The MONDAY

04/12/2020

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EMGT 5220 Project Management

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1. Letter of Transmittal

Professor Steve Klosterman,

The following report illustrates the key project management principles and tools employed for the production of the centralized home and industry automation device called “The Monday”. In the advent of Alexa, IoT and smart devices, adaptation to smart home automation has seen a major growth yielding customers a feeling of awe, which is a result of machine learning and artificial intelligence. But how far can this be taken is the Big question. The question “Can I eliminate the need for the physical interaction between human and devices?” provides an Idea to utilize Image processing, Natural language processing and predictive analysis to solve this issue.

The concept behind ‘Monday’ is to use Artificial Intelligence and Machine learning to provide automation for property owners to secure their facility and enable smart automation for electronic systems inside the facility. The product heavily relies upon the underlying technology and the software which acts as a central control system to utilize systems efficiently and provide a seamlessly fluidic futuristic experience. Inspiration for this product is derived from ‘Jarvis’ from Iron man. Aim of this product is to provide the average human being access to high tech solutions at an affordable price. The duration of the project is 12 months with an estimated project budget of $5 Million

This report focuses mainly on the product design cycle of the production but also emphasizes its relation and precedence to other processes, the organization structure, schedules and control structure of the production and development cycle.

2. Project Objectives

The objectives of this project is to develop an extremely reliable, customer focused, fluidic Virtual assistant whose underlying strength relies upon the Artificial Intelligence and Machine Learning Algorithms which has the potential to eliminate the physical interaction between devices and humans, autonomously control devices over time and enable a solid security system for Individual home and large scale industries. The entire project is started from scratch and the product design aspect is considered for the purpose of this proposal. Below given are the key objectives of the product design process.

- Obtain Market fit and strategy data and evaluate the requirements based on different use cases and industries and create sample data for buyer profiles
- Integrate AI into individual buyer profiles to Process Images and recognize action requests through NLP and Computer Vision
- Develop User friendly Software for control panel/console
- Testing and Validation of the software across multiple use cases
- Troubleshooting errors and building fail-safe mechanisms
- Prototype testing and data management
- Updating and iterating improvement areas
- Achieving a >50% share in the Virtual Assistant market in 36 months.

2.1 Strategic Activities of the Project

Project Selection: Since this is an independent project run by beginners, this particular project was selected based out of Competitive Necessity to maintain a stand in the marketplace against other products offered by Amazon, Google and Apple which focusses on mass production of Virtual Assistant devices and which currently have limited capability.

The Unique Selling point of this device is to collect user preference data from the customers only before they receive the devices which assures the protection of data and customers' privacy from snooping and hacking. We also offer customers to choose if they want to share their usage data in order for us to customize the devices to their needs.

Using the above mentioned USP to our advantage, we have two bases of customers buying for Home automation and the other for Industrial Automation purpose. This differentiation allows us to Manufacture the same device with two different configurations without much change in the actual device.

To also keep up with the changes in technology and advancements of AI and its innovation, updates to the software and firmware will be rolled out every month and this enables the customers to make use of the AI and Machine Learning technology to its full potential.

2.2 Critical Success Factors of the Project

“Monday” offers customers a one stop source to automate their household devices and equipment. This includes and not limited to the security systems, gate/door access control, HVAC systems, Lighting ,and communication systems. To enable these capabilities the project depends on critical factors in the development of this product as mentioned below

- Degree of customizability in customers’ buyer profile
- Rate of Learning of the AI algorithms
- Monitoring and Updating the firmware even after the sale of the device
- Cross functional involvement in the organization between Software development, industrial and electrical engineering teams and Manufacturing
- Expert inputs from SMEs from all the functional teams
- Marketing campaign making use of the USP of the product
- Setting up Control mechanisms and performance metrics and achieving maximum efficiency and minimal errors
- If needed, hiring consultants and outsourcing certain parts of the software development and serve as an advisory committee
- Adhering to the timeline of 12 months since inception will make sure that the product takes its place in the market as soon as possible and change the standards of Virtual assistant device

2.3 Plans for the Future

While in the development of the product and based on the different buyer profiles, we plan on clustering similar profiles and create multiple other products in the portfolio enabling us to innovate and further exploit the technology by venturing into different sectors such as Healthcare, Travel and so on.

