashtags., use very simple 51english, the post is about this article.*

The output of this article is the LinkedIn post created by ChatGPT. This will be added as a fourth column to our data table.

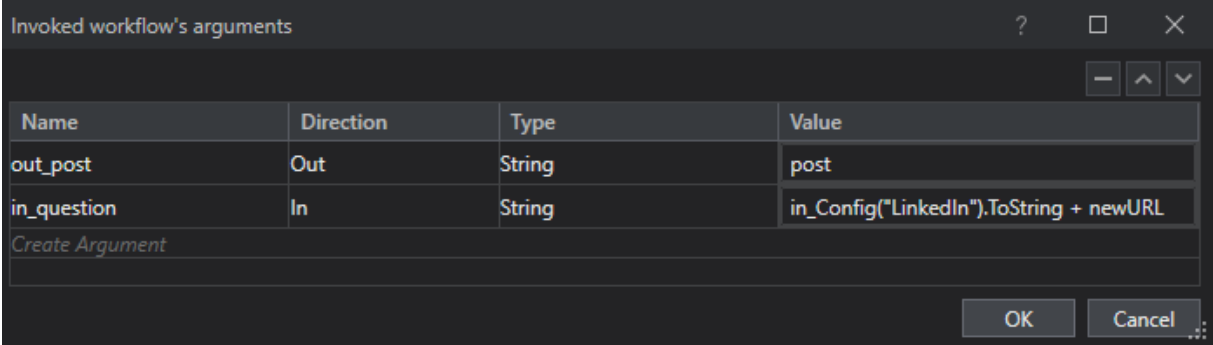


Figure 23: OA LinkedIn Arguments

4.3.2.5. Add Data Row

The last activity in the process is the "Add Data Row". The purpose is to add the created values from 4.3.2.1 – 4.3.2.4 of the current transaction item. As described at the beginning of chapter 4.3.2, the data table with four column was created. Values are added to following column: Titel, Summary, URL and LinkedIn post. Further this is added to output argument "out_DT", which is later assign to the "io_DT".

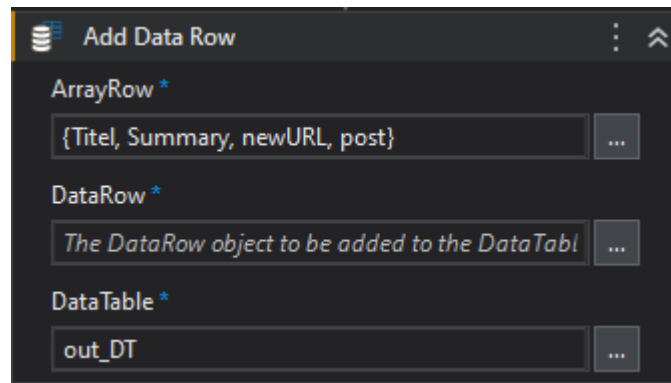


Figure 24: Add Data Row

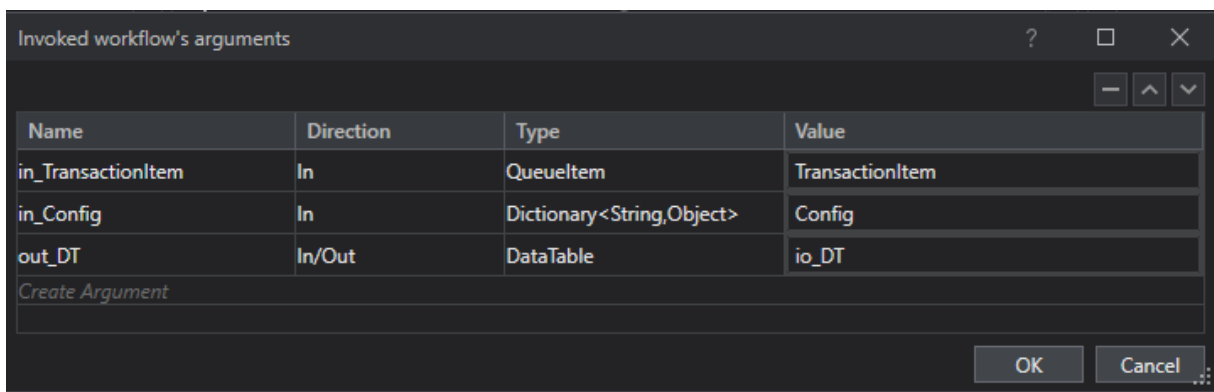


Figure 25: Arguments

Moving to the End Process activities. Here the following workflows CloseAllApplication, KillAllProcesses and HTML Convert are invoked.

4.3.2.6. HTML Convert

This workflow essentially processes data from a DataTable, formats it into HTML content for an email, and sends the email using the UiPath activities related to Outlook integration.

- "Assign" activities are used to set values for variables like "HTMLFooter," "MiddleHTML," and "DT" (which is a DataTable).

