Cancer Prediction Project Plan

By: Group 4

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Agenda

- 1. Literature Review
- 2. Project Management Plan
- 3. Project Design
- 4. Methodology
- 5. Test Planning

LITERATURE REVIEW

History of Cancer Classification

- Earlier cancer classification techniques (Munir et al, 2019)
 - Menzies method
 - Seven-point detection method
- Newer classification techniques (Munir et al, 2019)
 - Deep neural networks
 - Convolutional Neural Network (CNN)
 - Recurrent Neural Network (RNN)

Issues of Medical Data

- Medical data is hard to obtain (Delen, 2009) & (Kumar et al, 2019)
 - Patient' confidentiality
 - Vast variety (Kumar et al, 2019)
- Investigation of Medical images is hard (Nahid et al, 2018)
 - Complex nature of histopathological imaging

Classification Techniques

- Multiple classification techniques (Gupta et al, 2011)
 - Artificial Neural Network (ANN)
 - Decision Tree (DT)
 - Support Vector Machine (SVM)
- Performance
 - Decision Tree is faster than ANN (Kumar et al, 2014)
 - o Different techniques with pros and cons (Gupta et al, 2011)

Image Processing Techniques

- Steps of Image Processing (Ansary et al, 2017) & (Jain et al, 2015)
 - Pre-processing
 - Grayscale extraction
 - Image segmentation
 - Masking operation
 - Feature extraction

Feature extraction techniques

- Multiple deep learning algorithms (Alom et al . 2018)
 - Convolutional Neural Networks (CNN)
 - Alexnet
 - Residual Neural Network (Resnet)
- Performance
 - Resnet -> 84.09 % (Demir et al, n.d)
 - CNN -> 80.8% to 85.6% (Spanhol et al, 2016)
 - Alexnet -> 93.8% to 95.7% (Titoriya, 2019)

PROJECT MANAGEMENT PLAN

Product Requirements

	REQUIRE	MENTS TRACEAB	BILITY MATRI	x	
Project Name:	Data Mining Technique To Detect Cancer Using Predictive Modelling				
Project Manager Name:	Afsaneh Koohestani				
Project Description :	Building a predictive model to de	termine early stages of	cancer		
ID	Requirements (Functional or Non-Functional)	Assumption(s) and/or Customer Need(s)	Category	Source	Status
001	Image Processing - Find relevant dataset that could be used for testing & training	Source of images are come from a legit source	Functional	Kaggle	In Progress
002	Programming Skills - Understanding topics regarding Al, Machine Learning, Deep Learning, Transfer Learning	Extensive knowledge of these programming skills increases the chance of efficiency of our predictive model	Functional	Online resources such as Stack Overflow, Leetcode, and Monash Units	Planning
003	User Interface - Allow login specific of the health institutions	Our stakeholders have to be able to easily access and understand the interface for them to use the predictive	Non-functional	Dania da una mitra	Diamaina
		model	Non-functional	Project supervisor	Planning

Speaker: Elaine

Product Requirements

004	Stakeholder expectations met	Accuracy of the Model has to be > 98%	Non-functional	Stakeholders	Planning
005	The software system should be integrated with health institutions's API	If we are building on an existing model, then our predictive model must be integrated with the current system.	Functional	Stakeholders	Planning
006	Identify important predictors that have significant impact on successful cancer categorization	Identifying important predictors will allow us to increase model accuracy	Functional	Project supervisor	Planning

Project Organisation



(InDevLAB, 2020)