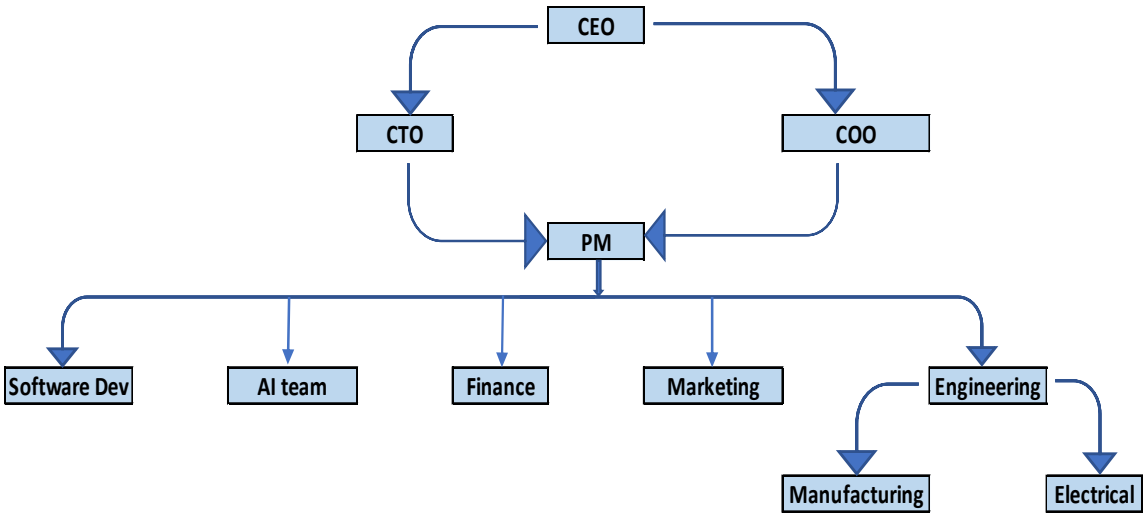
After the inception of “Monday”, customers and Investors would believe in the technology as a way of living and this leads to creation of many other related products and hopefully building a portfolio with wide range of applications and industries.

Currently “Monday” can be used as a way into the market and after achieving a substantial name and share in the market, venturing into different sectors would serve beneficial to the company.

A secondary option is to sell this project to a major company or a corporation and aim for a buy-out.

3. Project Organization

The organization structure of project Monday is a Hybrid structure with The PM reporting to the COO and CTO who in-turn reports to the CEO of the company. The Project manager is tasked with communicating with heads of various functions of the organization essential for the success of the project who also are the key stake holders of this project. The key responsibility of the PM is to ensure all the functions create a developmental approach towards the project and spot all the curveballs and provide immediate resolutions to the same. These different functions have SMEs and essential employees in its original form although any new requirements which could arise during the implementation of the project which is outside the scope and expertise of the functional teams will be considered to either outsourcing or hiring consultants to achieve the objective. This is done on a need only basis.



Project Monday Organizational Structure

4. Project Implementation Plan

The Project Implementation plan consists of an Integrated Definition modeling (IDEF0), Work Breakdown Structure (WBS), a RACI matrix and a CPM scheduling diagram.

4.1 IDEF0

The IDEF0 functional modeling method is designed to model the decision, actions and activities. This also depicts the roadmap for the lifecycle of the product by identifying the stake holder, the inputs, controls and mechanisms that each of these functions require to achieve operational objectives or outputs. This mapping process establishes the dependencies and requirements of all the functions which enable the project manager to allocate resources effectively.

The IDEF0 model for project Monday can be found in Appendix A

4.2 Work Breakdown Structure

The Work Breakdown Structure often called just as WBS is a list of all the functional processes identified steps broken down into tasks and sub tasks so that each packet of these tasks can be directed to specific team members and eventually also enable in identifying errors and track the dependencies which could lead to a better understanding between the tasks.