- "ForEachRow" activity iterates through rows of the DataTable stored in the "DT" variable. Inside the loop, there is a sequence of activities for processing each row. Within this loop, there are:
 - "Assign" activities used to extract values from the current row of the DataTable and assign them to variables:


```
"RowValue1 = CurrentRow(0).ToString", "RowValue2 = CurrentRow(1).ToString",
"RowValue3 = CurrentRow(2).ToString", "RowValue4 = CurrentRow(3).ToString".
```
 - The structure of the text in column four needs to be adjusted. LinkedIn Post should have two paragraphs after the first and second sentence. We add "Assign" activity and create new variable `"Sentences = rowValue4.Split("."c)"` this will split the text per dot. Next, we add the paragraphs, we create a new variable and another assign activity:


```
"ModifiedText = String.Join("<br><br>" & vbCrLf, Sentences.Take(2)) + ".<br><br>" &
vbCrLf + String.Join(".", sentences.Skip(2))
```
 - Further we have to assign the values to the columns in the table:


```
"MiddleHTML = "<tr> <td style='width: 15%;>"+RowValue1+"</td>
<td style='width: 40%;>"+ RowValue2+"</td>
<td style='width: 15%; word-wrap: break-word; word-break: break-
all;>"+RowValue3+"</td>
<td style='width: 30%; word-wrap: break-word; word-break: break-
all;>"+ModifiedText+"</td>
</tr>" + MiddleHTML "
```
- After the loop, there are "ReadTextFile" activities used to read the content of text files ("table.txt," "html1.txt," "Footer.txt") into variables "table," "Logo," and "Footer," respectively. This imports the code of our HTML format email body. We need to have a company logo, introduction text, data table, closing text and logo.
 - LOGO AND FIRST TEXT, Html1.txt code in Appendix 1, 6.1
 - DATA TABLE; Table.txt code in Appendix 2, 6.2
 - FINAL TEXT AND LOGO, Footer.txt code in Appendix 3, 6.3

- The next step is to assign these codes with our datatable and create a email body, This is done through an "Assign" activity which is used to combine the content of the "Logo," "table," "MiddleHTML," "HTMLFooter," and "Footer" variables into the "HTMLContent" variable, which will form the body of the email.
- A "Send Outlook Mail Message" activity is used to send an HTML-formatted email. It includes the "HTMLContent" as the email body, the subject, and the receiver's email address are imported as arguments.