Project Responsibilities

Building predictive model

• Developing a website

						-						
No.	Rank	Risk	Description	Category	Triggers	Root Cause	Potential Responses	Risk Owner	Probability	Impact	Status	Score
1	6	Losing	Team	People	A team member	Team member's	Consult project	Team	5%	High	Potential	
		team	members	risk	decides to leave	personal issue	manager, redefine					
		members	leaving the		the team		task responsibilities					
			team				for each remaining					
							team member					
2	9	Team	Team	People	A team member	Team member's	Consult project	Team	10%	Medium	Potential	
		members	member not	risk	encounters some	personal issue	manager					
		unable to	able to		issues that affects							
		contribute	complete		their work							
			their task									
			responsibilitie									
			s									
3	8	Slow	Indecisive	Managem	Clash within	Lack of	Conduct internal	Team	15%	Medium	Potential	
		decision	and not	ent risk	personal interests	open-mindedness	meetings with team					
		making /	prioritising		of team members	and clarity within	members and settle					
		Project	the success of		and unsuccessful	team members	on a middle ground.					
		Conflicts	the project		understanding of							
			rather for		given tasks.							
			personal									
			gains. Unclear									
			of project									
			objectives									
			and									
i			requirements									
l												

4		completion of earlier phases of	time to meet the schedule target to complete the	risk/ Schedule Risk	does not deliver	Time estimated for a certain task is not enough		Team	20%	Medium	Potential	
5	1	model has a low accuracy	The predictive model	risk / Performa		not properly developed	Reidentify important predictors for the model, do more research on algorithms used in developing predictive model	Team	30%	High	Potential	
6		source code	Source code is deleted and unable to be recovered	risk	accidentally	of project source	Use GitHub for backup to minimise the risk	Team	5%	High	Potential	

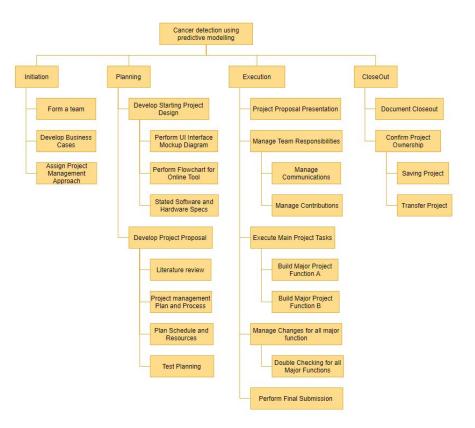
7	7	Website	The platform	Operation	Could be caused	Not choosing a	Researching on pros	Team	10%	Medium	Potential	
		downtime	that we	al Risk	by massive traffic	good platform to	and cons of several					
			decide to		or overall	host the website	website hosting					
			host our		unreliability		platforms and					
			website in is				choose the platform					
			unreliable				with the least risk					
			and can't									
			handle major									
			traffics									
8	10	Slow	Poor		Attempting to	Stakeholders are	Conduct regulatory	Team	5%	Low	Unlikely	
		Stakeholde	communicati		have	difficult to get hold	meetings and emails					
		r Actions	on with		Communicative	of	to stakeholders. Have					
		that delays	stakeholders		Measures with		a stakeholder					
		overall	and lack of		stakeholders but		communication plan					
		project	verbal		stakeholders		and update it					
		completion	support from		remain		accordingly. Make					
			stakeholders		unresponsive		sure stakeholders are					
							updated through					
							every changes in the					
							project					
9	11	Scope		1000		Excessive ideas	Clearly and succinctly	, ,	5%	Low	Unlikely	
		Creep	unnecessary		tor or occurs	given by team	state the	/ Team				
			extra			members		Members				
			functionality	1	enhance user		scope in the project					
			not originally		experience but		proposal. Update					
			stated in the		not addressing		business case in case					
			project scope	1	triple constraints		of changes					
					of project							

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Communication Plan

Stakeholders	Document	Document	Contact	Due
	Name	Format	Person	
Project	Progress report	Soft Copy via	Afsaneh	Weekly
Manager		Google Doc and	Koohestani	
		Zoom meetings		
Internal	Weekly status	Soft copy and	Jack Ooi,	End of week
Management	report	Zoom meetings	Elaine Liong,	
			Vionnie Tan	
Internal	Daily	Communication	Jack Ooi,	Daily
Management	communication	via Messenger	Elaine Liong,	
			Vionnie Tan	