The WBS for project Monday can be found in Appendix B

4.3 RACI Matrix

The Responsibility Matrix also known as RACI Matrix is a tool where in the project team members and stakeholders understand their role and the type of Ownership in the project they are assigned to. The basic RACI matrix includes four different ownership levels as listed below

R – Responsible

A – Accountable

C – Consult

I – Inform

Responsible parties are those who have the primary function to handle the task and meet the specified objectives. Accountable parties are those who manage the set of resources tasked with completing a functional objective, usually the Team Leads. Consulting parties are those who do provide inputs based on their functional expertise to solve and advice teams to deliver objectives, usually spread across different functions and referred to as Subject Matter Experts. Parties who need to be informed are those who on the top of the organizational structure who takes decisions based on the status report received by them, usually the management to whom the PM reports, need to be informed about the completion of some of the key objectives.

The RACI matrix for project can be found in Appendix C

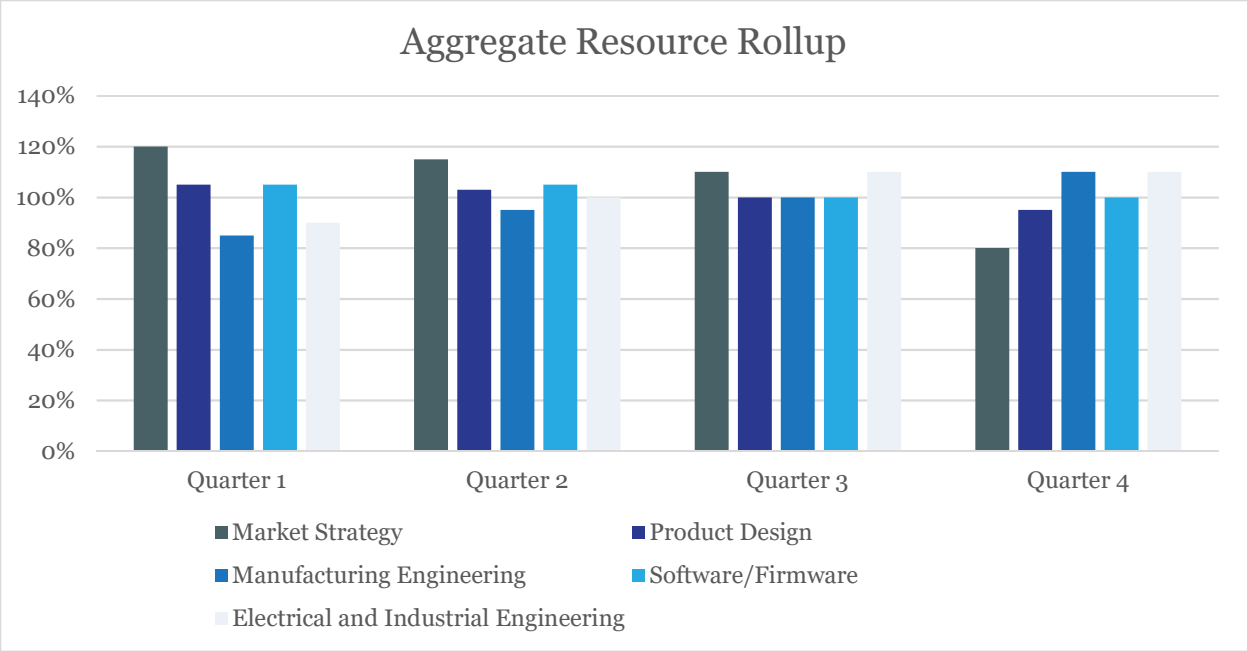
4.4 Scheduling

Adhering to the planned schedule allows the project to be completed in time and within the set budget. Every delay in tasks will have a rolling effect on successive task which relies upon timely completion of its preceding task. Missing the schedule also leads to over consumption of resources which in-turn increases the cost. Of the different types of scheduling plans available, we chose the GANTT chart and PERT to plot the precedence diagram. Of the different types of scheduling methods, GANTT chart provides a wholistic and easily interpretable scheduling diagram and PERT gives a tactical level planning and operational level control of the project.

