CZ3002 Project Proposal

Mall-E: A mall companion app

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Team: Run Time Error
School of Computer Science Engineering

Submitted to:
Nanyang Technological University
School of Computer Science Engineering

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Executive Summary

A year has passed since COVID-19 has surfaced and the trend is increasing at a decreasing rate for the number of COVID-19 infections as shown below. However, we have broken the record of going zero cases for 13 days [1] and the numbers are starting to hit the double digit again (29 cases for 31/01/2021) [2].

With concerning statistics as shown above, it is worrying that current measures in place are insufficient. We have decided to come up with a crowd monitoring application.

This application caters to everyone who owns a mobile device and serves to track crowds in malls in Singapore. Additional features include queue waiting time for each restaurant inside the mall and news updates regarding COVID-19 in malls in Singapore.

There is a similar website created by the government that performs roughly the same task as our proposed (https://www.spaceout.gov.sg/). However, even Spaceout has its limitations. Spaceout lacks information on every mall. Spaceout being a website might not be mobile-friendly / user-friendly.

We aim to raise awareness on COVID-19 and with our application crowd tracking function, we aim to lower the number of COVID-19 infections each day. If it is crowded, avoid it.

Statement of Problem

Since the start of COVID-19, statistics showed no signs of stopping, despite safe distancing measures enforced by the Singapore Government [3].

- Wearing of face masks at all times when outside one's home, unless when eating, drinking or doing strenuous exercises
- Maintaining a safe distance of at least one metre between individuals
- Maintaining a safe distance of at least one metre between groups (each group is to comprise not more than five persons) and strictly no intermingling between groups.
- At home, there should not be more than five visitors at any one time

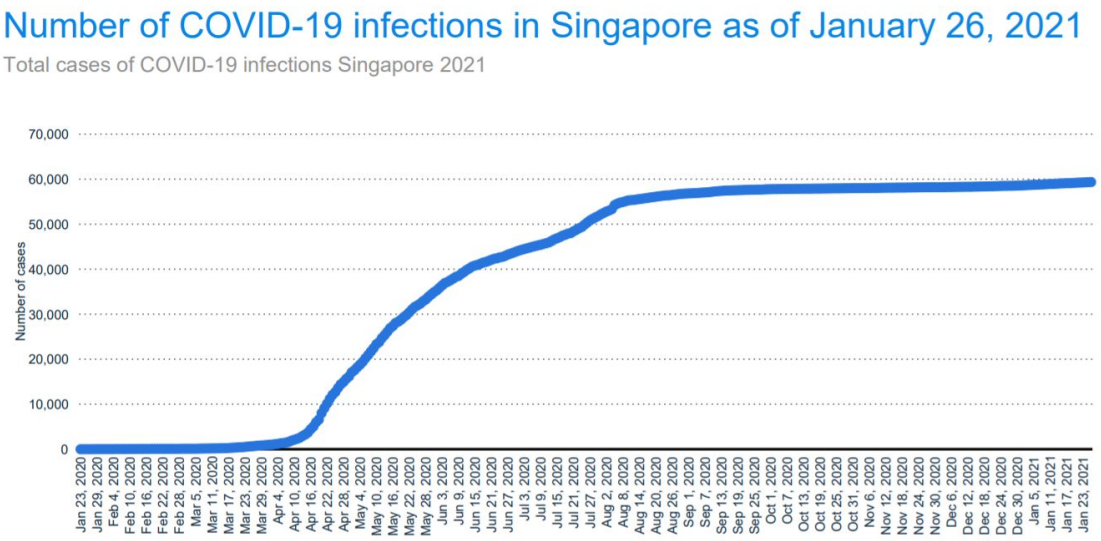


Figure 1

According to the trend till today, the number of COVID-19 infections are still increasing at a decreasing rate [4].