Schedule - WBS

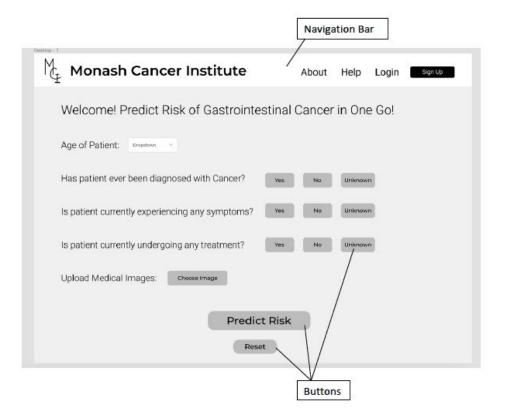


Schedule - Gantt Chart

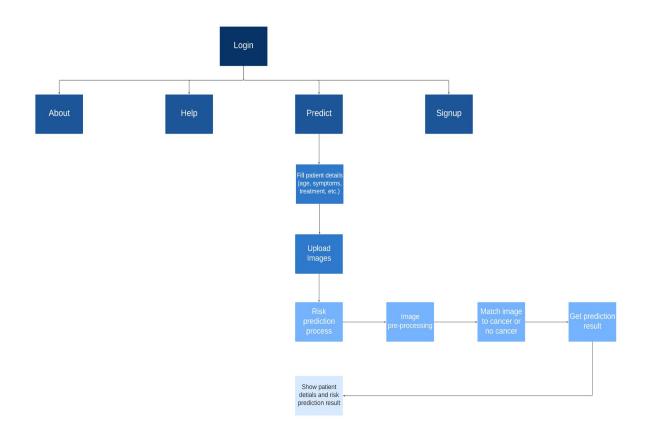
	Mar 2021	April 2021	May 2021	July 2021	Aug 2021	Sep 2021	Oct 2021	Oct 2021
Form a team								
Develop Business Cases								
Assign Project Management Approach								
Develop Starting Project Design								
Develop Project Proposal								
Project Proposal Presentation								
Manage Team Responsibilities								
Execute Main Project Tasks								
Manage Changes for all major function								
Perform Final Submission								
Document Closeout								
Confirm Project Ownership								

PROJECT DESIGN

User Interface



Website Flowchart



METHODOLOGY

Programming Language



Libraries











Libraries





Version Control System



Data Pre-Processing

- Dataset have been pre-processed
 - Images have automatic detection of tumor
 - Resized to 224 px x 224 px at a resolution of 0.5 μm/px
 - Color normalization using Macenko method
 - Patients are assigned to either "MSS" or "MSIMUT"
 - Reformatted to JPG format
- Feature extraction
- Divide dataset into 70% training set and 30% testing set

TEST PLANNING

Predictive Model Testing

- Use 30% testing set to evaluate model's performance
- Determine optimal cut off levels for each images using ROC
 - obtain model performance using AUC
- Further evaluate performance using concordance index (c-index)
- Generate confusion matrix
 - Measure model accuracy, precision, recall, specificity

Website Testing

- Handle mass traffic with reduced website downtime
- Providing same, accurate results as predictive model
- User's private information is kept confidential

CONCLUSION

Summary

- Literature Review
 - History of Cancer Classification
 - Issues of Medical Data Mining
 - Classification Techniques
 - Image processing Techniques
- Project Management Plan
 - Project requirements
 - Project Organisation
 - Project Responsibilities
 - Risk Management
 - Communication Plan
 - Schedule

- Project Design
 - User Interface
 - Website Flowchart
- Methodology
 - Programming Language & Libraries
 - Version Control System
 - Data Pre-processing
- Test Planning
 - Predictive Model Testing
 - Website Testing

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THANK YOU!