The GANTT Chart and PERT for project Monday can be found in Appendix D and E respectively

4.5 Resource Allocation

Based on the operational requirements, resources such as manpower, budget, materials and equipment are allocated to all the functions on a relative index over the course of 4 quarters of the scheduled completion time. These allocations are currently fixed as its original form after a brief study of the requirements and the scope, although this is subject to change on a need basis.



4.6 Stakeholder Risk Assessment

The Table given below shows the roles of major stakeholders and shows its impact and influence on the project.

Stakeholder	Interest	Impact	Influence
SDE team	Develop Software/App to control the console	High	High
	Intergrate Machine Learning	High	High
	Testing the performance of the software	Mid	Mid
ML scientist	Give input to SDE and improve performance	Mid	High
	Define the learning models and learning rate	High	Mid
Project Manager	Coordinate with SDE, ML, IE and Marketing team	High	High
	Report to upper management	Mid	Mid
	Approve requests	Mid	High
Industrial Engineering Team	Evaluate manufacturing processes	High	Mid
	Schedule and co-ordinate production process	Mid	Mid
Marketing manager	Forecasting demands	Mid	Low
	Marketing operations	High	Mid
Customer service team	Assisting the customer with the product	High	High
	Resolution ticketing all the errors being faced by customer	Mid	Mid

5. Budgeting

Initial Investment received for year 1: $2.0 Million

This section provides a summary of “Top- Down” estimate of expenditure to meet the objectives of the ‘Monday’ project as described in this Project Charter. This summary of spending is preliminary and should reflect costs for the entire investment lifecycle. It is intended to present probable funding requirements and to assist in obtaining budgeting support.

The resource allocation data given in section 4.5 serves as the basis for allocating the budget to various functional groups of the project. The table given below shows an approximated value each function receives over the period of the project based on the amount of funding needed.

	Total Budget Alloted		Percentage
Market Strategy	$	160,000.00	8
Product Design	$	500,000.00	25
Manufacturing Engineering	$	500,000.00	25
Software/Firmware	$	400,000.00	20
Electrical and Industrial Engineering	$	360,000.00	18
Total Used	$	1,920,000.00	
Emergency fund	$	80,000.00	

6. Control and Monitoring Mechanism

For the successful completion of the project, Control and Monitoring mechanisms across all functions are essential. Since, this project focuses mainly on the Product design aspect, particularly the software development and the AI integration process. The below given table illustrates the key metrics which is the most essential KPI of this project. These metrics shall be monitored in conjunction with performance metrics from other functions of the organization involved in this project.