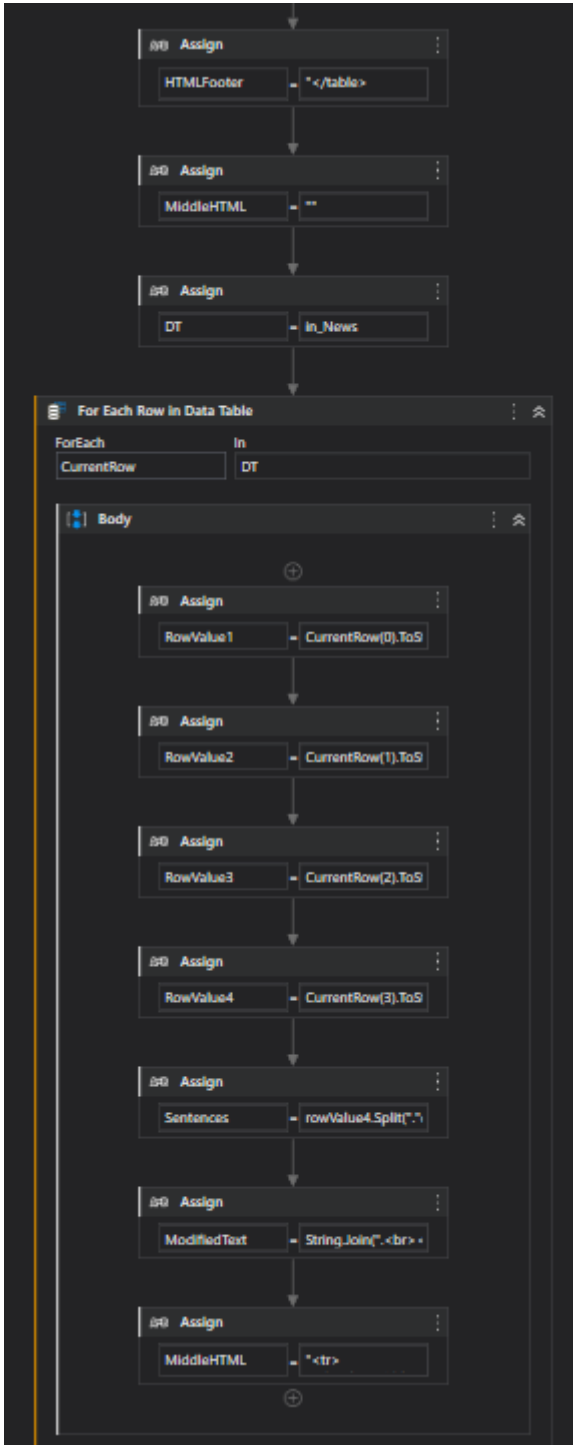


Figure 26: Send Outlook

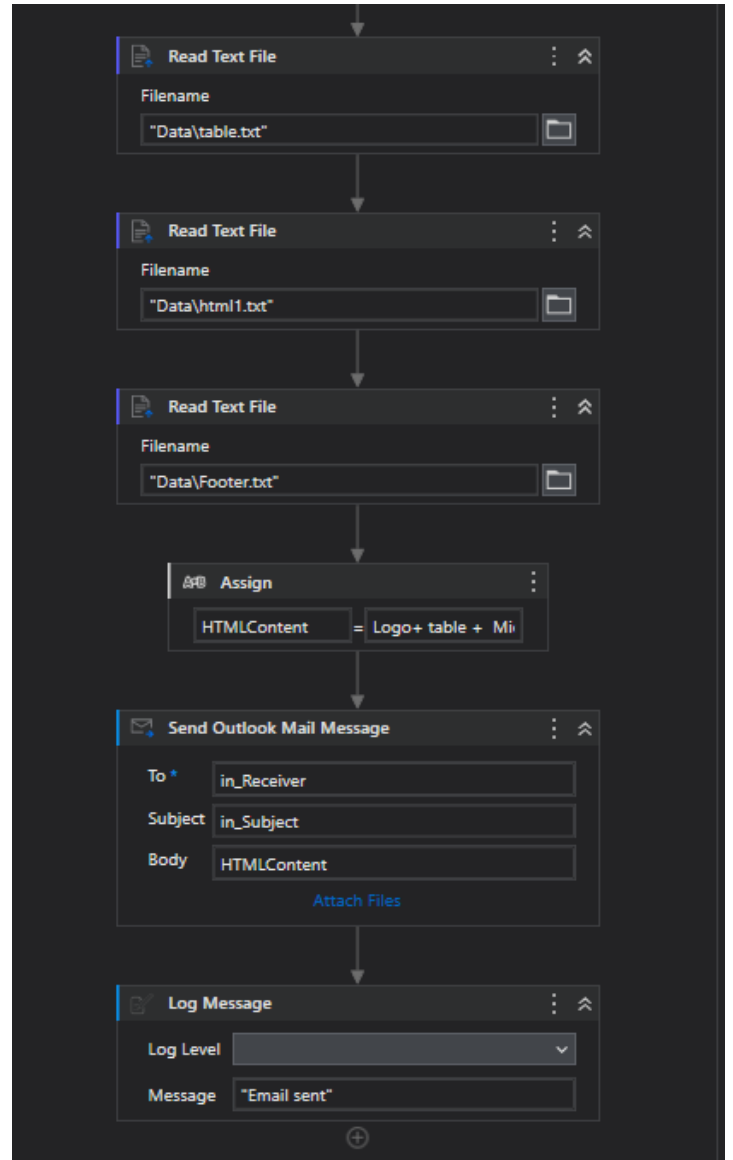


Figure 27: Send Outlook 2

4.4. MONITORING

The monitoring stage started, and the bot was tested on a weekly basis. Testing and monitoring took place during the whole development. Weekly meetings with the Head of Automation always resulted in feedback and some changes were applied. Also, the whole project was presented to the automation consultants of the company. This was done to receive feedback and ideas from more experienced developers and consultants. The feedback was collected, and other changes were applied. Following occurred during the monitoring phase (most of the events were already showed resolved in the chapter 4):

4.4.1. From Bing News to Google News

After running the bot few times, we saw that the search is not always that relevant and we expected some more interesting articles. That is why we switched to Google news search. Until now, Google search delivers better results.

4.4.2. Decoding URL

After switching to Google News another issue occurred. Google News decodes the URL of the article. During the project presentation it was agreed that it is important to see the encoded URL so that the reader sees the source directly. There were few possibilities to encode the URL. Firstly, we used another OpenAI prompt, unfortunately after a few tests, we saw the results are not always correct. After that a workflow was built where the decoded page is loaded, we add delay to fully load and then extract the original URL.

4.4.3. Title

An issue with the Title occurred. Extracting the Title from Bing News was possible, unfortunately Google News website is differently built. We had to build another workflow to extract this. Firstly, we asked OpenAI to give us the title in "", after we divided that with a Split function. This again delivered

very unstable results. We decided to build an extra OpenAI prompt, which returns just the title. This shows better results.

4.4.4. LinkedIn post

During the development, the Head of Automation had an idea to add another column where we prepare a LinkedIn post of the article. This should encourage the readers to share the article and start discussions. The structure of the post was important, we wanted to apply that directly to the Newsletter. The idea was to add paragraphs after the first and second sentence to create a better visual post.

Firstly, we split the post by dot and wanted to add paragraphs after the first and second split. This was unstable, because sometimes a dot was inside of a sentence (for example a number 10.000). After that, we asked in the summary prompt to replace the dots after first and second sentence with this symbol “§”, which we later replace with paragraphs.

4.4.4.1. Extracting just 10 articles

After some tests the following issue occurred. The page of the news it's not always loaded as whole. This means that the “Extract DataTable” activity could access just the first ten articles. This was solved by adding some keyboard shortcuts, which scrolled the page down. This ensures that the whole page is loaded and more articles can be extracted.

4.4.5. Mistakes

During the monitoring and testing, some mistakes in the structure occurred. Most of them were caused by the changing nature of the OpenAI prompts. The prompting is not 100% stable yet. A Some human intervention is still needed. This in form of controlling if the structure is correct. In the content of the prompts almost no mistakes were found.

4.5. OPTIMIZATION – CLOSURE

During the optimization stage the issues that occurred during the monitoring stage were solved and some additional improvements were made.

The main objective was to create a fully automated bot which solves the following. The purpose of the project was to create a knowledge channel to keep the employees informed about the news in the world of automation. This was completed by creating this newsletter which each employee receives every week.

The purpose was to get a summary of the article and in case of bigger interest, the whole article can be displayed. Another objective was to create intelligent automation and establish a connection with ChatGPT. This was used for the creation of a summary, extracting titles, and creating a LinkedIn post. After testing and monitoring the project was optimized and a final version was made. This version meets the established requirements and fulfills its intended purpose.

The bot is ready to be easily adapted for clients with different needs. A version with different keywords was tested as well and delivered very good results.

As a limitation is seen the occasional need for human intervention, which is needed for the control and occasional correction of some mistakes.

On the next three pages the copy of the newsletter is presented (below the logo there is an animation, which could not be properly displayed):

FW: Automation Bulletin - first draft



Tereza Lohynská
To Tereza Lohynská

☀️ 😊 ↶ Reply ↷ Reply All → Forward 🗑️ ⋮

Mi 23.08.2023 19:38

🌐 Translate message to: German | 🇬🇧 Never translate from: English | ⚙️ Translation preferences

Lunatec



Dear Lunatecs,

Have a look at this week's news from the world of automation.