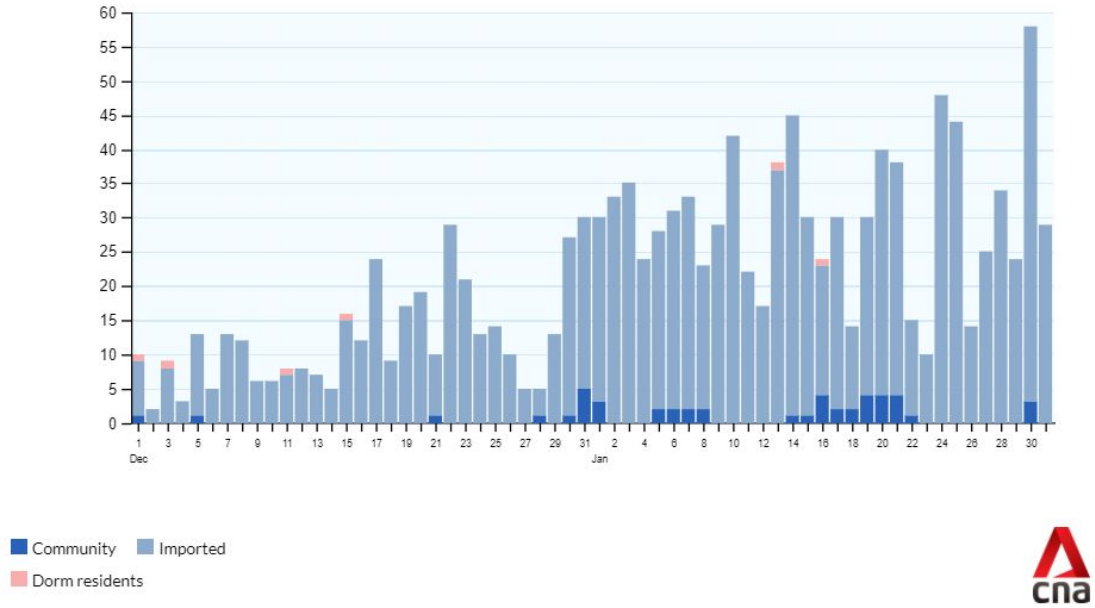


Figure 2

As of January 2021, it shows no sign of hitting the single digits. People are starting to be complacent and taking these laws implemented as privileges. From not wearing a mask [5], dining in groups of 12 [6] to overcrowding [7] are some of the few examples that can depict how Singaporeans are flouting the measures enforced.

Objectives

This document proposes an application that tracks the crowd within a mall in Singapore, specific to each level and each shop. This is to achieve:

1. Close monitoring on crowd levels in malls in Singapore
2. Providing waiting/queue times for restaurants in malls in Singapore
3. To raise awareness of COVID-19

For (1), close monitoring on the crowd levels in malls in Singapore will be such that the public can plan ahead for their schedule and avoid malls that are crowded. This will in turn reduce unnecessary contact.

For (2), the app includes information about waiting times for restaurants in minutes so that the user can better plan their outings. This allows the public to avoid restaurants that are especially crowded and opt for an alternative.

For (3), the app scrapes Google News for COVID-19 news related to malls in Singapore and displays the top headlines in a list format such that the user is kept updated with the latest information and data.

Technical Approach

After thorough evaluation of our primary customer's needs, we formulated the key specifications for our application along with the technology and the system architecture required to bring our vision into reality.

Customer Needs

The customers for our application, which mainly refers to the people of Singapore, require a mobile-based application that can be used to plan ahead before their trips to malls, and the restaurants within the malls. Safe-distancing amidst the COVID-19 pandemic is crucial, which is why a mobile application that can conveniently and accurately provide information on crowd levels in Singapore's malls would be invaluable to our customers. Using the Best-Time API, our application delivers this information to our customers. Moreover, the application further provides insight into the expected queue times and popular times for certain restaurants in Singapore malls, which could help customers decide on which restaurants to dine at (from a safe-distancing perspective) during peak hours.

Applications that currently exist, such as Spaceout, only provide information on the crowd levels within Singapore malls, and not information on expected restaurant queue times. In addition, Spaceout is available only in the form of a website, with no alternative app for mobile users - this is important for users who want to view the ever-changing information on-the-go. Spaceout also has a user-interface that might not be user-friendly to mobile browser users - our application addresses this problem by providing a user-friendly mobile application, which better meets the needs of customers.

Additionally, the Singapore government could use the application to better track the crowd density inside malls and estimate crowd levels in restaurants inside the malls, to ensure that the malls and restaurants are obeying the safe-distancing measures.

Target Specifications

The following application specifications target the needs of our customers:

1. Users can view the crowd density levels at most of Singapore's malls.

The primary feature of our application is to present information on crowd levels in Singapore malls to our users. This information will be presented in a user-friendly interface, including pie graphs showing hourly crowd levels relative to the malls' maximum weekly crowd levels (e.g. 90% crowded at 6 pm) and bar graphs to show trends in crowd levels over time.

2. Users can view the approximate queue times, popular times, and infer crowd levels at restaurants in Singapore malls.

The Best-Time API provides functionality to measure crowd levels in restaurants. Our application uses this information and estimates queue/waiting times at those restaurants – which is likely more useful to customers than crowd level estimates. Our application can also provide information on popular times for the restaurants, which further enables users to make informed decisions about their lunch/dinner plans.

3. Users can create accounts to add certain malls and restaurants to their list of favourites and conveniently view information about those malls/restaurants.

This feature is intended to increase convenience for users by providing a way to save certain malls and restaurants to a "favourites" list. The users would also be able to get periodic updates on crowd levels within saved malls and restaurants, which would be especially useful before and during peak hours. This feature would require users to create an account, though users can also view the information as a guest should they wish to do so.