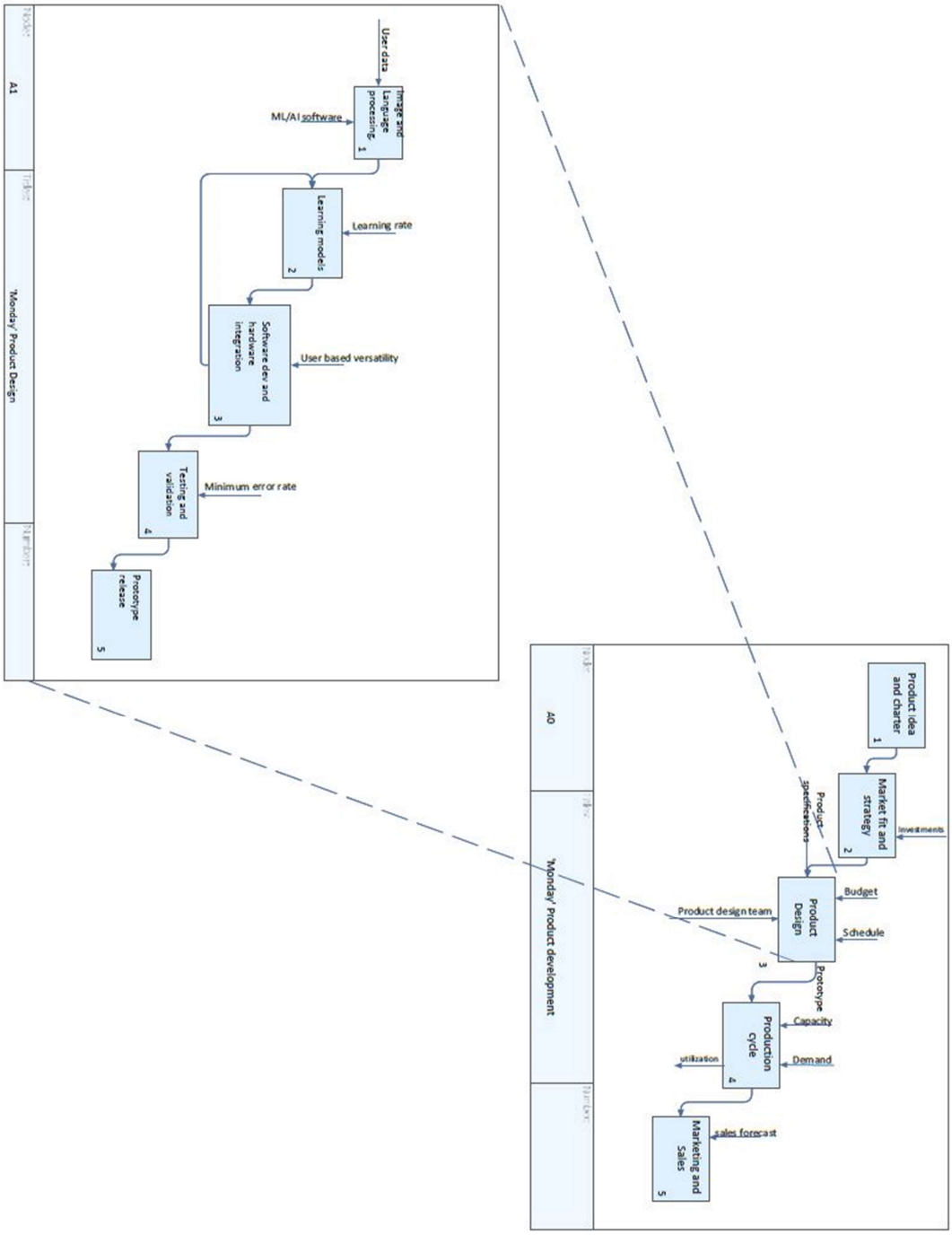
	INDICATOR	DEFINITION How is it calculated?	BASELINE What is the current value?	TARGET What is the target value?	DATA SOURCE How will it be measured?	FREQUENCY How often will it be measured?	RESPONSIBLE Who will measure it?	REPORTING Where will it be reported?
Goal	Decrease false positive and false negative ratio of the system	Total number of incorrect predictions and classifications divided by the total number of predictions and classifications made by the system	0.77	0.95	Data collected by the number of errors made, through user feedback and testing	Every Day	Data scientist Manager	Daily stand up meeting
Outcomes	Reduced errors in misidentification of surveillance graphics and misinterpretation of audio commands to execute accurate commands	Root mean squared error or prediction of the Image recognition and natural language processing system	0.23	0.05	ML and device performance data tracking	Every week	Software Engineering and ML team managers	Performance report
Output	Increase in accuracy of performance of the system	100 *((1 – sum ratio of all false positive and false negative cases) / 100)	70 %	95%	Data collected by the number of errors made, through user feedback and testing	Every Week	Program Manager	Weekly Stand up meeting

7. Conclusion

As indicated in all the above-mentioned sections of the proposal, this project proves to be a potential contender in the Virtual Assistant Market and as a technology-based product, development of this project will lead to other break through products through design iterations and innovations. The current market share of some of the competitors in the AI Virtual Assistant field has been predominant and this number speaks of the volume of interest among the tech-savvy customers to consider AI assistants as a way of life and into the future. Success of “Monday” will also tickle the Investors to earn an extra dollar through this project and create a snowball effect in the Investors’ community trying to buy a share of “Monday”. This is more than a win-win scenario.