Titel	Article	URL	LinkedIn
Business Process Automation (BPA) Gets an Upgrade with Self-Service Generative AI	Business Process Automation (BPA) is getting an upgrade with the introduction of Generative AI, a self-service automation solution. Generative AI is designed to streamline digital processes by quickly automating manual tasks and scaling to very complex operations. This technology provides increased accuracy and speed while reducing operational costs. It also enables businesses to respond quickly to customer needs. Generative AI simplifies operations, increases efficiency and requires no manual programming.	https://fagenwasanni.com/news/business-process-automation-bpa-gets-a-n-upgrade-with-self-service-generative-ai/165965/	<p>We are living in a time of vast digital transformation!</p> <p>Business Process Automation (BPA) offers a unique opportunity to operationalize AI with self-service, generative models.</p> <p>This is exciting news for organizations embarking on their intelligent automation journey. #IA #BPA By leveraging BPA, organizations can streamline processes and free up people from cumbersome tasks. In addition, the ability to automatically construct datasets, generate new algorithms and refine existing models will enable the delivery of even more cognitive automation capabilities. It's truly game-changing, both on the back end and through customer-facing experiences. What do you think about BPA and self-service generative AI?</p>
Tangentia and Decisions Partner to Build the Future of No-Code Intelligent Process Automation	Tangentia and Decisions have announced their new partnership, which will work towards building the future of 'no-code intelligent process automation'. They will use a range of technologies to empower their customers with a faster, more dexterous approach to automating tasks and accelerating digital transformation. The two companies plan to bring their expertise in engineering, design thinking and digital experience to usher in the next era of intelligent process automation.	https://www.einnews.com/pr_news/648832420/tangentia-and-decisions-partner-to-build-the-future-of-no-code-intelligent-process-automation	<p>The future of automation is here!</p> <p>Tangentia and Decisions are teaming up to revolutionize intelligent process automation quicker and smarter than ever before.</p> <p>Together, they have created a no-code platform that enables businesses to automate their processes more efficiently. With Tangentia's Field Configurator, enterprises can capture, represent and analyze their workflows to identify process issues faster than ever before. #IntelligentProcessAutomation #NoCode Join the automation revolution now to get the most out of your business processes. What do you think about using no-code solutions to streamline and automate tasks?</p>
UiPath Named a Leader in the 2023 Gartner Magic Quadrant for Robotic Process Automation*	UiPath, an RPA and AI software solutions provider, has been named a leader in the 2023 Gartner Magic Quadrant for Robotic Process Automation Software. This recognition highlights the company's commitment to providing the most advanced and secure automation solutions to its customers. UiPath's automated and intelligent platform enables enterprises to transform their business with intelligent automation solutions.	https://www.businesswire.com/news/home/20230807984931/en/UiPath-Named-a-Leader-in-the-2023-Gartner-Magic-Quadrant-for-Robotic-Process-Automation	<p>If you want to stay ahead of the game, you don't just need the best Robotic Process Automation (RPA) software, you need to know who the industry leaders are.</p> <p>UiPath has been named a leader in the Gartner Magic Quadrant for RPA software!</p> <p>This recognition is proof of UiPath's commitment to providing customers with innovative solutions. #rpatelchology #UiPath</p>
Intelligent Process Automation Market Segmented by Major Key Players, Application, Type and Region	The Intelligent Process Automation (IPA) market is expected to see significant growth over the forecast period (2020-2026). The use of IPA technology is expected to increase in various industry sectors, including BFSI, manufacturing, healthcare, and hospitality. Increased automation and improved efficiency are major drivers of the market growth. Moreover, the adoption of IPA technology in healthcare offers a wide range of benefits, such as improved data security, cost reduction, quicker healthcare services, and improved patient experiences.	https://finance.yahoo.com/news/intelligent-process-automation-market-segmented-153400475.html	<p>Intelligent process automation is taking the world by storm.</p> <p>It's quickly replacing manual labor in some fields, and improving processes in others.</p> <p>According to new research, the global intelligent process automation market is expected to surge in growth over the next six years. This growth is driven by advancements in technology and strive to achieve higher efficiency. The study also dives deeper into factors like end user, type of solution, and geography. It suggests that North America is set to be the dominating region in the global market, aided by the increasing automation advancements in the U.S. and Canada. It's an exciting future for intelligent process automation, and the opportunities it allows. #IPA #Innovation</p>


<p>Robotic Process Automation Market Revenue to Hit USD 107.34 Billion by 2035: Research Nester</p>	<p>The Robotic Process Automation (RPA) market size is expected to hit USD 107.34 billion by 2035, with a growth rate of 17.5% CAGR from 2020-2035, as per a report by Research Nester. The report states that the rapidly increasing investments being made for RPA implementation proceedings due to its automated business process management capabilities is driving the market growth. Furthermore, companies all across the globe are increasingly leveraging automation solutions for quicker response, customer satisfaction and cost reductions.</p>	<p>https://www.globenewswire.com/news-release/2023/08/03/2717830/0/en/Robotic-Process-Automation-Market-revenue-to-hit-USD-107-34-Billion-by-2035-says-Research-Nester.html</p>	<p>As technology progresses more and more, its impact can be seen in businesses around the world.</p> <p>Robotic Process Automation (RPA) is one such example which has been rapidly taking over businesses and markets.</p> <p>According to Research Nester the global RPA market is expected to reach USD 107.34 billion by 2035! #RPA #Automation Organizations across the globe are rushing to implement RPA to have better control and utilization of resources, reduce costs and increase efficiency. With the current pandemic, the time is perfect to make the switch, as it provides a remote working environment and improved process accuracy. What do you think about this revolutionising technology? #RPA #Future</p>
<p>Have a good week !</p> 			

Figure 28: Newsletter

5. BUSINESS CASE

In this chapter the difference between execution of the newsletter by human and by this bot is discussed. This shows the time and cost saving opportunity for Lunatec and other possible companies.