4. Users can view news and updates about Singapore malls in relation to COVID-19.

Users can view news and updates about the Singapore malls, such as news on COVID-19 outbreaks or cases in certain malls, which informs the users about potentially risky malls, which should be avoided.

Technology Consideration

These are the technologies that we plan to use during the development of the application:

Technology	Summary
React Native (frontend framework for mobile applications)	It is a JavaScript framework for building natively rendering mobile applications that runs on both iOS and Android. It is based on the web framework ReactJS made by Facebook [8].
NodeJS (backend run-time environment for web applications)	It is an open-source development platform used to execute server-side JavaScript code. It uses HTTP actions to act as a REST server which reacts appropriately to events fired off at the client-side [9].
MongoDB (NoSQL database)	It is a database used to store documents/images/other forms of data with good scalability and ease-of-access

	which help in seamless querying and indexing of data [10].

Table 1: Technologies used

Why are we using these technologies?

1. **React Native** [11]**:**
   - Cross-platform - Since React Native code renders all its components in the native language supported by whatever platform (iOS/Android) the app is being viewed in, developers only need to manage one unifying codebase instead of having multiple versions of the app for each platform. This also speeds up production.
   - Live and Hot Reloading - Unlike Java which is commonly used to make Android apps, React Native supports Live Reloading which means that only the portion of the file where the developer has made changes is re-compiled and not the whole file from the beginning. This along with Hot Reloading which allows the developer to see modifications to the app occur instantly after changing the code considerably improves development speed.
   - Cost-effective - As React Native code works on both Android and iOS, we don't have to employ specialized developers to build the app on two platforms. Even maintaining the code becomes easier in the future as it's just one codebase. This helps keep the main development team small.

2. **NodeJS** [12]**:**
   - Strong JavaScript Ecosystem - By using Node as the primary environment for server-side code, developers get access to all the JavaScript libraries such as Express, Passport, JWT, and MongoDB which are some of the most popular libraries for backend development.
   - Fast Performance - Our app aims to provide users with the most up-to-date information regarding malls in Singapore and using Node ensures that data retrieval is quick and easy. Since Node follows an event-based model, it only runs the specific code required to react to an event in the client thus reducing the number of times it needs to poll for changes in the client. Moreover, it is asynchronous meaning that multiple requests can be handled at once thus enabling high traffic (number of users) in our app.

3. **MongoDB** [13]**:**
   - Flexibility - As MongoDB does not require a schema (non-relational) unlike SQL databases, this allows for data to be stored in an unstructured and dynamic manner. Having a flexible data model is beneficial if the developers plan on changing the type of data being stored in the future.
   - Scalability - MongoDB allows for horizontal scalability by a method called sharding which involves connecting multiple database servers side-by-side to store large-sized data. This also has the added benefit of increasing performance

as more RAM is added to the distributed system thus enabling better throughput of data.

System Architecture/Platform

The overarching system architecture of the application is based on the Model-View-Controller (MVC) architecture [14]. Our app will be developed for both iOS as well as Android platforms. We will use Android Studio as the primary IDE for development and testing will be performed on a virtual Android device. The MVC architecture will handle the following responsibilities:

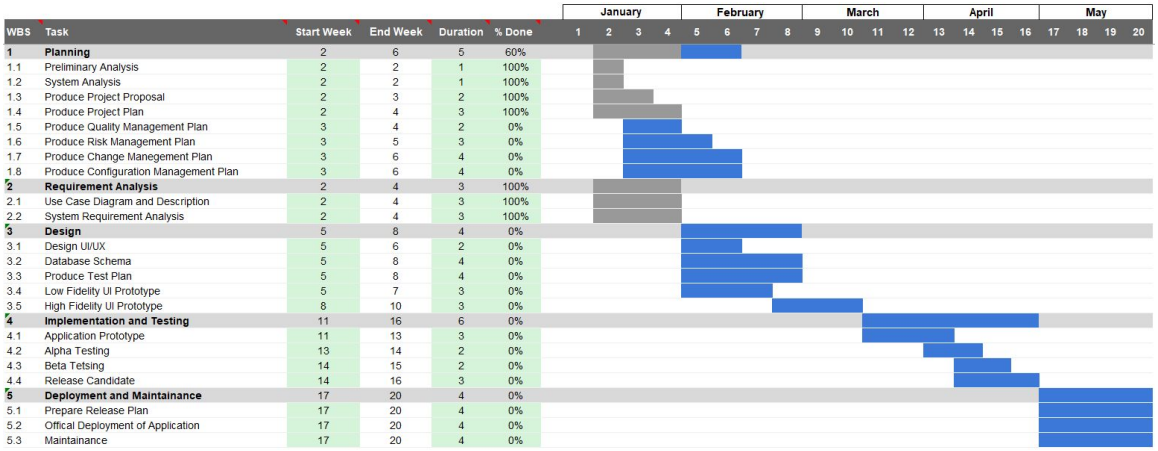
1. Model - This is the MongoDB database that would contain the data of our app as well as the underlying business logic of how the data is being manipulated by the user using the View.
2. View - This is the React Native frontend which acts as the user interface of our app and presents the data in an appropriate manner. The user interacts with the app on their mobile's screen thus changing the state which is then handled by the Controller.
3. Controller - This is the NodeJS backend which acts as an intermediary between the View and the Model. It handles how the data in the Model needs to morph to state changes in the View and vice versa. It enables two-way communication between the client and the server.