Appendix

A. IDEF0 Model



B. Work Breakdown Structure (WBS)

Work Breakdown Structure (WBS)

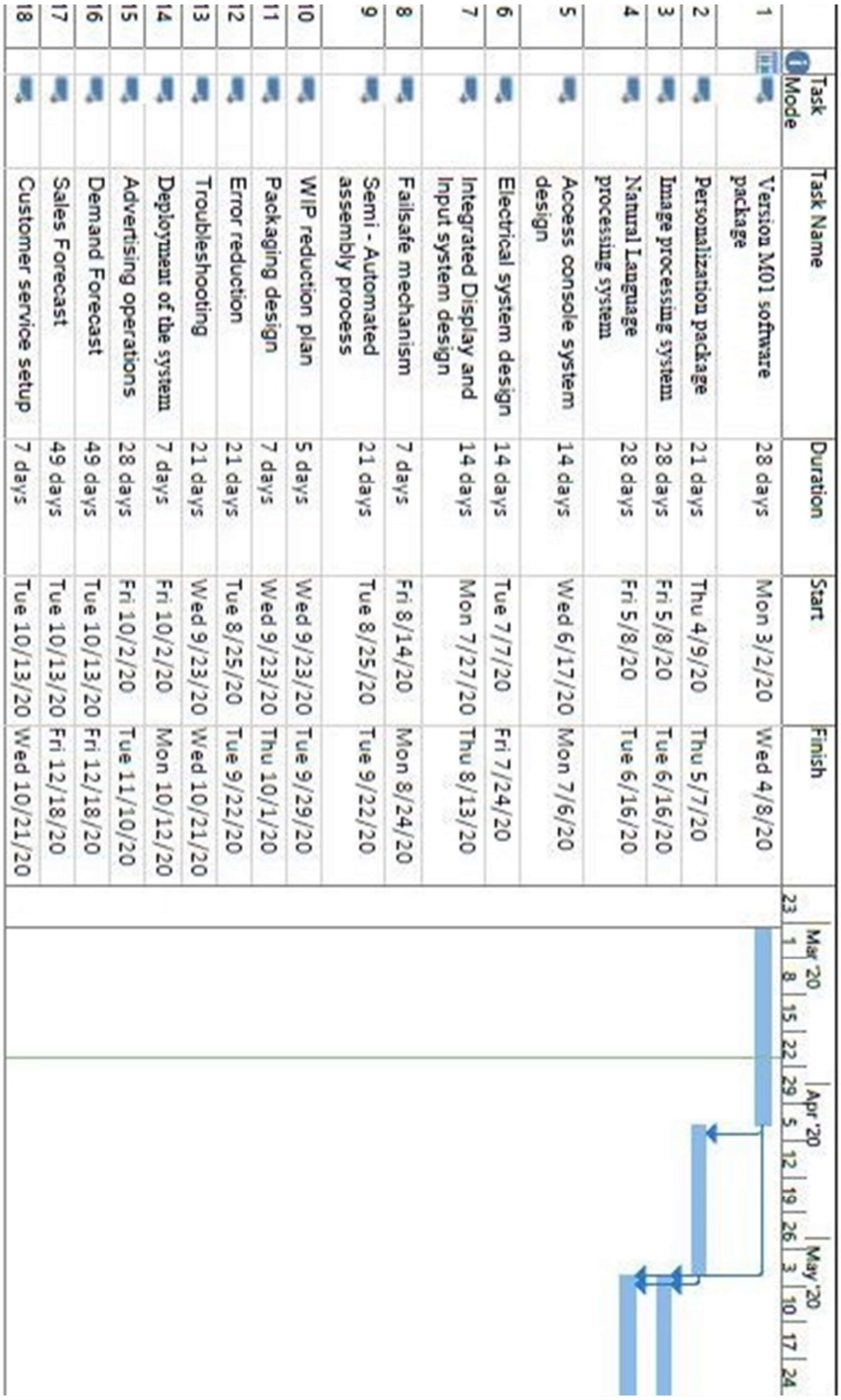
Project Name:	Monday
Project Manager:	Vipul V S
Date:	[03/26/2020]