5.1. HUMAN EXECUTION

A human worker would have to look for articles, read them, select the relevant ones, write a summary, write a LinkedIn post, add everything into an email body and send it to the employees. On average, the process described above executed by a human worker would take approximately 23 minutes per article. The Newsletter is sent once per week and consists of 20 articles. Reading time is approximately 5 minutes, summarizing the article takes on average 9 minutes and preparing a LinkedIn post around 5 minutes. This means that execution of a newsletter would take on average 19 minutes per article, which for 20 articles means 380 minutes (6 hours and 33 minutes) of working time.

The average hourly wage of postgraduate Marketing Specialist in Germany was in February 2023 on average of 54.500 EUR per year, which is 28,39 EUR per hour.

This results in a price per newsletter of 179,80 EUR per week, 719,2 EUR per month, 8630,4 EUR per year.

5.2. ROBOT EXECUTION

5.2.1. Costs of license

The runtime of Dispatcher and Performer is 7 minutes. We need to calculate the costs of license for this runtime:

7 minutes = 420 seconds

Cost per second = 10,000.00 EUR / 1 year / 365 days / 24 hours / 60 minutes / 60 seconds =
0.00031746 EUR/second

Total cost = Cost per second * 420 seconds = 0.00031746 EUR/second * 420 seconds ≈ 0.133 EUR

7 minutes would cost approximately 0.133 EUR per week, 0.533 EUR per month and 6,399 EUR per year.

5.2.2. Costs of development

The average hourly rate of an automation consultant in Germany in 2023 is 42.05 EUR. The development of the newsletter took 58 hours. This means that the costs of development are 2.438,9 EUR.

5.2.3. Costs of maintenance

This is calculated as 10% of the development's costs. Which is 243,89 EUR per year, 20,325 per month.

5.2.4. Costs of infrastructure

We do not have any costs for infrastructure as we operate in cloud.

5.2.5. Costs of OpenAI prompts

The costs of OpenAI prompts consist of tokens per question and answer.

- Summary prompt: 24 + 103 = 127 tokens
- LinkedIn prompt: 104 + 144 = 248 tokens
- Title prompt: 83 + 22 = 105 tokens

This results in 480 tokens.

Price per Token is 0.002\$/1K Token. This means \$0.000002 per Token. This multiplied by 480 tokens results in \$0.00096 per article. As we have 20 articles that go through this process we multiply by 20 and get to a results of 0,0192 \$ per Newsletter.

We have a weekly costs of 0.0177 euros for OpenAI prompts, 0,0708 per month

When we conclude we have initial costs of 2523 EUR and monthly costs of 20,87 EUR (0,533 + 20,325 + 0,0177).

5.3. BREAK EVEN POINT

To find the break-even point where it becomes more cost-effective to have a robot execute the task instead of a human, we need to determine when the cumulative costs of the robot become lower than the cumulative costs of a human.

H: Monthly cost of a human executing the task (719.2 EUR)

R_initial: Initial cost of the robot (2438.9 EUR)

R_monthly: Monthly cost of the robot (20.87 EUR)

The cumulative cost of a human after n months is: $H * n$

The cumulative cost of a robot after n months is: $R_initial + R_monthly * n$

To find the break-even point, we set the two cumulative cost expressions equal to each other and solve for n: $H * n = R_initial + R_monthly * n$

$$719.2 * n = 2438.9 + 20.87 * n$$

$$719.2 * n - 20.87 * n = 2438.9 \quad (719.2 - 20.87) * n = 2438.9 \quad 698.33 * n = 2438.9$$

$$n = 2438.9 / 698.33 \quad n \approx 3.49$$

$$3.49 \text{ months} * 30.44 \text{ days/month} \approx 106.18 \text{ days}$$

At the start of the 4th month, it would be more cost-effective to have the robot execute the task.

The costs of human execution overweight the costs of robot in 106.18 days.

6. RESULTS AND DISCUSSION

The results of the project are represented in the following table. The table compares the execution by a human and by a robot.

	HUMAN	ROBOT
Weekly time	380 minutes	7 minutes
Weekly costs	179,80 EUR	20,87 EUR
One-time costs	-	2523 EUR
First year costs	8.630,40 EUR	2.773,44 EUR
Following years costs	8.630,40 EUR	250,44 EUR

From the table above (Figure 29) we see that even though the initial costs of the robot are way higher than by human, it becomes very soon overweight by the costs of human execution. In the chapter 5.3 it was calculated that the break even point is after 106,18 days. After this amount of time it is worth it to implement the robot. When we implement the robot we save the first year 5.856,96 EUR. From the second year we save 8.379,96 EUR per year.

It is important to mention that this product is very scalable, and we can use it for delivering a different newsletter with various keywords. As mentioned in the theoretical part, scalability of the automation project is one of the many advantages (Rosemann & vom Brocke, 2010)

Based on the calculations above we can conclude that the results of implementation of this product are very positive, and it is worth it to implement this automation. In this project we proved the statement by Plattfaut & Borghoff, 2022, Rosemann & vom Brocke, 2010; van der Aalst et al., 2016, that automating processes means saving time, costs and enables human workers to focus on more creative tasks. We could say that it is an investment that returns quite soon and therefore an interesting solution for many companies. According to Lunatec's other automation projects, it is quite usual that the automation delivers such a positive result and the return on investment comes after just a few months.