The benefits of the MVC architecture is separation of concerns and loose coupling which are good practices to follow in software engineering. It also keeps the code modular so that new features can be built on top of existing features without having to change much of the old source code.

Project Management

The project has been divided into 5 major components - Planning, Requirement Analysis, Design, Implementation and Testing, Deployment and Maintenance. Each of these sections have been split into sub tasks to control and monitor the progress of the project.

Timeline



WBS	Task	Start Week	End Week	Duration	% Done
1	**Planning**	2	6	5	60%
1.1	Preliminary Analysis	2	2	1	100%
1.2	System Analysis	2	2	1	100%
1.3	Produce Project Proposal	2	3	2	100%
1.4	Produce Project Plan	2	4	3	100%
1.5	Produce Quality Management Plan	3	4	2	0%
1.6	Produce Risk Management Plan	3	5	3	0%
1.7	Produce Change Manegement Plan	3	6	4	0%
1.8	Produce Configuration Management Plan	3	6	4	0%
2	**Requirement Analysis**	2	4	3	100%
2.1	Use Case Diagram and Description	2	4	3	100%
2.2	System Requirement Analysis	2	4	3	100%
3	**Design**	5	8	4	0%
3.1	Design UI/UX	5	6	2	0%
3.2	Database Schema	5	8	4	0%
3.3	Produce Test Plan	5	8	4	0%
3.4	Low Fidelity UI Prototype	5	7	3	0%
3.5	High Fidelity UI Prototype	8	10	3	0%
4	**Implementation and Testing**	11	16	6	0%
4.1	Application Prototype	11	13	3	0%
4.2	Alpha Testing	13	14	2	0%
4.3	Beta Tetsing	14	15	2	0%
4.4	Release Candidate	14	16	3	0%
5	**Deployment and Maintainance**	17	20	4	0%
5.1	Prepare Release Plan	17	20	4	0%
5.2	Offical Deployment of Application	17	20	4	0%
5.3	Maintainance	17	20	4	0%

Figure 3: Gantt chart for the project. The grey solid bars indicate the portions of the tasks that we have accomplished.

Deliverables

The users will be offered a fully functional mobile application, user guides and customer support service. Subsequently, enhanced versions for the mobile application will be released to upgrade the features and user experiences.

Budget

The proposed annual budget for the project is provided in the following table. Major portion of the budget is for the development team and the remaining portion is for the ongoing expenses which are calculated annually.

Item	Supplier	Quantity	Unit Price	Total
Project manager	-	1	$90,000.00	**$90,000.00**
Project team members	-	5	$36,000.00	**$180,000.00**
Market Research	NTU	-	$8,000.00	**$8,000.00**
BestTime API Subscription	BestTime	1	$4,800.00	**$4,800.00**
Hosting Server	Amazon	1	$30,000.00	**$30,000.00**
Database	MongoDB	1	$20,000.00	**$20,000.00**
			TOTAL	**$332,800.00**

Table 2: Requested items and funds for initial design.

Communication and Coordination with Sponsor

The project manager will be mainly responsible for the communication between the sponsors, and the development team. He will ensure that the development team delivers quality products that meet the requirements of the project within the proposed timeline.

Weekly meetings will be organised for the development team to share their progress with the team members and thereby, will produce a weekly report. The weekly report will be passed on to the client and sponsors through mail to update about the progress and targets for the following week.

Monthly meetings will be held between the project manager, and sponsors to present work till date and mainly, to restrain any sort of miscommunication. Team members may be required to attend monthly meetings to clarify any technical queries.

Team Qualifications

Das Atrik : Third Year Student in Computer Science with a Minor in Business. Has experience with projects involving ReactJS, AngularJS, Ruby On Rails and other web development frameworks. Possesses knowledge of Kotlin and Java for Android development. Has over 3 years of leadership experience demonstrated by leading teams to victory in hackathons.

Padhi Abhinandan : Penultimate Year student in Computer Science with a Minor in Business at Nanyang Technological University (NTU), Singapore, undertaking a specialization in Artificial Intelligence and Data Science. My technical skills include Deep Learning, Computer Vision, TensorFlow, programming with Python, Java, and C++, as well as Web and Mobile App development.