1. **Software development/ML models**
    - 1.1. All in one app
        - 1.1.1. Base software
            - 1.1.1.1. Version M01 software package
            - 1.1.1.2. Personalization package
        - 1.1.2. ML integration
            - 1.1.2.1. Image processing system
            - 1.1.2.2. Natural Language processing system
2. **Manufacturing**
    - 2.1. Console
        - 2.1.1. Access console system design
        - 2.1.2. Electrical system design
        - 2.1.3. Integrated Display and Input system design
        - 2.1.4. Failsafe mechanism
3. **Production**
    - 3.1. Assembly process
        - 3.1.1. Semi - Automated assembly process design
        - 3.1.2. WIP reduction plan
        - 3.1.3. Packaging design
4. **Testing**
    - 4.1. Error reduction
    - 4.2. Learning model
        - 4.2.1. Troubleshooting
        - 4.2.2. Deployment of the system
5. **Marketing and Sales**
    - 5.1. Marketing
        - 5.1.1. Advertising operations
            - 5.1.1.1. Promotions and brand expansion
        - 5.1.2. Demand Forecast
    - 5.2. Sales
        - 5.2.1. Sales Forecast
        - 5.2.2. Customer service setup

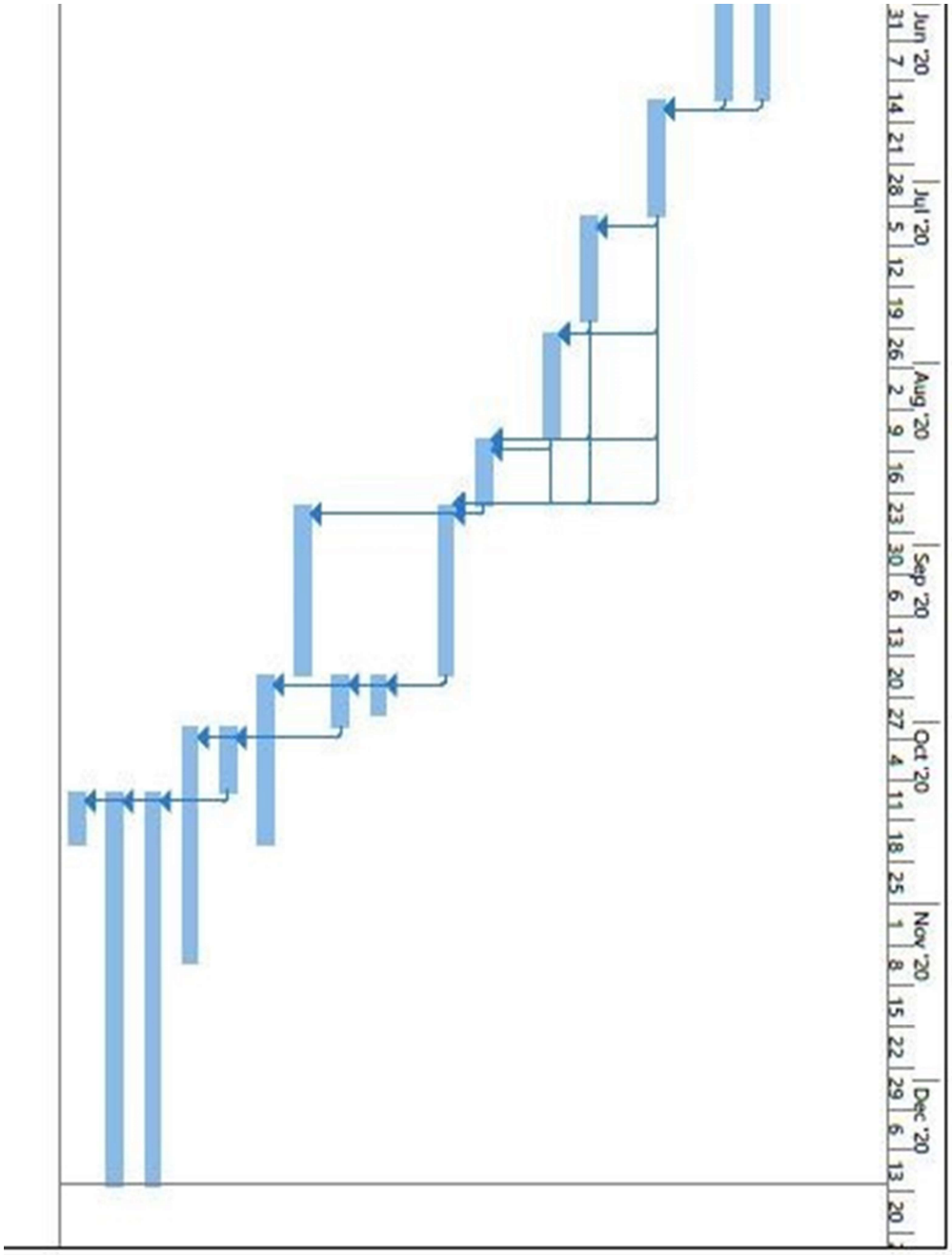
C. RACI Matrix

	SDE team	ML scientist	Project Manager	Industrial Engineer Team	Marketing manager	Customer service team
1. Software development/ML						
1.1. All in one app						
1.1.1. Base software	R	C	A		I	
1.1.2. ML integration	C	R	I			
2. Manufacturing						
2.1. Console						
2.1.1. Control system	C	I	A	R		C
2.1.2. Electrical system			A	R		
2.1.3. Display system	C		A			
2.1.4. Input system	I	C	A			
2.1.5. Failsafe system	I	C	I	R		C
3. Production						
3.1. Assembly process						
3.1.1. Inventory Control			I	R		
3.1.2. WIP reduction			I	R		
3.1.3. Packaging				R		
4. Testing						
4.1. Error reduction	R	C	I			