Intelligent automation enables to automate processes that used to be thought to be too complicated to automate (Berruti et al., 2017). Our connection with OpenAI made this possible, by automating not just repetitive tasks. ChatGPT has proved to carry on logical and contextually appropriate conversation (Brown et al., 2020) also in our project.

As mentioned above this automation still sometimes needs human assistance and it is needed pay attention to a collaboration between machines and humans (Besson and Rowe, 2012).

The newsletter ensures that employees are weekly informed about the news in the automation world and can keep up with the fast changing world. The further discussion is encouraged by preparing a LinkedIn post of the article so that the employees have the opportunity to start a discussion online with other automation specialists worldwide.

As already mentioned, technology develops in very high pace and it is necessary to keep up with the newest technologies. It was important to establish the connection between UiPath and OpenAI. During the digital transformation it is necessary that companies like Lunatec keep up with the fast development, and implement the newest technologies, so they can stay competitive on the market (Jeyaraj & Sabherwal, 2015). The developed workflows can be further used for another projects at the company and offered to clients.

7. CONCLUSION AND FUTURE WORK

In this final chapter, conclusions from the data that have been presented are performed and the possible directions for further study and research based on the findings of this project are discussed.

The goal of this project was to improve the knowledge base and internal communication of the Lunatec company while learning to work with the UiPath platform and developing independently.

After creating the newsletter bot, we looked at how a task would be carried out by a human and a robot, assessing the time and cost. The findings shown in Figure 29 give a clear picture of how human and robot execution differ. Although a robot requires a larger initial investment than human labor, the continuing operational costs of having humans involved quickly outweigh this difference.

As mentioned in Chapter 5.3, the robot's advantages in terms of cost and time become obvious at the break-even point, which happens after 106.18 days. Our research shows that using the robot results in significant cost reductions. Savings of 5,856.96 EUR are made in the first year, and 8,379.96 EUR can be made in the following years. These figures highlight the monetary advantages and rationale for using automation.

Another significant feature of this automation solution is its scalability. The flexibility of the project and its possibilities for wider use are demonstrated by the robot's adaptability for different newsletters with varied keyword combinations.

Lunatec is already in the process of offering this automation to its customers. This is giving the company the opportunity to offer this product to clients and grow it up even further, in addition to internally implementing and extending the automation.

This project brings up several interesting opportunities for further exploration and development. Even if the process currently functions well, continued improvement may further minimize the requirement for human involvement.

As the project emphasizes the value of human-machine cooperation, study into advanced methods for interaction and cooperation may produce even more effective results. Beyond newsletters, Lunatec can take advantage of the existing connection between UiPath and OpenAI for additional automation initiatives, benefiting on the company's commitment to embracing cutting-edge technologies. The landscape of technology is continually shifting, thus a proactive strategy is required. To maintain a competitive edge, Lunatec must remain alert in keeping up with the most

recent developments. As our reliance on automation grows, it is crucial to look into the ethical and social aspects of these changes to ensure their responsible and long-lasting implementation.

Lunatec offers a weekly meeting where the new developments, updates, and experiences are exchanged between the automation consultants. This supports the continuous learning, and another such initiatives and training programs are recommended. This gives its employees the abilities necessary to manage and collaborate with developing technology and to fully realize the potential of automation.

The execution of this automation project demonstrates Lunatec's dedication to advancement and innovation. By using intelligent automation, the business not only improves operational efficiency but also gives its staff members more freedom to engage in more fulfilling, innovative activities. The successful outcomes shown here support the idea that automation, when used intelligently, is an excellent investment that can generate sizable returns. As Lunatec moves forward, leveraging the insights gained from this project will undoubtedly contribute to its continued success in the era of digital transformation.

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APPENDIX

7.1. APPENDIX 1:

```
<!DOCTYPE html>
```

```
<html xmlns:v="urn:schemas-microsoft-com:vml" xmlns:o="urn:schemas-microsoft-com:office:office" lang="en">
```

```
<head>
```

```
  <title></title>
```

```
  <meta http-equiv="Content-Type" content="text/html; charset=utf-8">
```

```
  <meta name="viewport" content="width=device-width, initial-scale=1.0"><!--[if mso]><xml><o:OfficeDocumentSettings><o:PixelsPerInch>96</o:PixelsPerInch><o:AllowPNG/></o:OfficeDocumentSettings></xml><![endif]-->
```

```
  <style>
```

```
    * {
```

```
      box-sizing: border-box;
```

```
    }
```

```
    body {
```

```
      margin: 0;
```

```
      padding: 0;
```

```
    }
```

```
    a[x-apple-data-detectors] {
```

```
      color: inherit !important;
```

```
      text-decoration: inherit !important;
```

```
    }
```

```
    #MessageViewBody a {
```

```
      color: inherit;
```

```
      text-decoration: none;
```

```
    }
```

```
    p {
```

```

        line-height: inherit
    }

    .desktop_hide,
    .desktop_hide table {
        mso-hide: all;
        display: none;
        max-height: 0px;
        overflow: hidden;
    }

    .image_block img+div {
        display: none;
    }

    @media (max-width:620px) {
        .desktop_hide table.icons-inner {
            display: inline-block !important;
        }

        .icons-inner {
            text-align: center;
        }

        .icons-inner td {
            margin: 0 auto;
        }

        .row-content {
            width: 100% !important;
        }
    }