Chua Chong Hung, Kelvin : Second Year Student in Computer Science. Possess knowledge of several programming languages such as C, C++, Python, Java, JavaScript. Experienced in Front-end Website development frameworks like VueJs and ReactJs and Mobile App development like Flutter and Android Studio. Experienced in Back-end Server and Database like NodeJs, Express and MongoDB.

Chua Chong Wei, Melvin : Second Year Student in Computer Science. Possess knowledge of several programming languages such as C, C++, Python, Java, JavaScript. Experienced in Front-end Website development frameworks like VueJs and ReactJs and Mobile App development like Flutter and Android Studio. Experienced in Back-end Server and Database like NodeJs, Express and MongoDB.

Goh Hong Xiang, Bryan : Second Year Student in Computer Science. Possess knowledge of several programming languages such as C, C++, Python, Java, JavaScript. Experienced in Front-end Website development frameworks like ReactJs and Mobile App development like and Android Studio.

Rajuravi Vishal Raj : Final Year Student in Computer Science with a Double Minor in Business and Entrepreneurship. Possess knowledge of several programming languages such as C, Python, Java, JavaScript. Experienced in designing UI/UX and development frameworks like SprintBoot, Django.

Conclusion

As upstanding citizens of Singapore, we must adhere to the government attributed safe distancing measures while visiting public areas such as shopping malls and restaurants. Our application, Mall-E, ensures that users have adequate and accurate information regarding the crowd levels of malls and queue times of restaurants such that they can plan their outing better. This proposal includes the basic idea of the application and the technological as well as the business considerations of the app. This document aims to persuade our stakeholders to support us with finance, manpower and/or publicity regarding the development of the app.

References

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Appendix A:
Résumés of Team Members

Das Atrik's Resume

Name: ATRIK DAS | Mobile Number: 81214232 | Email: atrikdas@gmail.com | https://www.linkedin.com/in/atrik-das/

CAREER OBJECTIVES

Looking for a challenging role in an organization well-versed in the latest emergent technology to utilize my skills in Machine Learning, Artificial Intelligence and Web/App Development for the growth of the organization as well as to enhance my own expertise.

SKILLS

Programming skills: Python, Java, C, HTML/CSS, Full Stack Web languages, Android App Development, Ruby on Rails
Digital skills: Microsoft Office, Adobe Dreamweaver
Languages: Proficient in English and Hindi, conversant in Bengali

EDUCATION

Bachelor of Computer Science with a Minor in Business **Jul 2018 – Present**
Nanyang Technological University, Singapore

- Clubs: NTU Entrepreneurship Society, Open Source Society – Technical Director, Innovation Lab - Technical Interviews Mentor

IB Diploma **Apr 2016 – Apr 2018**
The International School, Bangalore

- Higher Level (HL) subjects: Math, Physics, Chemistry
- Graduated with a score of 41/45

INTERNSHIPS

FastLap **Jun 2020 – Aug 2020**
Software Engineer Intern

- Developed new features such as media sharing and ticket purchasing while also making improvements to existing features such as the race tracker and the dashboard of the FastLap website which is a portal for track aficionados to buy tickets for race events around the world
- Participated in the maintenance pipeline of the website by performing front-to-end QA testing and bug fixing

Appface Technologies Pvt Ltd **Jun 2017 – Aug 2017**
Software Engineer Intern

- Built a survey web app that can add, update and delete question types using AngularJS, HTML/CSS and JQuery
- Received a letter of recommendation and a bonus for completing more than my initial responsibility

IMR.SV **May 2017 – Aug 2017**
Lead Web Developer

- Built a website that can host 360 videos and photos using Python and JavaScript which is now being used to host pictures from 6 different events
- Collaborated with web designers to make sure the vision of our client is coded into reality

Padhi Abhinandan's Resume

ABHINANDAN PADHI

Email: abhinand001@e.ntu.edu.sg | LinkedIn: linkedin.com/in/abhinandan-padhi
GitHub: github.com/AbhinandanPadhi | Phone: +65 86612040

I am a penultimate year Computer Science undergraduate at Nanyang Technological University (NTU), Singapore, undertaking a specialization in Artificial Intelligence and Data Science. My technical skills include Deep Learning, especially Computer Vision using TensorFlow, programming with Java and C++, as well as web and app development. I am seeking roles that allow me to contribute my technical skills and apply them to real-world problems.

EDUCATION

Nanyang Technological University, Singapore

- *Bachelor of Engineering (B.Eng.) Computer Science, with a Minor in Business*
- Year 3, Expected Graduation: August 2022
- Relevant Coursework: Neural Networks & Deep Learning, Computer Vision, Software Engineering, Algorithms, Data Structures, Fundamentals of Management, Business Finance.