4.2. Learning model	C	R	I			
4.2.1. Troubleshooting	R	C				
4.2.2. Deployment	R	C		I		
5. Marketing and Sales						
5.1. Marketing					R	
5.1.1. Advertising operations			A			
5.1.2. Demand Forecast			C	I	R	
5.2. Sales						
5.2.1. Sales Forecast			C	C	R	
5.2.2. Customer service	C	C				R

D. GANTT Chart



	Task Mode	Task Name	Duration	Start	Finish
1		Version M01 software package	28 days	Mon 3/2/20	Wed 4/8/20
2		Personalization package	21 days	Thu 4/9/20	Thu 5/7/20
3		Image processing system	28 days	Fri 5/8/20	Tue 6/16/20
4		Natural Language processing system	28 days	Fri 5/8/20	Tue 6/16/20
5		Access console system design	14 days	Wed 6/17/20	Mon 7/6/20
6		Electrical system design	14 days	Tue 7/7/20	Fri 7/24/20
7		Integrated Display and Input system design	14 days	Mon 7/27/20	Thu 8/13/20
8		Failsafe mechanism	7 days	Fri 8/14/20	Mon 8/24/20
9		Semi - Automated assembly process	21 days	Tue 8/25/20	Tue 9/22/20
10		WIP reduction plan	5 days	Wed 9/23/20	Tue 9/29/20
11		Packaging design	7 days	Wed 9/23/20	Thu 10/1/20
12		Error reduction	21 days	Tue 8/25/20	Tue 9/22/20
13		Troubleshooting	21 days	Wed 9/23/20	Wed 10/21/20
14		Deployment of the system	7 days	Fri 10/2/20	Mon 10/12/20
15		Advertising operations	28 days	Fri 10/2/20	Tue 11/10/20
16		Demand Forecast	49 days	Tue 10/13/20	Fri 12/18/20
17		Sales Forecast	49 days	Tue 10/13/20	Fri 12/18/20
18		Customer service setup	7 days	Tue 10/13/20	Wed 10/21/20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31 7 14 21 28
Jul '20
5 12 19 26
Aug '20
2 9 16 23 30
Sep '20
6 13 20 27
Oct '20
4 11 18 25
Nov '20
1 8 15 22 29
Dec '20
6 13 20

E. PERT

***Attached as an external document due to fit issues**

References

- Meredith, Jack R.; Mantel, Samuel J.; Shafer, Scott M. Project Management: A managerial Approach, 10th Edition