```

```

        .stack .column {
            width: 100%;
            display: block;
        }

        .mobile_hide {
            max-width: 0;
            min-height: 0;
            max-height: 0;
            font-size: 0;
            display: none;
            overflow: hidden;
        }

        .desktop_hide,
        .desktop_hide table {
            max-height: none !important;
            display: table !important;
        }
    }
</style>
</head>

<body style="text-size-adjust: none; background-color: #fff; margin: 0; padding: 0;">
    <table class="nl-container" width="100%" border="0" cellpadding="0" cellspacing="0" role="presentation"
    style="mso-table-lspace: 0pt; mso-table-rspace: 0pt; background-color: #fff;">
        <tbody>
            <tr>
                <td>
                    <table class="row row-1" align="center" width="100%" border="0"
                    cellpadding="0" cellspacing="0" role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">
                        <tbody>

```

```

<tr>

<td>

<table class="row-content stack"
align="center" border="0" cellpadding="0" cellspacing="0" role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt; color: #000; width: 600px; margin: 0 auto;" width="600">

<tbody>

<tr>

<td
class="column column-1" width="100%" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt; text-align: left; font-weight:
400; padding-bottom: 5px; padding-top: 5px; vertical-align: top; border-top: 0px; border-right: 0px; border-bottom: 0px;
border-left: 0px;">

<table class="image_block block-1" width="100%" border="0" cellpadding="0" cellspacing="0"
role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">

<tr>

<td class="pad" style="width:100%;padding-right:0px;padding-left:0px;">

<div class="alignment" align="center" style="line-height:10px"></div>

</td>

</tr>

</table>

<div class="spacer_block block-2" style="height:10px;line-height:10px;font-size:1px;">&#8202;</div>

<table class="image_block block-3" width="100%" border="0" cellpadding="0" cellspacing="0"
role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">

<tr>

<td class="pad" style="width:100%;">

<div class="alignment" align="center" style="line-height:10px"></div>

```

</td>

</tr>

</table>

<table class="divider_block block-4" width="100%" border="0" cellpadding="10" cellspacing="0" role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">

<tr>

<td class="pad">

<div class="alignment" align="center">

<table border="0" cellpadding="0" cellspacing="0" role="presentation" width="100%" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">

<tr>

<td class="divider_inner" style="font-size: 1px; line-height: 1px; border-top: 1px solid #dddddd;"> </td>

</tr>

</table>

</div>

</td>

</tr>

</table>

<table class="heading_block block-5" width="100%" border="0" cellpadding="5" cellspacing="0" role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">

<tr>

<td class="pad">

<h2 style="margin: 0; color: #151415; direction: ltr; font-family: 'Helvetica Neue', Helvetica, Arial, sans-serif; font-size: 14px; font-weight: 400; letter-spacing: normal; line-height: 120%; text-align: center; margin-top: 0; margin-bottom: 0;">Dear Lunatecs, </h2>

</td>

</tr>

</table>

<table class="heading_block block-6" width="100%" border="0" cellpadding="10" cellspacing="0" role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">

<tr>

<td class="pad">

<h1 style="margin: 0; color: #0b0a0b; direction: ltr; font-family: 'Helvetica Neue', Helvetica, Arial, sans-serif; font-size: 14px; font-weight: 400; letter-spacing: normal; line-height: 120%; text-align: center; margin-top: 0; margin-bottom: 0;">Have a look at this week's news from the world of automation.</h1>

</td>

</tr>

</table>

<div class="spacer_block block-7" style="height:60px;line-height:60px;font-size:1px;"> </div>

</td>

</tr>

</tbody>

</table>

</td>

</tr>

</tbody>

</table>

<table class="row row-2" align="center" width="100%" border="0" cellpadding="0" cellspacing="0" role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">

<tbody>

<tr>

```

        <td>
            <table class="row-content stack"
align="center" border="0" cellpadding="0" cellspacing="0" role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt; color: #000; width: 600px; margin: 0 auto;" width="600">
                <tbody>
                    <tr>
                        <td
class="column column-1" width="100%" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt; text-align: left; font-weight:
400; padding-bottom: 5px; padding-top: 5px; vertical-align: top; border-top: 0px; border-right: 0px; border-bottom: 0px;
border-left: 0px;">
                            <table class="icons_block block-1" width="100%" border="0" cellpadding="0" cellspacing="0" role="presentation"
style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">
                                <tr>
                                    <td class="pad" style="vertical-align: middle; color: #9d9d9d; font-family: inherit;
font-size: 15px; padding-bottom: 5px; padding-top: 5px; text-align: center;">
                                        <table width="100%" cellpadding="0" cellspacing="0" role="presentation"
style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">
                                            </table>
                                        </td>
                                    </tr>
                                </tr>
                            </table>
                        </td>
                    </tr>
                </tbody>
            </table>
        </td>
    </tr>
</tbody>
</table>
</td>
</tr>
</tbody>
</table>
</td>
</tr>
</tbody>
</table><!-- End -->
</body>
</html>

```



```

<head>

  <title></title>

  <meta http-equiv="Content-Type" content="text/html; charset=utf-8">

  <meta name="viewport" content="width=device-width, initial-scale=1.0"><!--[if
mso]><xml><o:OfficeDocumentSettings><o:PixelsPerInch>96</o:PixelsPerInch><o:AllowPNG/></o:OfficeDocumentSettings
></xml><![endif-->

  <style>

    * {

      box-sizing: border-box;

    }

    body {

      margin: 0;

      padding: 0;

    }

    a[x-apple-data-detectors] {

      color: inherit !important;

      text-decoration: inherit !important;

    }

    #MessageViewBody a {

      color: inherit;

      text-decoration: none;

    }

    p {

      line-height: inherit

    }

    .desktop_hide,

    .desktop_hide table {