NPS International School, Singapore

- *International Baccalaureate (IB) Diploma:* 40/45 points – June 2018
- *IGCSE (Cambridge International Examinations):* 8 A*, 3 A – June 2016
- *Outstanding Cambridge Learner Award* – ***Top in the World (100%)****:* for having gained the highest marks in the world for Cambridge IGCSE Mathematics – 2015

SKILLS

Python 3	Advanced
Machine Learning	Advanced
Deep Learning: TensorFlow 2 & Keras	Intermediate
Data Science & Analytics	Intermediate
Programming: Java, C, C++, SQL	Intermediate
Algorithms & Data Structures	Advanced
Web Development: HTML5, CSS3, JavaScript (ES6)	Advanced
MEAN stack (MongoDB, Express.js, Angular.js, Node.js) & React.js	Intermediate
Mobile App Development – Flutter	Intermediate

SELECTED PROJECTS

Fine-Grained Car Classification on Stanford Cars Dataset

- Fine-grained classification is the task of identifying the exact makes and models of cars in images – a tricky task for conventional CNNs due to similarity in design and structure between modern cars.
- Developed custom Inception V3 and ResNet50 CNN architectures by adding and modifying layers in the networks, including image pre-processing and augmentation layers, regularization layers, and top fully connected layers.
- Fine-tuned the models using a grid-search of different hyperparameters (optimizers, learning rate, regularization).

CarMap – Flutter App for iOS and Android

- Collaborated with six-student team to create an app to provide real-time parking lot data to users.
- Implemented a minimalist cross-platform UI in Flutter based on low fidelity design mock-ups.
- Government API and Google Maps API were used to present parking lot data (in real-time) in list and map views.
- Incorporated MVC architecture to structure the project and to allow for parallel development.
- Documented each stage of SDLC in our Software Requirements Specification.

Chua Chong Wei Melvin's Resume

CHUA CHONG WEI MELVIN
684C Woodlands Drive 62 #06-161 Singapore 733684
(+65) 9782 4096
CHUA0946@e.ntu.edu.sg

INTERNSHIP EXPERIENCE

Professional Internship as a Full Stack Developer **May 2020 – June 2020 (2 Months)**
Ectivise Solutions Pte Ltd

- Design and create multiple Websites and a Dashboard for their Clients using VueJs, HTML, CSS, JavaScript, Sass and Component Libraries such as BootStrap, Vuetify and Element UI.
- Using NodeJs and co-developed RestAPI that can collect and collate all the Wireless Speed Test results in MongoDB
- Integrate the Backend and Frontend so that the frontend can show all the history and Analysis of all Wireless Speed Test results in the hotel

NTU-UBC Research Centre of Excellence **July 2015 (2 Weeks)**
in Active Living for the Elderly (LILY)

- Analyze and design a functional product to empower the Elderly under the mentorship of Research Engineer
- Leverage on Java programming language to support the centre in their mobile application projects

"During this period, Melvin Chua, displayed creativity and good analytical skils in the completion of the design tasks allocated. After completing the allocated tasks ahead of time, Melvin Chua went above and beyond what was required, and attempted to implement a prototype of the system. Such initiative is to be highly commended."

Letter of Commendation by Research Engineer Manager Benny Tan.

EDUCATION

Nanyang Technological University **Aug 2019 – Present**
Bachelor of Engineering
(Computer Science Year 2)

- current CGPA: 4.62/5.00 (First Class)

CO-CURRICULAR ACTIVITIES

Robotics Club (Nanyang Junior College) **Jan 2015 – Dec 2016**
(Training-Manager)

- Led a team of 3 and secured Third Place in National Junior Robotics Competition (NJRC)
- Represented Team Singapore in World Robo Olympiad (WRO) in Doha, Qatar in 2018
- Organize and coordinated Training event to help students with no background in Robotics

Robotics Enterprise (Admiralty Secondary School) **Jan 2010 – Dec 2014**
(President)

- Managed and hosted National Robotics Programming Competition in Admiralty Secondary School, participated by 20 Secondary Schools and 100 participating students
- Completed in multiple Robotics Competitions such as National Junior Robotics Competition, Robo-Cup, RoboMasters, Vex Robotics Competition and First Lego League

Outward Bound Singapore
(Volunteer Leader)

- Volunteered as Alumni Leader at OBS Project Island-A-Hand and Led a group of 20 students to perform a coastal cleanup along the coast of Pulau Ubin, and collected 25,000 pieces of trash
- Attended 5 Day Leadership Camp during secondary school and expanded my team working skills and leadership qualities

SKILLS

Technical

- Strong co-ordination skills and great team working skills
- Critical technical evaluation as well as troubleshooting skills
- Experience in working in a high-pressured environment and in a team

Software

- Proficient in Programing Software (Python, C, Jupyter Notebook, Java)
- Proficient in Frontend Software (HTML, CSS, JavaScript, VueJs, Sass)
- Proficient in Backend Software (MongoDB, NodeJs, MySQL)

Chua Chong Hung Kelvin's Resume

Kelvin Chua Chong Hung | **Mobile No.: 97824058**
Email: chua0945@e.ntu.edu.com

EDUCATION

Nanyang Technological University, Singapore
Bachelor of Computer Science (currently Year 2)

- Honours (Distinction), Current CGPA: 4.37/5.00

INTERNSHIPS

Ectivise Solutions Ptd Ltd May 2020 – Jun 2020

Develop an app to monitor all the networks in a hotel

- Developed a RESTful API using Node JS and Express JS framework for backend
- Integrated the REST API with MongoIDB for database
- Used Android Studio for app development

Eye of Truth Work Study Project Dec 2020 – Jan 2021

Developed an Android App that communicate with a Glucometer

- used Android Studio for app development
- worked with communication with USB devices

ACADEMIC PROJECT

Nanyang Technological University, Singapore

Year 1 Sem 1 Intro for Computing Project – Designed a User interface for ordering food Aug 2018 – Nov 2019

- Developed a GUI interface using Python for users to browse through menus of the food across all canteens in NTU
- Lead the group in both the programming and designing of the interface. Manage tasks by delegating the things needed to be done among group member and able to meet the tight deadline for the project

CO-CURRICULAR ACTIVITIES

Represented Singapore at World Robo Olympiad in Doha, Qatar Nov 2017 – Dec 2017

- One of the 7 candidates selected
- Program the robot to complete the mission despite very short timeline
- Clinched the top ten position for Robot Performance

Achieved 2nd runners up in National Junior Robotics Competition Mar 2017 – July 2017

- Was the main builder and programmer for the team
- To build and program a robot that could carry different coloured boxes to their respective coloured mountains
- Found the most effective and efficient robot design by testing different methods
- Managed to clinch the 2nd runners up in the tertiary division

Vice President of Robotics Club (Nanyang Junior College) Mar 2017 – Feb 2018

- Taught new fellow club members about robotics on how to build a robust robot design and efficient Lego Mindstorms programming
- Club members feedbacked that they had an enriching experience with robotics and gained new interests in mechanical and software engineering

Community service at PAP Community Foundation Kindergarten Feb 2019 – Mar 2019

- Our club initiated to teach kindergarten kids about technology and its uses on our present world
- Structured the curriculum that made it more interesting and engaging by incorporating the use of our Lego robots
- Taught them how to build and program remote controlled robots

SKILLS

- Strong co-ordination skills and great team working skills
- Critical technical evaluation as well as troubleshooting skills
- Experience in working in a high-pressured environment and in a team
- Languages: Proficient in English and Chinese
- Digital Skills: C, Java, Python, Java Script, Node JS, HTML, CSS, UI UX design, currently learning Flutter

Goh Hong Xiang, Bryan's Resume

Goh Hong Xiang, Bryan | **Mobile No: 9690 7321** | **Email: bgoh015@e.ntu.edu.sg**

INTERNSHIP

Dreamcloud Nov 2020 – Jan 2020
Software Developer Intern
- Software Testing and Software Testing Scripting
- Exposure to Outsystems and Agile / Waterfall software methodology

EDUCATION

Yishun Junior College Jan 2015 – Dec 2016
GCE A' Level Certificate

Nanyang Technological University, Singapore Aug 2019 – Present
Bachelor of Engineering (Computer Science) Current GPA 4.08/5

ACADEMIC PROJECTS / PROJECTS

Human-Computer Interaction Project Jan 2020 – Apr 2020
- Learnt important principles and guidelines of designing user interface.
- Designed a lo-fi prototype for an asynchronous collaborative discussion platform, which allows for easier referencing of multiple past posts.
- Refined the lo-fi prototype and created a hi-fi prototype using Microsoft PowerPoint.

Full-Stack Software Development
- Coded and Designed an application using Flutter(Front-End) and Firebase(Back-End) which serve to find the best location for shop owners to run their business at.

Game Developer
- Worked with UBS to create a game to create awareness for cyber-security.

WORK EXPERIENCE

CPF Nov 2018 – Dec 2018
Administrative Assistant Jun 2020 – Jul 2020
- Duties include data entry, filing, scanning and ad-hoc duties
- Duties include distribution of workload to staff and running of company's macro files.