```

```
mso-hide: all;

display: none;

max-height: 0px;

overflow: hidden;

}
```

```
.image_block img+div {

display: none;

}
```

```
@media (max-width:620px) {

.desktop_hide table.icons-inner {

display: inline-block !important;

}
```

```
.icons-inner {

text-align: center;

}
```

```
.icons-inner td {

margin: 0 auto;

}
```

```
.image_block img.big,

.row-content {

width: 100% !important;

}
```

```
.mobile_hide {

display: none;

}
```

```
.stack .column {  
    width: 100%;  
    display: block;  
}
```

```
.mobile_hide {  
    min-height: 0;  
    max-height: 0;  
    max-width: 0;  
    overflow: hidden;  
    font-size: 0px;  
}
```

```
.desktop_hide,  
.desktop_hide table {  
    display: table !important;  
    max-height: none !important;  
}
```

```
}
```

```
</style>
```

```
</head>
```

```
<body style="background-color: #ffffff; margin: 0; padding: 0; -webkit-text-size-adjust: none; text-size-adjust: none;">
```

```
    <table class="nl-container" width="100%" border="0" cellpadding="0" cellspacing="0" role="presentation"  
    style="mso-table-lspace: 0pt; mso-table-rspace: 0pt; background-color: #ffffff;">
```

```
        <tbody>
```

```
            <tr>
```

```
                <td>
```

```
                    <table class="row row-1" align="center" width="100%" border="0"  
                    cellpadding="0" cellspacing="0" role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">
```

```
                        <tbody>
```

```
                            <tr>
```

```

<td>

<table class="row-content stack"
align="center" border="0" cellpadding="0" cellspacing="0" role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt; color: #000000; width: 600px;" width="600">

<tbody>

<tr>

<td
class="column column-1" width="100%" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt; font-weight: 400; text-align:
left; padding-bottom: 5px; padding-top: 5px; vertical-align: top; border-top: 0px; border-right: 0px; border-bottom: 0px;
border-left: 0px;">

<div class="spacer_block block-1" style="height:75px;line-height:75px;font-size:1px;">&#8202;</div>

<table class="heading_block block-2" width="100%" border="0" cellpadding="10" cellspacing="0"
role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">

<tr>

<td class="pad">

<h1 style="margin: 0; color: #0b0a0b; direction: ltr; font-family: 'Helvetica Neue',
Helvetica, Arial, sans-serif; font-size: 14px; font-weight: 400; letter-spacing: normal; line-height: 120%; text-align: center;
margin-top: 0; margin-bottom: 0;"><span class="tinyMce-placeholder">Have a good week !</span></h1>

</td>

</tr>

</table>

<div class="spacer_block block-3" style="height:25px;line-height:25px;font-size:1px;">&#8202;</div>

<table class="image_block block-4" width="100%" border="0" cellpadding="0" cellspacing="0"
role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">

<tr>

<td class="pad" style="width:100%;padding-right:0px;padding-left:0px;">

<div class="alignment" align="center" style="line-height:10px"></div>

```

```

        </td>
    </tr>
</table>
</td>
</tr>
</tbody>
</table>
</td>
</tr>
</tbody>
</table>
<table class="row row-2" align="center" width="100%" border="0"
cellpadding="0" cellspacing="0" role="presentation" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">
    <tbody>
        <tr>
            <td>
                <table class="row-content stack"
align="center" border="0" cellpadding="0" cellspacing="0" role="presentation" style="mso-table-lspace: 0pt; mso-table-
rspace: 0pt; color: #000000; width: 600px;" width="600">
                    <tbody>
                        <tr>
                            <td
class="column column-1" width="100%" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt; font-weight: 400; text-align:
left; padding-bottom: 5px; padding-top: 5px; vertical-align: top; border-top: 0px; border-right: 0px; border-bottom: 0px;
border-left: 0px;">
                                <table class="icons_block block-1" width="100%" border="0" cellpadding="0" cellspacing="0" role="presentation"
style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">
                                    <tr>
                                        <td class="pad" style="vertical-align: middle; color: #9d9d9d; font-family: inherit; font-size:
15px; padding-bottom: 5px; padding-top: 5px; text-align: center;">
                                            <table width="100%" cellpadding="0" cellspacing="0" role="presentation"
style="mso-table-lspace: 0pt; mso-table-rspace: 0pt;">

```

<tr>

<td class="alignment" style="vertical-align: middle; text-align: center;"><!--[if vml]><table align="left" cellpadding="0" cellspacing="0" role="presentation" style="display:inline-block;padding-left:0px;padding-right:0px;mso-table-lspace: 0pt;mso-table-rspace: 0pt;"><![endif]-->

<!--[if !vml]><!-->

<table class="icons-inner" style="mso-table-lspace: 0pt; mso-table-rspace: 0pt; display: inline-block; margin-right: -4px; padding-left: 0px; padding-right: 0px;" cellpadding="0" cellspacing="0" role="presentation"><!--<![endif]-->

<tr>

</tr>

</table>

</td>

</tr>

</table>

</td>

</tr>

</table>

</td>

</tr>

</tbody>

</table>

</td>

</tr>

</tbody>

</table>

```
        </td>
    </tr>
</tbody>
</table><!-- End -->
</body>

</html>
```