SGX Jan 2019 – May 2019
Administrative Assistant
- Duties include data entry of customers portfolio, filing, scanning and ad-hoc duties
- Basic customer service duties include handling customers' complaints and drafting letters to be mailed to customers
- Involved in AML (Anti-Money Laundering)

CO-CURRICULAR ACTIVITIES

ODAC (Yishun Junior College) Jun 2015 – Jun 2016
Logistics Officer
- Managed and organised CCA sessions which includes liaising with external vendors to organise major events like Rock-Climbing to allow members to get their one-star Rock-Climbing certificate
- Managed the logistics flow in the storeroom and be meticulous such that logistics matches logbook.
- Planned for a national event ATC (Adventure Trail Challenge) along with the team members
- Duties include brainstorming, logistics flow and proposal writing

Freshmen Orientation Camp Jul 2020 – Aug 2020
Group Leader
- Planned camp activities for about 200 freshmen to encourage interaction and bonding
- Trained 30 camp volunteers on facilitation skills during a half day workshop to enhance ability to carry out camp activities safely

SKILLS

Languages: Proficient in English and Chinese / Basic Korean Reading and Speaking
Digital Skills: Python, C, C++, Java, Flutter, Firebase, SQL, Unity, Microsoft Office, Excel, Words

Rajuravi Vishal Raj's Resume

VISHAL RAJ

vishalra001@e.ntu.edu.sg | (+65) 8425 0250
LinkedIn : www.linkedin.com/in/vishalraj23

EDUCATION

NANYANG TECHNOLOGICAL UNIVERSITY, SINGAPORE
BEng in Computer Science
Double Minor in Business and Psychology
Expected graduation in Dec 2021
Accelerated Bachelors Program

OUR OWN ENGLISH HIGH SCHOOL, SHARJAH
Grad. June 2018 | Sharjah, UAE.
CBSE 12th Percentage : 95 %
CBSE 10th CGPA : 10

SKILLS

PROGRAMMING & IT
Coursework :
• Python • Pandas • SQL • JavaScript •
• HTML • CSS • C • InVision • Figma •
• Flutter • Android SDK • Java • Canva •
• MS Office • WordPress • MailChimp •

NON - TECHNICAL
• Inter-Personal • Problem Solving •
• Leadership • Analytical • Resilience •
•Critical Thinking • Avid Learner •

Languages :
• English • Tamil • Hindi • Arabic •
• Malayalam • Telugu •

POSITIONS

NTU CRICKET TEAM
Captain

NTU INDIAN DANCE
Co-founder & Choreographer

ENTREPRENEURSHIP SOCIETY
Technical Director

NTU MODEL UNITED NATIONS
Operations Director

NTU TAMIL LITERARY SOCIETY
Business Committee

COURSEWORK

• Consumer Neuroscience
• Fifty Inventions, Fifty Discoveries
• Business Finance
• Marketing in 21st Century

INTERESTS

• Psychology • Philosophy • Chess •
• Entrepreneurship • Reading • Art •

EXPERIENCE

SOFTWARE DEVELOPER | PART-TIME INTERN
AUG 2019 - OCT 2019 | OMNIAZ
- Optimizing bottle detection model in TensorFlow by applying concepts of Machine Learning and Neural Network.
- Working extensively with CTO European team in developing innovative features for the DRNK mobile application and scaling the business.

IT SYSTEM ENGINEER | INTERN
MAY 2019 - JULY 2019 | NATIONAL OILWELL VARCO PTE LTD
- Created an automated Emailing Application using Python to send over 50 mails simultaneously to clients
- Configured, tested and maintained system management tools & application software. Provided 2nd and 3rd level technical support and troubleshooting

STUDENT RESEARCH ASSISTANT |
JUL 2019 - AUG 2019 | NTU SINGAPORE
- Assisted in building an indoor navigation application for NTU Campus using Wifi-Signals aided by graph theory algorithm based on the field data collected.

EPIC AMBASSADOR | ACTION COMMUNITY FOR ENTREPRENEURSHIP
JUL 2019 - AUG 2019 | NTU SINGAPORE
- Being an influencer to reach out to the community and startups to participate in the showcase, marketing and publicising the event.

PROJECTS

POLLUT X
JAN 2020 - PRESENT | SOFTWARE ENGINEERING PROJECT
- Developing an app using Flutter to exhibit & predict pollutant levels (PSI, PM2.5 & UVI) using real-time APIs provided by Singapore government

GITLANCE
JUN 2019 - AUG 2019 | DBS PARADIGM SHIFT 2019
- Created a web application & chrome extension that integrates GitHub Issues repository to facilitate freelance jobs and developed a code testing mechanism to analysis the work submitted

DIGITAL IDENTITY
NOV 2018 | SINGAPORE-INDIA HACKATHON 2018
- Placed among top 15 teams in Singapore
- Programmed a smart solution to unify digital identity for effective communication & tracking attendance during event registration

BANDERSNATCH SIMULATOR
JAN 2019 | NUS HACK & ROLL 2019
- Created a Python program to replicate the Netflix Movie Bandersnatch, enabling the user to choose a continuation for the story with multiple endings

CANTEEN RECOMMENDATION SYSTEM
OCT 2018 - NOV 2018 | UNIVERSITY COURSE PROJECT
- Suggested the best canteen by sorting travel distance and ranking canteens based on user's food preference & location and proposed the ideal bus route